**COUNCIL OF
HIGHER SECONDARY EDUCATION
ODISHA, BHUBANESWAR**

COURSES OF STUDIES
IN
SCIENCE STREAM

**FOR THE
HIGHER SECONDARY EXAMINATION
2014 AD**

CONTENTS

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(a)

SCHEME OF STUDIES

The following combinations in Science Stream are allowed. Any deviation of this will not be entertained.

Compulsory Subjects

Compulsory subjects English and M.I.L. carry 200 marks each

(100 Marks in 1st year and 100 marks in 2nd year)

English

M.I.L. (Oriya / Telugu/ Bengali/ Urdu & Persian/ Hindi/ Sanskrit/Alternative English)

Environmental Education (Compulsory) 100 marks

The Environmental Education will be assessed at the college level for 100 marks (70 marks for theory and 30 marks for project work) at the end of 1st year +2 course and the grades (A+, A, B, C, D, in order of merit) are to be awarded by the College and the same shall be recorded in the body of the pass certificate given by the council subsequently. The grade secured in the Environmental Education (EE) will not affect the result of the candidate.

Marks	Grade
70% and above	Gr A+
60% to 69%	Gr A
50% to 59%	Gr B
35% to 49%	Gr C
Below 35%	Gr D

Elective Subjects

Each elective subject carries 200 marks

(100 marks in 1st year and 100 marks in 2nd year)

1. Physics
2. Chemistry

A student shall have to offer any four Elective Subjects out of the following groups as 3rd and 4th elective. Group - A for 3rd and 4th elective subject and Group B for 4th Elective.

Group - A Mathematics / Biology / Geology (can be opted as either 3rd or 4rth elective subject (one in each core).

Group - B Electronics/Statistics/Geography/Computer Science/ Information Technology/Biotechnology/ Economics/Sanskrit (can be opted as 4th Elective Subject only)

(b)

INTRODUCTION TO NEW COURSE STRUCTURE & DISTRIBUTION OF MARKS IN SUBJECT,

HAVING PRACTICALS

With the introduction of the New Course structure from the academic session 2008-09 basically to de-stress the students joining +2 courses under the CHSE, Orissa, there will be yearly examinations at the end of 1st year and 2nd year classes. 1st year and 2nd year courses have been separated accordingly. The 1st Year examination will be conducted at the college / H.S. School level for 100 marks in each subject and the 2nd year examination will be conducted at the Council level for 100 marks in each subject. Marks secured in the 1st year examiantion shall be considered only for promotion of students to the 2nd year class and will have no bearing on the terminal examiantion, conducted by the Council at the end of the 2nd year.

Pass certificates will be awarded to successful candidates basing on the performance in the Council examination at the end of the 2nd year only.

Restriction on selection of elective subjects is a new feature in the present course structure. Each student has to read four elective subjects in addition to the compulsory subjects i.e. English, M.I.L. and Environmental Education.

The Distribution of marks for subjects with practicals will be as follows :

DISTRIBUTION OF MARKS IN SUBJECT WITH PRACTICAL

FOR H.S EXAMINATION 2013 & 2014 ONWARDS.

Total Marks-100   **Theory - 70 Marks**

                                       Practical- 30 Marks

Theory

Group-A   Objective Type Compulsory

Q.1 Multiple choice   1 mark each x 10 =10 marks

      (from all units)

Q.2 One word answer /   1 mark each x 10 =10 marks

      Very short answer/

      Correct the sentence /

      Fill up the blanks

Group B   (Short type Answer)

Q.3 Answer within Two/three   2 mark each x 10 =20 marks

      sentences

      (out of 12 bits, one has to

      answer 10 bits)

Q4. Answer within six sentences   3 mark each x 3 =09 marks

      (Out of five bits, one

       has to answer three bits)

(c)

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Group C   (Long Type Answer)

Q5. to   Out of six Questions from all units

to Q7. one has to answer

      3 questions- unitwise 7 mark each x 3 = 21 marks

DISTRIBUTION OF MARKS IN BIOLOGY FOR H.S EXAMINATION-2013

    Theory Botany - 35 marks, Practical -15 marks

    Theory Zoology - 35 marks, Practical -15 marks

Group - A: Objective Type Compulsory

1.	Multiple choice / One word answer	1 marks each x 5 = 5 marks
2.	Correct the sentences / Fill up the blanks	1 marks each x 4 = 4 marks

Group - B: Short Answer Type

3.   Answer within two / three sentences   2 marks each x 4 = 8 marks

    (Out of 8 bits - one has to answer 5 bits)

4.   Short answer type II Two bits to be answer

    from 4 bits each carry 3 marks answer with

    5 sentence with diagram.   3 marks each x 2 = 6 marks

Group - C: Long Answer Type

5.   Out of 4 questions from all units,

    one has to answer 2 questions   6 marks each x 2 = **12** marks

DISTRIBUTION OF MARKS IN SUBJECT WITH OUT PRACTICAL FOR H.S EXAMINATION-2013 & ONWARDS.   (Total Marks-100)

Group A   (Objective type - Compulsory)

Q.1 Multiple choice (from all units)   1 mark each x 15 =15 marks

Q.2 One word answer /

    Very short answer/

    correct the sentence /

    filling up the blanks   1 mark each x 15 =15 marks

Group B   (Short type Answer)

Q.3 Answer within Two/three   2 mark each x 11 =22 marks

    sentences

    (out of 14 bits, one has to answer 11 bits)

Q4. Answer within six sentences   3 mark each x 6 =18 marks

    (Out of eight bits, one has to answer six bits)

Group C   (Long answer type)

Q5.   Out of six Questions from 7.5 mark each x 4 = 30 marks

to Q10. all units, one has to

    answer 4 questions

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<div align="center">(d)</div>

Syllabus for Higher Secondary Education in English

(for ARTS, SCIENCE, and COMMERCE)

        Higher Secondary education for a large number of students is a preparation for the University, where a fairly high degree of proficiency in English language and literature is necessary. For another large and significant group, the higher secondary education is a preparation for entry into professional education.   This Course, therefore, is designed to   cater to both the groups by promoting higher skills of thinking as well as language skills required for academic study and for the workplace. In this sense, this syllabus is learner-centred or need-centred.

        It is expected that students have acquired the basic language skills in English by the time they come to the First Year of the +2 class. It is necessary that by the end of +2 they should   be equipped with adequate linguistic competence to comprehend and appreciate texts, and express themselves in clear and grammatical English using appropriate punctuation and cohesive devices. The aim of this syllabus, therefore, is to hone all the language skills (L-S-R-W) of the students.

        Instructional Materials consist of 4 textbooks : (a) Invitation to English-I (New Edition), which includes non fictional prose pieces and poems, for intensive study (b) Invitation to English-II (New Edition), which includes genres like short fiction, one-act play and biography/autobiography for extensive study, (c) Invitation to English -3, a Work Book for developing writing skills, and (d) Invitation to English -4, a Work Book for grammatical exercises.

        The present syllabus envisages a lot of teacher-pupil interaction. While dealing with texts for both intensive and extensive study, teachers should encourage group activity in the classroom   for 'Pre-reading', 'While-reading', and 'Post-reading activities'. They should be careful not to put any question to an individual student but to a group of 3 - 4 students encouraging one of them to give the answer with the feedback he/she gets from the group so that none of the students shall feel diffident to interact. As Invitation to English -3 and   Invitation to English - 4 are Work Books, they should be worked out in the class-room.

        The Scheme of Evaluation, at the end of the syllabus, specifies the allocation of marks for each skill. It should be noted that texts prescribed for detailed as well as non-detailed study have been allotted only 60 marks out of total 200. It would be appropriate, therefore, to devote the bulk of classroom time to Invitation to English -3, and   Invitation to English -4,

INSTRUCTIONAL METERIALS FOR THE HIGHER SECONDARY CLASSES (ARTS/SCIENCE/COMMERCE)

1.   For Intensive Reading: An anthology of non-fictional prose pieces and poems

Book prescribed: Invitation to English-I (New Edition, 2012)

Published by Odisha Sate Bureau of Text Book Preparation and Production, Bhubaneswar.

Pieces to be studied in the 1st year

A. Prose:

i.	Standing Up for Yourself	Yevgeny Yevtushenko
ii.	The Legend behind a Legend	Hariharan Balakrishnan
iii.	The Golden Touch	Nathaniel Hawthorne
iv.	In London In Minus Fours	Louis Fischer
v.	The Cancer Fight, from Hiroshima to Houston	Ritsuko Komaki

B. Poems:

i.	Stopping by Woods on a Snowy Evening	Robert Frost
ii.	Oft, in the Stilly Night	Thomas Moore
iii.	The Inchcape Rock	Robert Southey
iv.	To My True Friend	Elizabeth Pinard
v.	Fishing	Gopa Ranjan Mishra

Pieces to be studied in the 2nd year

A. Prose:

i.	My Greatest Olympic Prize	Jesse Owens
ii.	On Examinations	Winston S. Churchill
iii.	The Portrait of a Lady	Khushwant Singh
iv.	The Magic of Teamwork	Sam Pitroda
v.	Development of Polio Vaccines	Bonnie A. M. Okonek and Linda Morganstein

B. Poems:

i.	Daffodils	William Wordsworth
ii.	The Ballad of Father Gilligan	William Butler Yeats
iii.	A Psalm of Life	Henry Wadsworth Longfellow
iv.	Television	Roald Dahl
v.	Money Madness	D.H. Lawrence

2. For Extensive Reading:

A collection of short stories, short plays, excerpts from biographies or autobiographies for non- detailed study

Book Prescribed: Invitation to English-II (New Edition)

Published by Orissa State Bureau of Text Book Preparation and Production, Bhubaneswar

Pieces to be studies in the 1st year

i.	Three Questions	Leo Tolstoy
ii.	After Twenty Years	O. Henry
iii.	The Open Window	Saki
iv.	The One and only Houdini	Robert Lado
v.	Childhood	Jawaharlal Nehru
vi.	Marriage	Dr. Rajendra Prasad

Pieces to be studied in the 2nd Year

i.	The Doctor's Word	R K Narayan
ii.	The Nightingale and the Rose	Oscar Wilde
iii.	Mystery of the Missing Cap	Manoj Das
iv.	The Monkey's Paw	W.W Jacobs
v.	My Mother	Charlie Chaplin
vi.	Stay Hungry. Stay Fit.	Steve Jobs

3.   Writing Skills:

A Work-Book on writing designed to provide practice in different forms of writing and develop the different skills of writing as specified in the syllabus.

Book Prescribed:

Invitation to English - 3

Published by Odisha State Bureau of Textbook Preparation and Production, Bhubaneswar.

Units to be studied in the 1st Year

I.   Writing a Paragraph

II.   Developing Ideas into Paragraphs

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III.   Writing Personal Letters and Notes

IV.   Writing Applications, Official Letters and Business letters

V.   Writing Telegrams, E-mails, Personal Advertisements and Short Notices

VI.   Using Graphics

Units to be studied in the 2nd year

VII. Interpreting Graph, Charts Tables and diagrams etc

VIII. Reporting Events and Business Matters

IX. Note-making and summarizing

X. Extended Writing:

4. Grammar:

A Work Book of Grammar is designed to provide practice in the use of selected grammatical items, in meaningful contexts

Book prescribed:

Invitation to English - 4

Published by Odisha State Bureau of Textbook Preparation and Production, Bhubaneswar.

Units to be studied in the 1st Year

I.   Countable and Uncountable Nouns

II.   Tense Patterns

III.   Modal Verbs

IV.   Prepositions

V.   The Imperatives

 Units to be studied in the 2nd year

I.   Revision of 'Tense Pattern's' and 'Modal verbs'

II.   Conditionals

III.   The Passive

IV.   Direct and Reported Speech

V.   Interrogatives

VI.   Phrasal Verbs

SCHEME OF EVALUATION

There shall be two papers in English – English Paper I and English Paper II – each carrying 100 marks. A written examination for English Paper I shall be conducted by the colleges at the end of the First Year. A written examination for English Paper II shall be conducted by the CHSE, Odisha at the end of the Second Year   to test the skills of reading and writing as well as the ability to use grammar in context.

Paper -I (To be evaluated at the College Level)

1. Reading Comprehension

(a) Prescribed Prose Pieces. (5 questions to be answered, each carrying 2 marks)	10 marks
(b) Prescribed Poems (5 questions to be answered each carrying 2 marks)	10 marks
(c) Prescribed Extensive Reading Texts (2 questions to be answered carrying 5 marks each; only global, inferential and evaluative questions to be set)	10 marks

2. Reading - related skills

(a) Vocabulary skills	5 marks
(b) Information Transfer (Converting verbal information to non-verbal forms, such as diagrams, charts and tables)	5 marks
(c) Reordering/sequencing sentences	5 marks
(d) Dictionary/Reference skills (2 marks on using a dictionary, and 3 marks meanings of a word)	5 marks
e) Cohesive Devices	5 marks

3. Writing skills

a) Letter Writing (personal/official/commercial: Word limit: 150)	10 marks
b) Description of object/event /process (Word limit: 1.50)	10 marks
c) Slogan/telegram/caption writing (Word limit: 10)	5 marks

4. Grammar in context   10 marks

5. Translation/story-developing   10 marks

Total: 100 Marks

Paper -II (To be evaluated by the CHSE, ODISHA

1. Reading Comprehension

(a) Prescribed prose Pieces

(5 questions to be answered carrying 2 marks each)   10 marks

(b) Prescribed Poems

(5 questions to be answered carrying 2 marks each)   10 marks

(c) Prescribed Extensive Reading Texts   10 marks

(2 questions to be answered carrying 5 marks each,

 only global, inferential and evaluative questions

to be set on a passage of about 250 words)   10 marks

(d) Unseen Prose passage 10 marks

(5 questions including inferential ones, carrying 2 marks each)   10 marks

2. Reading- related skills

a) Vocabulary skills (to be tested on the unseen passage)   5 marks

b) Information transfer (70 words)

 (Converting non-verbal information into verbal form)   5 marks

c) Dictionary/Reference skills   5 marks

3. Writing skills

(a) Report writing (200 words)   10 marks

(b) Guided Note making on a given passage   7 marks

(c) Summarizing on the same passage   8 marks

(d) Essay writing (250 words - on given outlines)   10 marks

4. Grammar in context   10 marks

Total: 100 Marks

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M.I.L (ODIA)
ଆଧୁନିକ ଭାରତୀୟ ଭାଷା (ବାଧତାମୂଳକ) – ଓଡ଼ିଆ
କଳା/ ବିଜ୍ଞାନ/ ବାଣିଜ୍ୟ ସ୍ରୋତ ନିମନ୍ତେ
ପ୍ରଥମ ବର୍ଷ – ସାହିତ୍ୟ ସରଣୀ – ୧ ମ ଭାଗ

ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା – ୧୦୦   ସମୟ – ୩ ଘଣ୍ଟା

ପିରିଅଡ଼ ସଂଖ୍ୟା – ସାପ୍ତାହିକ – ୫ (ବାର୍ଷିକ – ୮୦)

ପ୍ରଥମ ଏକକ – ଗଦ୍ୟ (୨୦ ପିରିଅଡ଼)   ୨୫ ନମ୍ବର

    ୧. ଅସୁର ଦାଘି – ଫକୀର ମୋହନ ସେନାପତି

    ୨. ମୋ ସମୟର ଭାରତ ଓ ଓଡ଼ିଶା – ଡ. କୃଷ୍ଟଚନ୍ଦ୍ର ପାଣିଗ୍ରାହୀ

    ୩. ଆମେରିକାର ବିଶ୍ୱବିଦ୍ୟାଳୟମାନେ – ହୃଦାନନ୍ଦ ରାୟ

    ୪. ଜୈବ ଭାସ୍ୱର୍ଯ୍ୟର ଅନୁପମ ବିଦ୍ୱାଣୀ ଜିନ୍ – ଶୈଳେଶ୍ୱର ନଦ

➤ ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➤ ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୩x୨=୬ ନମ୍ବର

➤ ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୨x୨=୪ ନମ୍ବର

➤ ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୧x୨=୨ ନମ୍ବର

➤ ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଏଁ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧ୍ୟରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ
    ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।
    ଏହାର ମୂଲ୍ୟ ୧x୫=୫ ନମ୍ବର

ଦ୍ୱିତୀୟ ଏକକ – ପଦ୍ୟ (୨୦ ପିରିଅଡ଼)   ୨୫ ନମ୍ବର

    ୧. ସତ୍ୟ ଆମ କଥା – ସାରଳା ଦାସ

    ୨. ଛାଟ ପକାଇ କଲେ ଚିତ୍ତା – ଜଗନ୍ନାଥ ଦାସ

    ୩. ସରସୀରେ ରାଜକନ୍ୟା – କବି ସମ୍ରାଟ ଉପେନ୍ଦ୍ରଭଞ୍ଜ

    ୪. ଗଲାଣିତ ଗଲାକଥା – କବି ସୂର୍ଯ୍ୟ ବଳଦେବ ରଥ

    ୫. ସତ୍ୟରେ ମରିବି ସତ୍ୟରେ ତରିବି, ଭୀମ ଭୋଇ ।

➤ ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➤ ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୩x୨=୬ ନମ୍ବର

➤ ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୨x୨=୪ ନମ୍ବର

➤ ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
    ଏହାର ମୂଲ୍ୟ ୧x୨=୨ ନମ୍ବର

➤ ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଏଁ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧ୍ୟରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ

ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।

ଏହାର ମୂଲ୍ୟ ୧X୫=୫ ନମ୍ବର

ତୃତୀୟ ଏକକ – ଏକାଙ୍କିକା (୨୦ ପିରିଅଡ) ୨୫ ନମ୍ବର

୧. ଦୂର ପାହାଡ – ପ୍ରାଣବନ୍ଧୁ କର

୨. ମକଦ୍ଦମା – ଗୋପାଳ ଛୋଟରାୟ

୩. ଛଦ୍ମବେଶୀ – ବିଶ୍ୱଜିତ୍ ଦାସ

➤ ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➤ ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

ଏହାର ମୂଲ୍ୟ ୩X୨=୬ ନମ୍ବର

➤ ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

ଏହାର ମୂଲ୍ୟ ୨X୨=୪ ନମ୍ବର

➤ ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

ଏହାର ମୂଲ୍ୟ ୧X୨=୨ ନମ୍ବର

➤ ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଏଁ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧ୍ୟରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।

ଏହାର ମୂଲ୍ୟ ୧X୫=୫ ନମ୍ବର

ଚତୁର୍ଥ ଏକକ – ବ୍ୟାକରଣ (୨୦ ପିରିଅଡ) ୨୫ ନମ୍ବର

୧. ପ୍ରବନ୍ଧ ରଚନା / ଭାବ ସଂପ୍ରସାରଣ

୨. ରୂଢ଼ି ପ୍ରୟୋଗ

୩. ପଦ ନିର୍ଣ୍ଣୟ

➤ ଏହି ଏକକରୁ ପ୍ରବନ୍ଧରଚନା ଅଥବା ଭାବସଂପ୍ରସାରଣରେ ୨ଟି ପ୍ରଶ୍ନ ଆସିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦ ମଧ୍ୟରେ ଦେବାକୁ ହେବ

ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➤ ରୂଢ଼ି ପ୍ରୟୋଗରୁ ୮ଟି ପ୍ରଶ୍ନ ଆସିବ । ସେଥିରୁ ୫ ଟିର ଉତ୍ତର ଦେବାକୁ ହେବ । ପ୍ରତ୍ୟେକ ରୂଢ଼ିର ଅର୍ଥ ନିର୍ଣ୍ଣୟ ପାଇଁ ୧ ନମ୍ବର ଓ ବାକ୍ୟରେ ପ୍ରୟୋଗ ପାଇଁ ୧ ନମ୍ବର ରହିବ ।

ଏହାର ମୂଲ୍ୟ – ୨X୫=୧୦ ନମ୍ବର

➤ ପଦ ନିର୍ଣ୍ଣୟ ପାଇଁ ଏକ ଗଦ୍ୟ ଅନୁଚ୍ଛେଦ ଦିଆଯିବ । ସେଥିରେ ବ୍ୟବହୃତ ୧୦ଟି ରେଖାଙ୍କିତ ପଦରୁ ୭ଟିକୁ ଚିହ୍ନାଇ ଦେବାକୁ ହେବ ।

ଏହାର ମୂଲ୍ୟ – ୧X୭=୭ ନମ୍ବର

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ଆଧୁନିକ ଭାରତୀୟ ଭାଷା (ବାଧତାମୂଳକ) – ଓଡ଼ିଆ

କଳା/ ବିଜ୍ଞାନ/ ବାଣିଜ୍ୟ ସ୍ରୋତ ନିମନ୍ତେ

ଦ୍ୱିତୀୟ– ସାହିତ୍ୟ ସରଣୀ – ୨ ୟ ଭାଗ

ପୂର୍ଣ୍ଣ ସଂଖ୍ୟା – ୧୦୦   ସମୟ – ୩ ଘଣ୍ଟା

ପିରିଅଡ ସଂଖ୍ୟା – ସାପ୍ତାହିକ – ୫ (ବାର୍ଷିକ – ୮୦)

ପ୍ରଥମ ଏକକ – ଗଦ୍ୟ (୨୦ ପିରିଅଡ)   ୨୫ ନମ୍ବର

    ୧. ଜାତୀୟ ଜୀବନରେ ସାହିତ୍ୟର ସ୍ଥାନ – ବିଶ୍ୱନାଥ କର

    ୨. କ୍ଷମା – ମାୟାଧର ମାନସିଂହ

    ୩. ଭୁଲ – ଭୁବନେଶ୍ୱର ବେହେରା

    ୪. ଜାତିର ଜୀବନ ଓ ସଂସ୍କୃତି – ଗୋଲୋକ ବିହାରୀ ଧଳ

➢   ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➢   ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୩**x**୨=୬ ନମ୍ବର

➢   ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୨**x**୨=୪ ନମ୍ବର

➢   ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୧**x**୨=୨ ନମ୍ବର

➢   ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଁୟ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧ୍ୟରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।

    ଏହାର ମୂଲ୍ୟ ୧**x**୫=୫ ନମ୍ବର

ଦ୍ୱିତୀୟ ଏକକ – ପଦ୍ୟ (୨୦ ପିରିଅଡ)   ୨୫ ନମ୍ବର

    ୧. ଚନ୍ଦ୍ରଭାଗା – ରାଧାନାଥ ରାୟ

    ୨. ସ୍ଥୁଳ କଳେବର ନୁହଇ ଅମର – ଗଙ୍ଗାଧର ମେହେର

    ୩. ଧର୍ମପଦର ଆମୂଲିପି – ଗୋପବନ୍ଧୁ ଦାସ

    ୪. ଗ୍ରାମ ଶ୍ମଶାନ – ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ

    ୫. ବିଶ୍ୱଜୀବନ ପଥେ – ରାଧାମୋହନ ଗଡ଼ନାୟକ

➢   ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➢   ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୩**x**୨=୬ ନମ୍ବର

➢   ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୨**x**୨=୪ ନମ୍ବର

➢   ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।

    ଏହାର ମୂଲ୍ୟ ୧**x**୨=୨ ନମ୍ବର

➢   ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଁୟ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧ୍ୟରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ

ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।

ଏହାର ମୂଲ୍ୟ ୧×୫=୫ ନମ୍ବର

ତୃତୀୟ ଏକକ – ଗଳ୍ପ (୨ ୦ ପିରିଅଡ)   ୨ ୫ ନମ୍ବର

୧. ଏବେ ମଧ ବଞ୍ଚିଛି – ଗୋଦାବରୀଶ ମହାପାତ୍ର

୨. ବିଟ୍ଘର ଓ ରେଲଗାଡ଼ି – କାଳିନ୍ଦୀ ଚରଣ ପାଣିଗ୍ରାହୀ

୩. ଅନେକ ସ୍ମିତ ହସ – ମନୋଜ ଦାସ

୪. ଦର୍ଶନ – ବୀଣାପାଣି ମହାନ୍ତି

➤ ଏହି ଏକକରୁ ୨ଟି ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ୧୫୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
  ଏହାର ମୂଲ୍ୟ – ୮ ନମ୍ବର

➤ ୩ଟି ୩ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୩୦ ଶବ୍ଦରେ ଦେବାକୁ ହେବ ।
  ଏହାର ମୂଲ୍ୟ ୩×୨=୬ ନମ୍ବର

➤ ୩ଟି ୨ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ୨ଟି ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
  ଏହାର ମୂଲ୍ୟ ୨×୨=୪ ନମ୍ବର

➤ ୩ଟିର ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୨ଟିର ଉତ୍ତର ଗୋଟିଏ ବାକ୍ୟରେ ଦେବାକୁ ହେବ ।
  ଏହାର ମୂଲ୍ୟ ୧×୨=୨ ନମ୍ବର

➤ ୫ଟି ୧ ନମ୍ବର ବିଶିଷ୍ଟ ପ୍ରଶ୍ନ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପ୍ରଶ୍ନ ପାଇଁ ୪ଟି ଲେଖାଁ ସମ୍ଭାବ୍ୟ ଉତ୍ତର ଦିଆଯିବ । ସେଥିମଧରୁ ପରୀକ୍ଷାର୍ଥୀ କେବଳ ଠିକ୍ ଉତ୍ତରଟି ବାଛି ଲେଖିବେ ।
  ଏହାର ମୂଲ୍ୟ ୧×୫=୫ ନମ୍ବର

ଚତୁର୍ଥ ଏକକ – ବ୍ୟାକରଣ (୨ ୦ ପିରିଅଡ)   ୨ ୫ ନମ୍ବର

୧. ଦରଖାସ୍ତ ଲିଖନ ।

୨. ଅବରୋଧ ପରୀକ୍ଷଣ ।

୩. ବିପରୀତ ଅର୍ଥ ବୋଧକ ଶବ୍ଦ ।

୪. ସମୋଚ୍ଚାରିତ ଭିନ୍ନାର୍ଥବୋଧକ ଶବ୍ଦ ।

୫. ଏକପଦୀକରଣ ।

➤ ଦରଖାସ୍ତ ଲିଖନରୁ ୨ଟି ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୧ଟିର ଉତ୍ତର ଦେବାକୁ ହେବ
  ଏହାର ମୂଲ୍ୟ – ୬ ନମ୍ବର

➤ ଅବରୋଧ ପରୀକ୍ଷଣ ନିମନ୍ତେ ଏକ ଗଦ୍ୟ ଅନୁଭେଦ ଦିଆଯିବ । ସେଥିରୁ ୫ଟି ପ୍ରଶ୍ନ ପଡ଼ିବ । ସମସ୍ତ ପ୍ରଶ୍ନର ଉତ୍ତର ବାଧ୍ୟତାମୂଳକ ।
  ଏହାର ମୂଲ୍ୟ – ୨×୫=୧୦ ନମ୍ବର

➤ ବିପରୀତ ଅର୍ଥ ବୋଧକ ଶବ୍ଦ, ସମୋଚ୍ଚାରିତ ଭିନ୍ନାର୍ଥ ବୋଧକ ଶବ୍ଦ ଏବଂ ଏକପଦୀକରଣ   ପ୍ରତ୍ୟେକରୁ   ୫ଟି ଲେଖାଁ ? ପ୍ରଶ୍ନ ପଡ଼ିବ । ସେଥିରୁ ୩ଟି ଲେଖାଁ କରିବାକୁ ପଡ଼ିବ ।
  ଏହାର ମୂଲ୍ୟ – ୧×୩=୩, ୧×୩, ୧×୩= ୯ ନମ୍ବର

M.I.L. (HINDI)
+2 1st Yr Arts, Com & Science

Time : 3 Hours   Full Marks : 100

There shall be one paper carrying 100 marks. The duration of Examination will be three hours.

Distribution of marks -

पाठ्य पुस्तक : साहित्य विविधा -1   - सं.प्र. एम. वेंकटेश्वर
                                          - डा. स्मरप्रिया मिश्र
                                          - सोनम प्रकाशन,
                                            बादामबाडी, कटक

1.   **Unit -I** (गद्य)   18 Classes
     सम्पूर्ण (All)
2.   **Unit -II** (काव्य)   18 Classes
     सम्पूर्ण (All)
3.   **Unit -III** (भाषा अध्ययन)   18 Classes
     सम्पूर्ण (All)
4.   **Unit -IV** (निबन्ध)   18 Classes
     समसामयिक विषय (All)

Distribution of Marks for M.I.L. (Hindi)

Group - A

1.   Multiple choice (From I, II & III units)
2.   One word Answer (- do -)
3.   Correct the sentences (- do -)
4.   Fill up the Blanks (- do -)

GROUP - B (SHORT TYPE)

5.   Write notes on any five (From Unit-I, II & III)

6.   Explain only (From Unit - I & II)

GROUP - C (LONG TYPE)

7.   Four Long questions
     From I & II Units
     From II & IV Units

M.I.L. (HINDI)

+2 IInd Yr Arts, Com & Science

Time : 3 Hours   Full Marks : 100

There shall be one paper carrying 100 marks. The duration of Examination will be three hours.

Distribution of marks -

पाठ्य पुस्तक : साहित्य विविधा - II :   सं.डा. शंकरलाल पुरोहित

                                             डा. कमलप्रभा कपानी

1.   **Unit -I** (गद्य)   18 Classes

     सम्पूर्ण (All)

2. **Unit -II** (काव्य) 18 Classes

सम्पूर्ण (All)

3. **Unit -III** (कहानी) 18 Classes

सम्पूर्ण (All)

4. **Unit -IV** 18 Classes

(क) पत्र लेखन (व्यक्तिगत एवं आवेदन पत्र)

(ख) पल्लवन

DISTRIBUTION OF MARKS FOR MIL (HINDI)

GROUP - A (Objective type)

1. Multiple Choice (From All Units) I, II & III
2. One word answer (-do-) I, II & III
3. Correct the sentences (-do-)
4. Fill up the Blanks I, II & III

GGROUP - B (SHORT TYPE)

5. Write notes on any five (From Unit-I, II & III)

6. Explain only (From Unit - I & II)

GROUP - C (LONG TYPE)

7. Four Long questions
   From I & II Units
   From II & IV Units

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Modern Indian Language (M.I.L)
BENGALI (Compulsory)

The present syllabus in Bengali is designed to improve the Bengali language and knowledge in Bengal literature and Indian Culture. To strengthen the national integrity a profound sense of patriotism and nationalism tempered with the spirit of "Vasundhaiva Kutambakam.

The Syllabus has been divided into two parts. The first part is meant for the students of XI class and the examination of the first part shall be conducted at the end of the XI Class at College/ HS School level.

The Second part of the syllabus is meant for the students of XII Class and the examination of this part shall be conducted at the end of XII Class at Council level.

M.I.L (BENGALI)
(Compulsory)
First year Paper-I
(F M. -100 Time -3 hours and consisting of four units.)

The examination shall be conducted at the end of XI class at College / H.S. School level.

According to the educational policy and guideness given by the Council the Syllabus is prepared as follows:

UNIT - I
Books Prescribed :

PROSE :

Uchha Madhyamik Bangia Sankalan. (Gadya) for Class XI & XII. Published by paschim Banga uchha Madhyamik Siksha Sansad, Viswa Vharati.

The following pieces are to be studied in the first year :

1. Bangladeshe Nilkar   - Pyarichand Mitra.
2. Sitar Banabas   - Iswarchandra Vidyasagar.
3. Bisarjan   - Bankimchandra Chattopadhya
4. Sudra gagaran   - Swami Vivekananda.

UNIT - II
POETRY :

Madhukari - Kalidas Ray

(Published by Orient Book Company, Kolkata -12)

The following pieces are to be studied in the first year :-

1. Srigoura Chandra   - Gobinda das kabiraj.
2. Bhabollas   - Vidyapati.
3. Premer Tulana   - Durija Chandidas
4. Avigir Akshep   - Gyandas.

UNIT - III
NOVEL - (Non-Detailed)

Srikanta - Sarat chandra chattopadhayay
(Chapter - 1 to 7 (one to seven) to be read in the first year)

UNIT - IV
Grammar

Proverbs and Indioms, Sentence and word formation Annonyms and Synonyms.

Distribution of Marks of Unit wise :-

Unit - I   Prose

A. Two short Answer type questions with alternatives -
B. One explanation with alternatives
C. Five very Short Answer type questions with alternative

Unit -II   Poetry   -

A. Two short Answer type Questions with alternative-
B. One explanation with alternative
C. Five very short answer type questions with alternative

Unit - III   Novel (Non datail) -

A. Four short answer type Question with alternative

Unit - IV   Grammar & Essay -

A. Grammar objective type 10 Questions with alternative containing   2 marks each
   B.   Essay/ One essay with three alternatives -

M.I.L (Bengali)
SECOND YEAR

F.M. -100

Time -3 hrs.

The examination shall be conducted at the end of XII Class at Council level.

Books Prescribed :

UNIT - I   PROSE :

Uchha Madhyamik Bangia Sankal"an (Gadya) for Class XI & XII.

Published by Paschim Banga Uchha Madhyamik Siksha Sansad, Viswa Varati.

The following pieces are to be studied in the Second year :-

1.   Bangia Bhasa   - Haraprasad Sastri
2.   Tota Kahini   - Rabindra nath Tagore
3.   Naisha Avijaa   - Sarat Ch. Chattopadhayay
4.   Aranyak   - Bibhuti Bhusan Bandopadhay

UNIT -II   POETRY :

Madhukari - Kalidas Ray

(Published by Orient Book Company, Kolkata -12)

Pieces to be Studied :

1.   Baisakh   - Oebendra Nath Sen
2.   Lohar Byatha   - Jatindra Nath Sengupta
3.   Swarga Haite Viday - Rabindra nath Tagore
4.   Rupai   - Jasimuddin

UNIT - III   NOVEL - (Non-detailed Study)

Srikanta = Sarat Chandra Chattopadhay

(Chapter (8 to 12) eight to twelve to be studied in the Second year.)

UNIT - IV   Grammar and Essay

(i)   Pada Paribartan
(ii)   Somas
(iii)   Somo chharita-Bhinna Thark Sobda and its application in sentences.

Distribution of marks of unit wise :-

There shalf be four units.

Unit - I   Prose   -

A. Two short Answer type questions with alternatives -

B. One explanation with alternatives   -
C. Five very Short Answer type questions with alternative   -

Unit -II   Poetry

A. Two short Answer type Questions with alternative

B. One explanation with alternative
C. Five very short answer type questions with alternative

Unit - III   Novel (Non datail) -

A. Four short answer type Question with alternative

Unit - IV   Grammar & Essay -

A. Grammar objective type 10 Questions with alternative containing   2 marks each

B. Essay/ One essay with three alternatives -

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M.I.L (TELUGU)

FIRST YEAR

(Compulsory)

Time 3 hours   **No. of Periods : Weekly-5**   **Full Marks 100**   **Yearly 80**

There shall be one paper carrying 100 marks of 3 hours duration consisting of four units. The examination shall be conducted at the end of First Year of college / H.S. School.

DISTRIBUTION OF MARKS

Group- A (Objective Type)

1.	Thirty very short questions (from unit I, II & III)	30x1 =30 Marks
2.	Ten very questions (from unit IV- A)	10x1=10 Marks

Group- B (short Type Questions)

3.	Six short questions(from Unit I, II & III)	6x2=12 Marks
4.	Four explanation (only Bhavartha from unit I & II)	4x2=8 Marks
5.	Five short questions (from Unit IV-A)	5x2=10 Marks

Group -C (Long Type Questions)

6.	Three long questions with alternative	3x7=21 Marks
7.	Letter writing /essay with alternative(from unit iv-B)	1x9=9 Marks
	TOTAL	100 marks

TOPICS TO BE STUDIED :

UNIT – I   POETRY : (20 periods)

1.	Ekalavyudu	-	Nannaya Bhattu
2.	Balivamana Samvadamu	-	Bammera Potana
3.	Subhashitamulu	-	Enugu Lakshmana Kavi
4.	Tokachukka	-	Gurajada Apparao
5.	Gongali Purugulu	-	Balagangadhara Tilak
6.	Pushpa Vilapamu	-	Jandhyala Papayya Sastri

UNIT – II   PROSE : (20 periods)

1.	Mitra Labhamu	-	Paravastu Chinnayasuri
2.	Vemana	-	Dr G.V.Krishna Rao
3.	C.P. Brown Sahitya Seva	-	Prof. K. Sarvothama Rao
4.	A I D S	-	Dr. Singupuram Narayana Rao
5.	Telugu Patrikala Purva Rangam	-	Namala Visveswara Rao

UNIT – III NON – DETAIL : (16 periods)

Raja Raja Prasasti	-	Prof. S. Gangappa

UNIT – IV   (A) GRAMMER : (16 periods)

Vibhaktulu - Pratyayalu, Prakruti - Vikrutulu, Vyatireka Padamulu,
Paryaya Padamulu, Jateeyalu - Padabandhalu

B) LETTER WRITING / GENERAL ESSAY: (08 periods)

BOOKS PRESCRIBED :

1. **Poetry & Prose :** **SAHITEE VIPANCHI**
    - By Dr. Singupuram Narayana Rao
2. **Non-Detail :** **RAJA RAJA PRSAST**I
    -By Prof. S. Gangappa
3. **Grammar :** **VYAKARANA PARIJATAMU**
    - By Dr. Singupuram Narayana Rao

M.I.L (TELUGU)
SECOND YEAR
(Compulsory)

Time 3 hours   **No of Periods : Weekly-5**   **Full Marks 100**   **Yearly 80**

There shall be one paper carrying 100 marks of 3 hours duration consisting of four units. The examination shall be conducted at the end of Second Year at Council level.

DISTRIBUTION OF MARKS

Group- A (Objective Type)

1.	Thirty very short questions (from unit I, II & III)	30x1 =30 Marks
2.	Ten very questions (from unit IV- A)	10x1=10 Marks

Group- B (short Type Questions)

3.	Six short questions(from Unit I, II & III)	6x2=12 Marks
4.	Four explanation (only Bhavartha from unit I & II)	4x2=8 Marks
5.	Five short questions (from Unit IV-A)	5x2=10 Marks

Group -C (Long Type Questions)

6.	Three long questions with alternative	3x7=21 Marks
7.	Letter writing /essay with alternative(from unit iv-B)	1x9=9 Marks
	TOTAL	**100 marks**

TOPICS TO BE STUDIED:

UNIT – I POETRY : (20 periods)

1.	Sanjaya Rayabharamu	-	Tikkana Somayaji
2.	Hanumatsandesamu	-	Atukuri Molla
3.	Piradausi Lekha	-	Gurram Jashuwa
4.	Manchi Mutyala Saralu	-	Sri Sri
5.	Jateeyata	-	Dr. Nagabhairava Koteswara Rao
6.	Panjaramlo Amma	-	Dr. Bhusurapalli Venkateswarlu

UNIT – II   PROSE :   (20 periods)

1.	Mitra Bhedamu	-	Paravastu Chinnayasuri
2.	Rayaprolu streevada drukpadham	-	Prof K.Yadagiri
3.	Ahalya Sankrandanam Parta Chitrana	-	Dr. Nagabhairava Adinarayana
4.	Veyipadagalu Samajika Drukpadham	-	Dr. Singupuram Nayayana Rao
5.	Goutama Budhudu	-	Dr. V.R.Chakravarty

UNIT – III NON – DETAIL : (16 periods)

Rudrama Devi	-	Smt. P.B. Kausalya

UNIT – IV   A) GRAMMAR : (16 periods)

Paribhashika padamulu

Chandssu :   Utpalamala, Champakamala,
                 Sardhulamu, Mathebhamu, Ataveladi, Tetageeti

Alankaramulu : Upama, Rupaka, Utpreksha, Ardhantaranyasa, Atisiyokti

B) RE-TRANSLATION (English to Telugu) :(08 periods)

BOOKS PRESCRIBED :

1) Poetry & Prose   :   **Sahitee Mandaram**
                           - By Dr. Singupuram Narayana Rao
2) Non-Detai   :   **Rudramadevi**
                           - By Smt. P.B. Kausalya
3) Grammar   :   **Vyakarana Parijatamu**
                           - By Dr. Singupuram Narayana Rao

M.I.L (URDU)

(Compulsory)
FIRST YEAR

Time- 3hrs   **Total Classes-80**   **F.M-100**

There shall be one paper carrying 100 marks consisting of 3(three) groups and duration of examination will be of 3(three) hours at the college/H.S School Level

Distribution of marks

Group-A   30 Marks

Q.   1 Objective type questions from all units prose, Poetry and non-detailed

    a. Five objective type questions from prose   1 x 5=5 marks

    b. Five objective type questions from poetry   1 x 5=5 marks

    c. Five objective type questions from Non-detailed   1 x 5 =5 marks

    Total = 15 marks

Grammar

Q.2   a. One word answer five questions   1 x 5 = 5 marks

    b. Very short answer five questions   1 x 5 = 5 marks

    c. Fill up the Blanks five questions   1 x 5= 5 marks

    Total = 15 marks

Group- B   40 marks

Short Type Answer

Q.3 Answer within two/three sentences

    a. Prose- Six questions to be answered out of eight questions   6 x2=12 Marks

    b. Poetry- Five questions to be answered out of six questions   5x2= 10 marks

Q.4 Answer with in six sentences.

    a. Prose- Three questions to be answered out of four questions   3x3=9marks

    b. Ghazaliyat- Three Ashaar explanation to be answered out of four Ashaar   3x3=9marks

Total- 18 marks

Group- C   30 marks

Q.5

    a. Prose : One long answer type question about 150 words with

    an alternative from prose portion.   7½ Marks

    b. Poetry : One long answer type question about 150 words with

an alternative from poetry portion   7½ Marks

c. Non detailed- one long answer type question about 150 words
with an alternative from non-detailed portion   7½ Marks

   d. Letter/Application : one Letter writing/application writing
about 100 words.   7 ½ Marks

Books Prescribed :

MEYAR- E- ADAB
Compiled by prof: Suraiya Husain
To be had from Education Book
House Aligarh U.P

1. Prose portion :   20 Classes

Portions to be studied :

i.   Sair Pahle Darwesh Ki---Mir Amman
ii.   Lakhnow Ki Raisana Zindagi KI Ek Jhalak---Sharar
iii.   Khutut---Mirza Ghalib
iv.   Kalim Daulat A bad mein---Nazir Ahmed
v.   Ghalib Ki Shairi--- Hali
vi.   Bahaduron ke Karname --- Hasan Nizami
vii.   Namak Ka Darogha --- Premchand

2. (a) Poetry Portion :-   24 Classes

Portions to be studied

i.   Qaid Khane Ki Rat--- Mir Anis
ii.   Jogan Aur Chandni Rat--- Mir Hasan
iii.   Tazhiq- E- Rozgar--- Sauda
iv.   Israf--- Hali
v.   Ahd-E-Wafa--- Akhtarul Iman

(b) Ghazaliyat Portion :

First two Ghazals from the following poets

i. Wali, ii. Meer, iii. Ghalib, iv. Momin, v. Atish

3. Non detailed studies :-   16 Classes

Any one of the following books only first half
Of the books in the 1st year
Books prescribed :

i.   Taubatun Nasooh :-
By Deputy Nazeer Ahemad
To be had from Maktab – E-Jamiya Ltd
Jamia Nagar New Delhi- 110025

ii.   Musaddas Hali
By Altaf Husain Hali
To be had from Educational Book House Aligarh (U.P)

5. Letter writing :

There shall be letter writing/Application writing   5 Classes
6. Grammar   15 Classes
Book Prescribed
Urdu Zoban –o- Quwaid Part- I
By Shafi Ahmed Siddiqui
Portions to be studied :
i.   Ism Ki Quismen
ii.   Fail Ki Quismen
iii. Sabqueour Laahque
iv.   Mutashaba Alfaz

Arts/Sc/Com Stream

SECOND YEAR

Time- 3 hrs   **Total Classes- 80**   **F.M- 100**

There shall be one paper carrying 100 marks consisting of 3(three) groups and duration of examination will be of 3 (three) hours at the council level.

Distribution of marks

| | **Group-A** | **30 Marks** |

Group-A   **30 Marks**

Objective type compulsory

Q1.   Objective type question from all units prose, poetry and Non-detailed
       a. Five objective type questions from prose   1x5=5 marks
       b. Five objective type questions from poetry   1x5=5 marks
       c. Five objective type questions from no detailed   1x5=5 marks
                                                                            Total:15 marks

GRAMMAR

Q.2
       a. One word answer five questions   1x5=5 marks
       b. Very short answer five questions   1x5=5 marks
       c. Fill up the blanks five questions   1x5= 5 marks
                                                                            Total:15 marks

Group-B   **40 Marks**

Short Type Answer

Q.3 Answer within two/three sentences.
       a.   Comprehension of an unseen passage of about 150 words
             followed by seven questions to be answered out of nine
             question   7x2=14 marks
       b.   Prose : Four questions to be answered out of
             five questions   4 x 2 =8 marks

Q4. Answer within six sentences

      a.   Prose : Three questions to be answered out of

             Four questions   3x3=9 marks

      b.   Ghazaliyat : Three Ashaar explanation to be

             Answered out of four Ashaars   3x3=9 marks

                                                        Total = 18 marks

Group- C   **30 Marks**

Long Type Answer

Q.5   a.   Prose : One long answer type question about

             150 words with an alternative from

             Prose portions   7½ marks

      b.   Poetry : One long answer type question about

             150 words with an alternative from

             Poetry portion.   7½ marks

c.   Non- Detailed : One long answer type question

      About 150 words with an alternative

      From non-detailed portion   7½ marks

d.   Essay : One long answer type question about

      150 words with three alternatives   7½ marks

Books prescribed

MEYAR- E-ADAB

Compiled by Prof Suraiya Husain

1. Prose Portion :   20 Classes

        Portions to be studied :

        i. Ek- Khat   : Abul Kalam Azad

        ii.Kutte   : Patras Bokhari

        iii. Nazir Ahmad Ki Kahani : Farhatullah Baig

        iv. Acchi Kitab   : Abdul Haque

        v. Hali   : Aale Ahmad Suroor

2.   (a) Poetry portion

      Portions to be studied :

        i. Bazmein Anjum   : Iqbal   25 Classes

        ii. Kashmir   : Chakbast

        iii. Badli Ka Chand   : Josh Malleeh Abadi

        iv. Pairahane Sharar   : Sardar Jafri

(b)   Ghazaliyat : First two Ghazals of the following poets

i.   Hasrat, ii. Faani, iii. Shaad, iv. Firaq, v. Faiz

      3. Non detailed studies   15 Classes

Any one of the following books from the remaining
Half portion dis-continued in the 1st year

a. Taubatun Nasooh
By Deputy Nazeer Ahemad
To be had from Maktab- E-Jamiya Ltd

b. Musaddas Hali:
By:- Altaf Husain Hali
To be had from Educational Book House Aligarh (U.P)

4. (a) Essay :
There shall be one general Easy with three alternatives 5 Classes
(b) Comprehension
5. Grammar
Book Prescribed 15 Classes
Urdu Zoban- O – Qawaid Part-1
By Shafi Ahmed Siddiqui
Person to be studies :
i. Tazkir-O-Tanis, ii. Wahid-O-Jama, iii. Mutazad Alfaz, iv. Mahaware

QUESTION PATTERN AND MARK-DIVISION

M.I.L. (SANSKRIT)

1st Year

TIME:03 Hrs   **GROUP -A**   **FULL MARKS - 100**

Q.1. Multiple Choises :   1 x 15 = 15

    MARK-DIVISION   : PROSE   - 1X3 = 3

                  : POETRY   - 1X2 = 2

                  : SANDHI   - 1X3 = 3

                  : SANDHIVICCHEDA   - 1X3 = 3

                  : KARAKA - VIBHAKTI   - 1X4 = 4

Q.2. One word Answer / Correction / Fill up the Blanks : 1x15 =15

    MARKDIVISION   :PROSE   - 1x2 =2

                  :POETRY   - 1x3 =3

                  : PRAKRUTI-PRATYAYA   - 1x3 =3

                  : SAMASA   - 1X3 =3

                  : EKAPADIKARANA   - 1X4 = 4

                  (from Stripratya and Samasa)

GROUP -B

Q.3. Short Type Answer (within 2/3 sentences / 12words) : 2x11 = 22

    MARKDIVISION : (a) Comprehension   - 2x6 = 12 (out of 07Qs.)

                  (passages from 1to 8 of Samskrtaprabha)

                  (b) Translation

                  (from Unseen Sanskrit   - 2x5 = 10 (out of 07Qs.)

sentences into Odiya/English)

Q.4. Short Type Answer (within 06 sentences / 25words) : 3x6 = 18

    MARKDIVISION : (a) PROSE   - 3x3 = 09 (out of 04 Qs.)

                           (b) POETRY   - 3x3 = 09 (out of 04 Qs.)

GROUP - C

Q.5. 04 Long Questions out of 06 Qs, $7^{1/2}$ x 4 = 30

        (within 08 sentences / 40 words)

      a)   Letter /Application writing.

      b)   Long Question (PROSE)

      c)   Long Question (POETRY)

      d)   Explanation (PROSE/ POETRY)

      e)   Expansion of Ideas (MORAL TEACHINGS FROM PROSE/POETRY)

      f)   Precis Writing (OF UNSEEN PASSAGE)

N. B. Answers in Sanskrit are to be written either in Odia Script or in Devanagari Script.

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M.I.L. (SANSKRIT)
FIRST YEAR

There shall be one paper carrying 100 marks.
The duration of Examination will be of three hours.

COURSE STRUCTURE

UNIT	CLASSES REQUIRED	MARKS ALLOTTED
Unit - I Prose	20	21 ½
Unit - II Poetry	20	21 ½
Unit - III Grammar (Textual & Outside)	12	20
Unit - IV Translation & Comprehension	18	22
Unit - V Letter/ Application, Expansion of ideas Precis writing	10	15
Total	**80 Classes**	**Total 100**

PORTIONS TO BE STUDIED

Unit - I

Prose- Samskrtaprabha (Gadyabhagah)

संस्कृतप्रभा (गद्यभाग:)

The following prose pieces from the above mentioned book are to be studied.

1. मनुमत्स्याख्यानम् (Manumatsyakhyanam)

2. चतुरशृगाल: (Caturasrgalah)

3. संस्कृते किं नास्ति (Samskrte kim nasti)

4. जाबाल: सत्यकाम: (Jabalah Satyakamah)

UNIT-II

Poetry- Samskrta Prabha (Padya Bhagah)

संस्कृतप्रभा (पद्यभाग:)

The following poetry pieces from the above book are to be studied.

1. सुभाषितावली   (Subhasitavali)
2. भाति मे भारतम्   (Bhati me Bharatam)
3. वसन्तः   (Vasantah)

Unit - III
(A) Grammar from the text

01. सन्धि   (Sandhi)
02. सन्धिविच्छेद   Sandhi Viccheda
03. कारक-विभक्ति   Karaka-Vibhakti
04. प्रकृति-प्रत्यय   Prakrti Pratyaya

(B) Grammar from outside the text /General

01. स्त्रीप्रत्यय   (Stripratyaya)
02. समास   (Samasa)
03. एकपदीकरण   (Formation of single word from Stripratyaya and Samasa)

Unit - IV
Translation and Comprehension

A)   Comprehension - Sanskrit passage for the comprehension (Passage No. 01 to 08)
       of संस्कृतप्रभा

B)   Translation of unseen Sanskrit sentences into Odia/English

Unit - V

The art of Writing of Letters, Applications, Expansion of Ideas, Textual Explanations, Textual Long Questions and Precis writing.

Books Recommended:

1. **Samskrta Prabha** - संस्कृतप्रभा

   Published by Odisha State Bureau of Textbook Preparation and Production.

2. **Vyakarana-darpanah -** व्याकरण दर्पणः

   Published by Odisha State Bureau of Textbook Preparation and Production.

QUESTION PATTERN AND MARK-DIVISION
M.I.L. (SANSKRIT)
2nd Year

TIME:03 Hrs   **GROUP - A**   **FULL MARKS - 100**

Q.1.MULTIPLE CHOICES :   1 x 15=15

    MARKDIVISION : PROSE   - 1X3 = 3

                : POETRY   - 1X2 = 2

                : SAMASA   - 1X4 = 4   :

        : SABDARUPA   - 1x3 = 3

                : DHATURUPA   - 1x3 = 3

Q.2. One word Answer / Correction / Fill up the Blanks : 1x15 =15

    MARKDIVISION : PROSE   - 1x2 =2

                : POETRY   - 1x3 =3

                : SANDHI   - 1X2 = 2

                : SANDHIVICCHEDA - 1x2 =2

                : KARAKA VIBHAKTI   - 1X3 = 3

                : STRIPRATYAYA   - 1X3 = 3

GROUP-B

Q.3. Short Type Answer (within 2/3 sentences / 12words) : 2x11 = 22

    MARK DIVISION : (a) Comprehension - 2x6 = 12 (out of 07Qs.)

                (passages from 9 to16 of Samskrtaprabha)

              : (b) Translation   - 2x5 = 10 (out of 07Qs.)

              (from Odiya/English into Sanskrit)

Q.4. Short Type Answer (within 06 sentences / 25words) : 3 x 6 = 18

    MARKDIVISION : (a) PROSE   - 3 x 3 = 09 (out of 04 Qs.)

              (b) POETRY   - 3 x 3 = 09 (out of 04 Qs.)

[34]

GROUP - C

Q.5. 04 Long Questions out of 06 Qs, $7^{1/2}$ x 4 = 30

   (within 08 sentences / 40 words)

   a)   Letter /Application writing.

   b)   Long Question (PROSE)

   c)   Long Question (POETRY)

   d)   Explanation (PROSE/ POETRY)

   e)   Expansion of Ideas (MORAL TEACHINGS FROM PROSE/POETRY)

   f)   Precis writing (OF UNSEEN PASSAGE)

N.B. Answers in Sanskrit are to be written either in Odia Script or in Devanagari Script.

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M.I.L. (SANSKRIT)
SECOND YEAR

There shall be one paper carrying 100 marks.

The duration of Examination will be of three hours

COURSE STRUCTURE

UNIT	CLASSES REQUIRED	MARKS ALLOTTED
Unit - I		
Prose	20	21 1/2
Unit - II		
Poetry	20	21 1/2
Unit - III		
Grammar (Textual & Outside)	12	20
Unit - IV		
Translation & Comprehension	18	22
Unit - V	10	15
Letter/ Application Expansion of ideas Precis writing		
Total	**80 Classes**	**Total 100 Marks**

PORTIONS TO BE STUDIED

Unit - I

Prose- Samskrtaprabha (Gadyabhagah)

संस्कृतप्रभा (गद्यभाग:)

The following prose pieces from the above mentioned book are to be studied.

1. कपोतलुब्धककथा   (Kapotalubdhakakatha)
2. सुश्रुतस्य यन्त्रकर्मशस्त्रकर्माणि (Susrutasya Yantrakarma sastrakarmani)
3. गुणिगुणहीनविवेक: (Gunigunahinavivekah)
4. रामतपोवनाभिगमनम् (Ramatapovanabhigamanam)

UNIT-II

Poetry- Samskrtaprabha (Padyabhagah)

संस्कृतप्रभा (पद्यभाग:)

The following poetry pieces from the above book are to be studied.

1. दशावतारस्तुतिः (Dasavatarastutih)

2. गीतासौरभम् (Gitasaurabhavam).

3. रघुवंशम् (Raghuvamsam)

Unit - III
(A) Grammar from the text

01. कारक-विभक्ति   Karaka-Vibhakti

02. सन्धि   Sandhi

03. सन्धिविच्छेद   Sandhi Viccheda

(B) Grammar from outside the text/General

01. शब्दरूप - Sabdarupa- (नर, फल, लता, मुनि, मति, वारि, नदी, पितृ, मातृ, गच्छत्, मनस्, आत्मन्, तद्, किम्, इदम्, अस्मद्, युष्मद्, द्वि, त्रि, चतुर्)

02. धातुरूप - Dhaturupa- (भू, गम्, पठ्, कृ, अस्, लभ्, पूज्)

03. समास -(Samasa)

04 स्त्रीप्रत्यय- -(Stripratyaya)

Unit - IV
Translation and Comprehension

A)Comprehension - Sanskrit passages for the comprehension (Passage No. 09 to 16) of **संस्कृतप्रभा**
B) Translation of Odia/English sentences into Sanskrit.

Unit - V

The art of Writing of Letters, Applications, Expansion of Ideas, Textual Explanations, Textual Long Questions and Precis writing.

Books Recommended:

1. **Samskrta Prabha** - **संस्कृतप्रभा**

   Published by Odisha State Bureau of Textbook Preparation and Production.

2. **Vyakarana-darpanah -** व्याकरणदर्पणः

   Published by Odisha State Bureau of Textbook Preparation and Production.

ALTERNATIVE ENGLISH

1. Introduction : The course is meant for the students

(a)   who opt to study English in lieu of a Modem Indian Language, and

(b)   who seek-to develop a high level of competence in English.

It is assumed that the students who offer to study this course have high motivation and competence in English. Hence, it aims at building up on their previous learning and their acquisition of skills in compulsory English course which they are exposed to simultaneously.

2. Objectives : By the end of the course a student should be able to

(a)   transact real-life business in English, and

(b)   appreciate, evaluate and enjoy different types of writing in English

By the end of the Higher Secondary Course in Alternative English, the learners are expected to acquire the language skills specified below :

3.1. Reading (Non-fictional prose) :

(a)   To make predictions and guesses while reading a prose text

(b)   To understand relations between the parts of a reading text and recognize the indicators in discourse.

(c)   To understand the writer's intention/attitude, to discriminate between facts and opinions, to recognize the writer's bias, if any, and to assess the communicative value of a given text.

(d)   To identify the structure of a text, such as descriptive sequence, chronological sequence, cause-arid-effect chain, argumentative and logical organization, etc.

(e)   To compare and contrast two texts on similar themes

(f)   To use reference skills to select a suitable text for reading.

(g)   To use the title, blurb, contents and index of a book in order to form an overall idea of what the book is about and of whether it will be relevant reading with reference to a particular topic.

3.2. Reading (Poetry) :

(a)   To recognize the structure of a poem and to appreciate the themes and ideas presented therein.

(b)   To recognize, identify and interpret poetic structure in a given poem.

(c)   To recognize and appreciate the effects of different poetic devices like simile / metaphor / symbol / personification / irony / alliteration / assonance, etc.

3.3. Reading (short stories, one-act plays) The students are expected to develop in them the capacity

(a)   To comprehend the plot and characters of a given short story/play, and

(b)   To interpret the themes and points of view contained in a given story/play.

4.1. Writing : The students will be able

(a)   to formulate ideas for compositions, to brainstorm and organize ideas, to write and revise their writing on common themes/situations for given purpose.

(b)   to identify grammatical errors and to correct them in their own writing or in peer writing.

(c)   To design and write a brochure or pamphlet

(d)   To write the dialogues of a face-to-face/telephonic conversation.

4.2. Creative Writing : The students are expected to develop in them the ability

(a)   To add a suitable beginning/ending/title to a given poem/story

(b)   To reconstruct a story from a given set of questions/fillers/outlines.

(c)   To rewrite a poem/short story as a different from of discourse, i.e. a page of a diary, a newspaper article or a script for a play etc.

4.   **Grammar and Usage :** Points relating to Grammar and usage will be mainly discourse-based. These points are discussed in 'Approaches to English Book I' and in Reference Books for Grammar mentioned under 'Instructional Materials'. They are related to the following broad topics :

i)   Tense and Aspect

ii)   Modals

iii)   Non-finite Verb forms

iv)   The Passive

v)   Prepositions

vi)   Phrasal Verbs

vii)   Clause-types

viii)   Linking Devices

ix)   Word Order and Emphasis

5.   **Instructional Materials :**

(a)   Approaches to English, Book-I

(b)   Approaches to English, Book-II

Published by the Orissa State Bureau of Textbook Preparation and Production, Pustak Bhavan, Bhubaneswar.

(c)   Reference Books for Grammar and Usage :

(i)   A University Grammar of English (Quirk, Greenbaum et al)

(ii)   English Grammar Practice (Bijoy Kumar Bal)

FIRST YEAR

A.   APPROACHES TO ENGLISH, BOOK-I

Prose

Units to be studied :

i.   The Adventure of Learning

ii.   Men and Women

iii.   Modern Living

iv.   Food for Thought

B.   APPROACHES TO ENGLISH, BOOK -II

Poetry

Units to be studied :

i.   Ecology (A.K.Ramanujan)

ii.   Dog's Death (John Updike)

iii.   The Fog (W.H.Davies)

iv.   Girl Lithe and Tawny (Pablo Neruda)

v.   Ballad of the Landlord (Langston Hughes)

Short Stories

Units to be studied :

xi. The Rainbow-Bird (Vance Palmer)

xii. The Eyes Have it (Ruskin Bond)

xiii. The little Wife (William March)

One-Act Plays

Units to be studies :

xvii. Mother's Day (J.B. Priestley)

xviii. The Unexpected (Ella Adkins)

C. GRAMMAR & USAGE

i. Tense and Aspect

ii. Modals

iii. Non-finite verb forms

iv. The passive

v. Prepositions and Phrasal Verbs

SECOND YEAR

A. APPROACHES TO ENGLISH, BOOK-I

Units to be studied

vi. The Wonder World of Science

vii. Our Environment

viii. The World of Business

ix. The Changing World

B. APPROACHES TO ENGLISH, BOOK-II

Poetry

Units to be studied :

vi. Indian Children Speak (Juanita Bell)

vii. The Goat Paths (James Stephen)

viii. Of a Questionable Conviction (Jayanta Mahapatra)

ix. Mirror (Sylvia Plath)

x. Toads (Philip Larkin).

Short Stories

Units to be studied :

xiv. The Happy Man (W.S.Maugham)

xv. The Tree (Manoj Das)

xvi. The Watch Man (R.K.Narayan)

One Act Plays

Units to be studies

xix. The Hour of Truth (Percival Wilde)

C. GRAMMAR & USAGE

i. Revision of 'Tense and Aspect'

ii. Revision of Prepositions and Phrasal Verbs

iii.   Clause-types

iv.   Linking Devices

v.   Word Order and Emphasis

Scheme of Evaluation

There will be a college examination in Alternatjve English at the end of the First Year. This will be Alternative English Paper -I carrying 100 marks. The final examination to be conducted by CHSE at the end of the second year of the course will consist of one written paper of Alternative English carrying 100 marks. The paper shall test the student's proficiency in English with respect to correctness, appropriacy, tone and style.

Alternative English (1st Year) - (To be evaluated at the college level)

1.   Reading Comprehension :

(a)   A prescribed prose piece or extract
        (5 questions - including inferential
        questions-are to be answered)

(b)   A prescribed poem/extract (5 questions
        including inferential questions and those
        on poetic devices, figures of speech,
        mood, tone and style etc.)

(c)   A prescribed story / one-act play or its
        extract (5 questions including inferential
        questions and those on literary devices,
        tone etc.)

(d)   An unseen passage of at least
        200 words (5 questions including
        Inferential ones)

2.   Reading related skills.

(a)   Guided note making based on the passage 1 (d)

(b)   Cohesive devices

3.   Writing skills.

(a)   Summarising an unknown passage as given in
        1 (d) with caption

(b)   Reconstruct a story from a given set of
        questions/fillers/outlines or completion of a story

(c)   Essay writing (including brainstorming, organizing,
        outlining, writing first draft and revising)

4.   Grammar and usage (in context) (3 questions
        on the prescribed grammar units)

Alternative English (2nd year) To be evaluated at CHSE level

1.   Reading Comprehension.

(a)   A prescribed prose piece or extract

(5 questions including inferential questions are to be answered).

(b) A prescribed poem / extract (5 questions including inferential questions and those on poetic devices, figures of speech, mode, tone and style etc.)

(c) A prescribed story / one-act play or its extract (5 questions including Inferential questions and those on literary devices, tone etc.)

(d) An unseen passage of at least 200 words (5 questions including inferential ones)

2. Reading related skills.
Unguided note making (based on the passage given in 1 (d).

3. Writing skills.

(a) Designing and writing a brochure / pamphlet

(b) Writing dialogues of a face-to-face / telephonic conversation.

(c) Rewriting a poem/short story as a different form of discourse i.e. a page of a diary, a newspaper report/article or a script for a play etc.

(d) Adding a suitable beginning/ending/title to a given poem/story.

4. Grammar and usage (in context) (3 questions on the prescribed grammar units including modified cloze tests).

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ENVIRONMENTAL EDUCATION

(Compulsory)

The Environmental Education (EE) is incorporated in the New Syllabus of Higher Secondary (+2) students of all streams (Science, Arts & Commerce) from 2006 (admission batch). The theory course shall be taught in 40 periods.

The syllabus is compulsory for all students. To reduce the work-load of students, EE will be taught in XI class only. The syllabus shall be of 100 marks of which 70 marks assigned to theory paper and 30 marks for project work.

Questions for theory paper shall be prepared by the Council and examination will be held on a stipulated date fixed by the Council.

The questions for theory paper will be prepared as per the norms of Council as done for all other subjects, 40 marks for short (which also includes objectives) and 30 marks for long questions.

Students are required to answer three long questions, one from each unit. Each unit will have 2 questions with internal choice. The short questions (covering all units) will be compulsory.

Each student has to submit a project work positively to the Principals of the respective colleges before Annual Examination.

There shall be 10 project work titles specified in the course and students are free to choose anyone of them. A group of teachers will be assigned to guide them. The project shall be evaluated in the respective colleges. The best project (as will be decided by the Principal) may be sent to Council for consideration for award of a special prize.

The Grade secured (taking together both the theory and project marks) will be reflected in the mark sheet and the Pass certificate of the Council.

(Above 70% -Gr A+, above 60% -Gr.A, above 50% -Gr.B, above 35% -Gr.C and below 35% -Gr. D)

THEORY

F.M. : 70

UNIT - I   *8 Periods*

(A)   *Man and Environment : Environment : Components: -*

Atmosphere, Lithosphere, Hydrosphere and Biosphere- Human being as a rational social partner in environmental action - Impact of human activities on environment -Environmental Problems of urban and rural areas- Stress on civic amenities: supply of water, electricity, transport and health services.

(B)   *Natural Resources :*   *6 Periods*

Land, water, forest as primary natural resources- Fresh water and Marine resources- Natural resources of Orissa - Concept of Biodiversity and its conservation - Renewable and non-renewable resources - Conventional and non - conventional energy.

UNIT - II   *6 Periods*

Environmental Pollution :

    Types of pollution and pollutants - Causes, effects and control of air pollution, water pollution, soil pollution and noise pollution, Green house effect, Global Warming, Eutrophication, Ozone layer depletion.

UNIT - III   *6 Periods*

(A)   *Environmental Management :*

    Scope of Environmental Management -Management of solid, liquid and gaseous wastes - Resource Management- disaster Management (flood, cyclone and earthquake) -Concept of sustainable development- Management of agricultural produce.

(B)   *Environmental Laws :*   *5 Periods*

    Constitutional Provisions -Major provisions of Environmental Laws and Pollution Control Laws with particular reference to the Water Act, 1974, the Air Act, 1981, the E(P) Act 1986, CPCB and SPCB- Central and State Pollution Control Boards.

PROJECTS

F.M. : 30

1.   To study the changes that have taken place in the given land area of a city/village/locality/market during the last five years in respect of at least five parameters like number of houses, residents and families; food habits, number of household goods in a family, consumption of water, electricity and fuel including that of personal vehicles by a family, sources of noise (public address systems being used, television, radio and vehicles on the road), common facilities like number of schools, hospitals, shops, theatres, public conveyance, public utilities, public transport, number of factories, industries and/or the facilities for production and processing of goods, loss of water bodies, types and quantity of wastes, their disposal and treatment facilities with a view to discuss the patterns of changes and impact on the environment and quality of life. One specific project on these aspects may be selected to study the changes that have taken place in a given area during the last five years in respect of the number of houses, residents and families and to prepare a report on the effects on civic amenities like availability of water, electricity and fuel; the drainage system, disposal of wastes including night soil.

2.   To study the environmental profile of a town/ locality/village in respect of population density, green cover, educational level of residents, social problems and sources of pollution and their effect on air, water and soil.

3.   To collect data on monthly consumption of electricity and fuel from at least five families, any two commercial establishments and four public utilities in a given locality. To plan strategies for educating consumers to economise on the consumption of electricity and fuel by reducing their over-use, misuse and improper use.

4.   To study, for a period of one month, the status of sanitary conditions and methods of waste disposal of a given locality vis-a-vis the role of Panchayat, Municipality or Corporation and to prepare an action plan for making the conditions more environment friendly.

5.   To investigate the impact of an industry or a large manufacturing unit on the local environment. The parameters

could be land use, the ratio of the covered area and the open space, the raw materials used for production, inputs like electricity and water, the types of waste generated and the modes of waste disposal, use of environment friendly and efficient technology, types of pollutants emitted or discharged, the average health status of the employees and residents in the area.

6. To study the impact of changes in agricultural practices or animal husbandry including poultry, piggery, fishery and apiculture over a period of time on the local environment of a given locality or village. The components for analysis may include: types of crops, land area under cultivation, mechanisation, use of electricity, mode of irrigation and agrochemicals, agro-waste and their disposal, types of animal breed and their feed, types of shelter and healthcare, methods of preservation and processing of products and animal wastes and their disposal. To suggest an action plan for modifying the prevailing practices so as to make them environment friendly and sustainable.

7. To collect samples of water from different sources and study their physical characteristics like turbidity, colour, odour, the measure of pH, the nature of suspended and dissolved impurities and pollutants, the presence of toxic materials like mercury, lead, arsenic, fluorine and the presence of living organisms. For testing the presence of toxic materials and living organisms, the help of a local laboratory or institution may be taken, if available. To identify the most polluted sample of water and locate the sources of its pollution. To devise an action plan for mobilising public opinion for checking the pollution.

8. To study the practices followed in the region for storage, preservation, transportation and processing of perishable or non- perishable farm products and to assess the extent of their wastage due to faulty practices.

9. To prepare a status report on the prevalence of child labour in a given area through sample surveys on children engaged as domestic help and as workers in farms, commercial establishments and manufacturing units. The survey may be in respect of age group, education, wages, working hours, working conditions, safety in works place, health, handling hazardous materials and the like. Units dealing with hazardous materials and processes may be identified and an action plan for mobilising public opinion against the practice of child labour may be prepared.

10. To conduct a survey of plants in a locality and to collect information about their cultural, economic and medicinal values from the local people and the available literature. To prepare an action plan for their propagation.

The grade secured taking together both the theory and Project/Practical marks will be refelected in the Marks sheet and the pass certificate of the Council.

Grade A$^+$ = 70% above, Grade B$^+$ = 60% and Grade B = 50% above, Grade C = 35% above and Grade D = below 35%

BOOK PRESCRIBED :

Bureau's Higher Secondary (+2) Environmental Education *Published by* **Orissa State Bureau of Textbook Preparation & Production, Bhubaneswar.**

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YOGA (Theory)
+2 1st year

Full Marks - 50   Time 2 hrs.

Unit - I   10 marks

CONCEPT YOGA

Meaning. Definition and Scope of yoga, Importance and aim of yoga for the students, Misconception of Yoga

Yoga and Spirituality

Unit - II   10 marks

BASIC PRINCIPLES OF YOGA PRACTICE

Place, Time, Age, Diet, Dress, Do's and Don'ts Power of Silence

Unit - III   10 marks

BRANCHES OF YOGA

Karma Yoga, Bhakti Yoga, Raja Yoga, Jnana Yoga Yoga in Srimad Bhagavat Gita

Unit - IV   10 marks

CONCEPT OF ASTHANGA YOGA

Yama, niyama, asana, pranayama, pratyahara, dharana, dhyana and samadhi

Unit - V   10 marks

YOGA AND PERSONALITY DEVELOPMENT

Meaning, Definition of Personality

Dimension of Personality: physical, mental, emotional, intellectual and spiritual. Personality Development in relation to external world civic, social, patriotic and global consciousness. Concept of Personality According to swami Vivekananda and Sri Aurobindo.

YOGA (Practical)
+2 2nd year

Full Marks - 50   Time 2 hrs.

Unit - I

ASANA

PRILIMINARY PRACTICES : Greeva Sanchalana, skandha chakra (shoulder rotation), purna, titali asana (full butterfly), marjari asana (car stretch pose), Surya Namaskara

STANDING POSTURE : Tadasana, tiryak tadasana, katichakrasana pada-hastasana, ardha chakrasana, ardhakati chakrasana, ekapada pranasmasana, garudasana, natarajasana.

SITTING POSTURE : padmasana janusirasana, paschimottanasana, supta vajrasana, shashankasana, ustrasana, ardhamatsyendrasana.

PRONE LYING POSTURE : shalabhasana, bhujangasana, dhanurasana.

SUPINE POSTURE : uttanapadasana, supta pawanamuktasana, naukasana, halasana, sarvangasana, matsyasana, chakrasana.

Unit-II

RELAXATION : savasana, yoganidra

Unit - III

PRANAYAMA : Priliminary practices: abdominal, thoracic, clavicular and full yogic breathing kapalabhati, nadisodhana, bhramari seetali/seetkari

Unit - IV and Unit - V

MEDITATION : Antarmouna - sensorial awareness : (sound, touch, vison, smell, taste), breath awareness, awareness of the spontaneous thought process.

Unit-V

KRIYA : Trataka (internal and external)

For +2 1st year 50 marks theory examination and For +2 2nd year 50 marks practical examination but in 1st year and 2nd year students will learn practical

The grade secured taking together both the theory and Project/Practical marks will be refelected in the Marks sheet and the pass certificate of the Council.

Grade A+ = 70% above, Grade B+ = 60% and Grade B = 50% above, Grade C = 35% above and Grade D = below 35%

Books Prescribed : An Introduction to Yoga, ଯୋଗ ପରିଚୟ
Published by Orissa State Bureau of Textbook Preparation and Production

BASIC COMPUTER EDUCATION

+2 1st Year

UNIT-I

Computer Fundamentals : Necessity and uses of computer, what is computer?, Computer as a ystem, problem and problem solving technique, Important terminology, Input-Output levices, types of computer, (Digital, Analog, Hybrid, Super computer, Main Frame, Mini, ᴶC, Note Book, and Laptop).Generation of Computer, Computer Memory, (Main, Secondary, 'irtual. Buffer, Cache,) Computer Languages and its types.

8 Hours

UNIT-II

Operating System: types, software, Dos and Windows : Fundamentals   and Commands , Security and Anti-virus

Introduction to MS_OFFICE:

MS- WORD: Creating a File, setting and typing text, page formatting, editing, printing, saving the files, creating Folders , Insertion tables and objects, Bulleting, Page Numbering, spell check, indenting , paragraph setting and mail merge, CD writing.

MS-EXCEL: Spread sheet and its uses , an introduction, formatting work sheet, setting columns/Rows, range, Format, protect, sorting, types of graphs, functions and formula, printing text, copying and saving the document.

MS-POWER POINT : Features, Uses, Menus, Toolbars, creating a presentation through auto context wizard, templates, manual slides show, saving, deleting, opening a presentation, Editing.

MS-ACCESS: Data base, data base Management system, RDBMS, advantages and limitations of MS-Access, parts, tables, integrity constraints, relationship and designing tables.

I5hours

UNIT-III

INTERNET AND COMPUTER SECURITY:

Introduction to Internet, net browsing, Emails, Networking and its types, topology, computer crime, components required for internet, saving and printing the web files.

APLLICATIONS: in Education, Medical Science, Business, Entertainment, Social services and Research etc. 7 hours

For +2 1st year 50 marks theory examination and For +2 2nd year 50 marks practical examination. TOTAL HOURS: 30 (THEORY) AND 10 HOURS (PRACTICAL).

+2 2nd Year

PRACTICALS :

DOS, Windows, MS-Office, web page, browsing, sending and creating a mail

The grade secured taking together both the theory and Project/Practical marks will be refelected in the Marks sheet and the pass certificate of the Council.
Grade A⁺ = 70% above, Grade A = 60% and Grade B = 50% above, Grade C = 35% above and Grade D = below 35%

CHEMISTRY

COUNCIL OF HIGHER SECONDARY EDUCATION, ODISHA
REVISED SYLLABUS
(Effective from 2012 Admission Batch)

Marking Scheme :

There shall be one theory paper carrying 70 marks in each year for which examination will be of 3 hours duration. The detailed distribution of marks with respect to the pattern of questions is given below.

Group-A

Q. 1 Compulsory :

Ten multiple choice answer type questions, each carrying one mark, covering all units. **10 mark**

Q. 2 Compulsory :

Ten one word answer / very short answer / correct sentences / fill in the blank type questions, each carrying one mark, covering all units. **10 mark**

Group-B

Q. 3 Short Answer Type Questions with alternatives :

Twelve short answer type questions, each carrying two marks, covering all units, out of which ten are to be answered. (Some of the questions should be of reasoning type, answers of which are to be written in two or three sentences) **20 mark**

Q. 4 Short Answer Type Questions with alternatives :

Five short answer type questions (answers of which will be within six sentences), each carrying three mark, covering all units, out of which three are to be. **9 mark**

Group-C

Long Answer Type Questions with alternatives :

Q.5 to Q.7 :

Six long answer type questions, each carrying seven mark, covering all units, out of which three are to be answered unit wise. **21 mark**

DETAILED SYLLABUS
CHEMISTRY THEORY
For +2 First Year

Unit-I

i) **Basic Concepts :** (*6 periods*)

Atomic mass, molecular mass and equivalent mass. Relation between atomic mass equivalent mass and valency. Equivalent mass of acid, base, salt, oxidant and reductant. Variable equivalent mass (examples). Percentage composition, empirical and molecular formula, Avogadro's hypothesis and its applications. Mole and molar mass, chemical reactions - stoichiometry and calculations based on stoichiometry.

ii) **States of Matter :**

a) **Gaseous State :** (*8 periods*)

Characteristics of gases. The four state variables of a gas - pressure, volume, temperature and amount (number of moles). Gas laws - Boyle's law, Charles' law, combined gas law, Avogadro's law, the ideal gas equation, Dalton's law of partial pressure (calculation of partial and total pressure in simple cases), Graham's law of diffusion / effusion. Numerical problems on gas laws.

Kinetic theory : Postulates, Derivation of the kinetic gas equation. Explanation of gas laws in light of kinetic model of gases. Ideal and real gases, deviation of real gases from ideal behaviour, the compressibility factor, van der Waals' equation. Molecular speeds - root mean square, average and most probable speeds, interrelations among them, distribution of molecular speeds (qualitative treatment only). Numerical problems. Liquefaction of gases (principle only), critical temperature.

b) **Solid State :** (*4 periods*)

Characteristics of solids. Classification into ionic, covalent, molecular and metallic solids. Crystalline & amorphous solids. Crystal lattices and unit cells - fcc, bcc and hcp crystals of simple ionic solids. Calculation of density of unit cells, packing in solids, voids, number of atoms per unit cells in a cubic unit cell, point defects. Numerical problems.

c) **Liquid State & Solution :** (*6 periods*)

Characteristics of liquids. Properties of liquids - viscosity and surface tension ; their variation with temperature. **Solutions :** Solute and solvent of a binary solution. Types of solutions, concentration of solution - percentage (*idea of ppm*), strength, normality, molarity, molality, mole fraction, formality,

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and their interrelations. Solubility of gases in liquids, Vapour pressure of solutions, ideal and non-ideal solutions. **Colligative properties :** Lowering of vapour pressure & Raoult's law (of ideal solutions and lowering of vapour pressure). Boiling point and its elevation. Freezing point and its depression. Osmosis and osmotic pressure ; laws of osmotic pressure. Determination of molar mass from colligative properties. Interrelations among colligative properties. Abnormal molecular masses - degree of association and dissociation. Numerical problems.

d) **Colloidal State & Surface Chemistry :**   (*4 periods*)

True solutions, colloids & suspension ; lyophilic, lyophobic, multimolecular and macromolecular colloids, preparation, purification, properties and uses of colloids, emulsion - types of emulsion. **Adsorption :** Types of adsorption, Freundlich and Langmuir adsorption isotherms, factors affecting adsorption of gases on solids, applications of adsorption.

iii) **Structure of Atom :**   (*8 periods*)

Thomson's model and its limitations, Rutherford's nuclear model of atom ; its defects. Hydrogen spectrum, different spectral series. Bohr model of atom, radius of electron orbits, energy of electron in hydrogen and hydrogen-like atoms ; speed of electron in different orbits, explanation of hydrogen spectra, defects of Bohr model. Dual nature of matter and de Broglie theory of matter waves. Heisenberg's uncertainty principle, quantum numbers and shapes of *s*-, *p*- and *d*-orbitals. Aufbau order of subshells, Pauli's exclusion principle and Hund's rule of maximum multiplicity. Electronic configuration of atoms and stability of half filled and filled subshells. Isotopes, isobars and isotones.

iv) **Periodic Classification :**   (*4 periods*)

Classification of elements, Periodic laws. Periods and Groups, classification of elements into *s*-, *p*-, *d*- and *f*-blocks. Periodicity in properties like atomic and ionic radii, ionisation enthalpy, electron gain enthalpy, electronegativity, and oxidation states.

Unit-II

i) **Chemical Bond :**   (*8 periods*)

Electrovalent (ionic) bond, lattice energy and Born-Haber cycle, covalent bond, coordinate (dative) bond, dipolemoment and polarity of covalent bond, calculation of percentage of ionic character from dipolemoment. Hybridisation (sp, sp^2, sp^3, dsp^2, dsp^3 & d^2sp^3) of covalent molecules and ions, VSEPR theory and shapes of linear, angular, planar, pyramidal, tetrahedral and octahedral molecules, s- and p-bonds. Hydrogen bonds - inter and intramolecular hydrogen bonds, their consequences. Molecular

orbital theory - linear combination of atomic orbitals, bonding and antibonding orbitals, energy level diagrams of simple homonuclear diatomic molecules of the elements of first and second periods only.

ii) **Chemical Reactions :**   (*4 periods*)

Types of chemical reactions, redox reactions, oxidation number, calculation of oxidation number, balancing redox equations by oxidation number and ion-electron methods. Neutralisation reaction - types of neutralisation reactions, volumetiric analysis. Numerical problems.

iii) **Principles of Extraction of Metals :**   (*3 periods*)

Occurrence of metals, ores and minerals, concentration, calcination, roasting, smelting, reduction methods (carbon reduction, aluminothermic process, electrolytic & self-reductions) of metal extraction, flux and slag, refining of metals.

iv) **s-Block Elements :**   (*3 periods*)

Alkali & alkaline earth Metals : General characteristics, principles of extractions, properties and uses of Na, Mg and Ca (industrial details excluded).

vi) **þ-Block Elements :**

a) **Group 13 elements :**   (*3 periods*)

General characteristics of boron family, principles of extraction and uses of aluminium, preparation, properties and uses of borax, boric acid and potash alum.

b) **Group 14 elements :**   (*3 periods*)

General characteristics of carbon family, allotropes of carbon, silicones and silicon carbides (preliminary idea).

c) **Group 15 elements :**   (*3 periods*)

General characteristics of nitrogen family, preparation, properties and uses of ammonia, phosphine and nitric acid (Ostwald's process), brown-ring test for nitrates.

Unit-III

Organic Chemistry :

i) **Some Basic Concepts :**   (*10 periods*)

Organic compounds, tetracovalency of carbon, state of hybridisation of carbon in organic molecules, functional groups, IUPAC system of nomenclature (substitutive system) of mono- and polyfunctional

organic molecules, the seniority table. Inductive effect, electromeric effect, resonance, hyperconjugation and their applications. Fission of carbon-carbon bond (homolytic and heterolytic fission), electrophiles and nucleophiles, idea of carbocation, carbanion and free radicals, their stabilities. Types of organic reactions (addition, substitution and elimination only). Isomerism - structural (chain, position, functional isomerisms, metamerism and tautomerism). Stereoisomerism : *a*) Geometrical isomerism - definition, examples, EZ-nomenclature. *b*) Optical isomerism - definition, chiral and achiral centres, optical rotations, examples, RS-nomenclature.

ii)   **Hydrocarbons :**

a)   **Alkanes :**   (*4 periods*)
General formula, methods of preparation (reduction, decarboxylation, Wurtz reaction, Grignard's and Kolbe's methods, Corey-House synthesis), properties - physical, chemical : Substitution (halogenation & nitration), aromatisation, pyrolysis and isomerisation. Conformations of ethane and butane.

b)   **Alkenes :**   (*4 periods*)
General formula, types of alkenes, stability of alkenes, methods of preparation (dehydration, dehydrohalogenation, dehalogenation, Kolbe's reaction), properties - physical, chemical (addition of H_2, X_2, HX, HOX, H_2O, H_2SO_4), Markownikoff's rule and peroxide effect, ozonolysis and polymerisation.

c)   **Alkynes :**   (*4 periods*)
General formula, methods of preparation (dehydrohalogenation, dehalogenation, from metal alkynides, electrolysis), preparation of acetylene from iodoform and calcium carbide, properties - physical, chemcial - additon of H_2, HX, HOX, H_2O, ozonolysis, acidic nature of terminal alkynes, reaction with ammoniacal cuprous chloride and ammoniacal silver nitrate solutions, uses of acetylene.

iii)   **Haloalkanes :**   (*4 periods*)
Types of halogen derivatives. Monohalogen derivative - preparation (addition of HX to alkenes, halogenation of alkanes, from alcohols), properties - physical, chemical (haloalkanes as potential synthetic agents, synthesis of alkanes, alkenes, alkynes, alcohols, aldehydes, acids, esters, nitroalkynes & amines, 2 grignard's reagent).

iv)   **Alcohols (Monohydric alcohols) :**   (*4 periods*)
General formula, classification into primary, secondary and tertiary alcohols, methods of preparation

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(from alkyl halides, esters, aldehydes, ketones, Grignard's reagents, alkenes by hydration, hydroboration-oxidation and oxymercuration-demercuration), properties - physical, chemical (acidity, reactions with organic and inorganic acids, formation of alkyl halides, oxidation, catalytic dehydrogenation), distinction among primary, secondary and tertiary alcohols by oxidation and catalytic dehydrogenation, Lucas' test and Victor-Meyer's test.

v)   **Organometallic compounds:**   (*3 periods*)

Nature of metal-carbon bond, organomagnesium compounds (the Grignard's reagent) : Preparation from alkyl halides, synthetic applications (synthesis of alkanes, alcohols, aldehydes, ketones, acids and esters).

CHEMISTRY PRACTICAL

Mark Distribution :

Full Mark : 30   **Time : 3 hrs**

1.	**Salt analysis (Acid radical)**	–	–	**10 mark**
	Dry Test	–	**04 mark**	
	Wet Test	–	**06 mark**	
2.	Crystallisation / Single titration /			
	Equivalent mass / Solubility	–	–	**10 mark**
3.	**Viva-voce**	–	–	**06 mark**
3.	**Record**	–	–	**04 mark**

Experiments :

1.   **Basic Laboratory Techniques: (Non-evaluative)**

a)   Bunsen burner (different parts and their functions)

b)   Chemical balance - weighing with chemical balance by equal oscillation method.

c)   Cutting and bending glass tube, drawing jet and boring a cork.

2.   **Crystallisation :**

Preparation of $CuSO_4$, $5H_2O$ crystal from $CuCO_3$.

3.   **Qualitative Analysis :**

a)   **Identification of acid radicals :**

Radicals : CO_3^{2-}, SO_3^{2-}, S^{2-}, NO_2^-, Cl^-, Br^-, I^-, NO_3^-, SO_4^{2-}, & PO_4^{3-}.

b)   **Identification of Basic Radicals :**

Radicals : Ag^+, Pb^{2+}, Hg_2^{2+}, Cu^{2+}, Hg^{2+}, Bi^{3+}, As^{3+}, Sb^{3+}, Sn^{2+}, Al^{3+}, Fe^{3+}, Cr^{3+}, Co^{2+}, Ni^{2+},

Zn^{2+}, Mn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, NH_4^+, Mg^{2+}, K^+ and Na^+ (Dry Tests only).

4. **Volumetric Analysis :**

Single titration of acids and bases (three experiments to be done ; one on direct determination of normality of one of the solutions from that of the other and the other two, involving numerical calculations)

5. **Gravimetric Analysis**

a) Equivalent mass of Mg by hydrogen displacement method.

b) Solubility of K_2SO_4 at room temperature.

(*For +2 2nd Year*)
CHEMISTRY THEORY

Unit-I : Physical Chemistry :

i) **Thermodynamics :** (*6 periods*)

System and its types, surroundings, properties of system, extensive and intensive properties of a system, thermodynamic state of a system, processes- reversible and irreversible processes, internal energy and enthalpy, the first law, heat capacity and specific heat, measurement of DU and DH. **Thermochemistry:** exothermic and endothermic reactions, enthalpy change of reaction at constant pressure and constant volume, relation between them, enthalpy of formation, combustion and neutralisation, sublimation, ionization and solution. Hess's law of heat summation and its applications. Entropy and free energy, spontaneity of a process.

ii) **Equilibria :**

a) **Chemical Equilibria :** (*6 periods*)

Equilibria in physical and chemical processes, law of mass action, equilibrium constants (K_c, K_p, and K_x), relation among them, the reaction quotient and its relation with the equilibrium, simple homogeneous equilibria, heterogeneous equilibria (dissociation of $CaCO_3$ and NH_4HS), Le-Chatelier's principle and its application to synthesis of NH_3 and HI. Numerical problems.

b) **Ionic equilibria :** (*6 periods*)

Theories of acids & bases, ionisation of weak acids and bases (derivation of expression, for ionisation constants & degree of ionisation), ionic product of water, pH and other logarithmic terms, common-ion effect, solubility product and their applications with special reference to application in salt analysis,

buffer solution & Henderson equations for acid and basic buffers, hydrolysis of salts, Numerical problems.

iii) **Chemical Kinetics :** (*6 periods*)

Slow and fast reactions, rate (speed) of reactions, average and instantaneous rates, factors affecting rate of reactions, order and molecularity of reactions with examples of simple reactions, kinetics of zero and first order reactions, fractional-life period (half-life period as a special case), dependence of rate constant with temperature (Arrhenius equation), activation energy. Collision theory of unimolecular reactions (elementary idea ; mathematical treatment excluded). Numerical problems.

iv) **Electrochemistry :** (*6 periods*)

Electrolytes and non-electrolytes, electrolysis in molten state and aqueous solutions, laws of electrolysis. **Electrolytic conductance :** conductance and resistance, specific, equivalent and molar conductance, variation of equivalent conductance with dilution (qualitative treatment), equivalent (and molar) conductance at infinite dilution, Kohlrausch's law and its applications. **Galvanic cells :** cells and cell reactions, electrode potential and cell potential, the Nernst equation and its application, standard electrode potential, electromotive series, emf of simple cells. Lead accumulator and fuel cells. Numerical problems.

Unit-II : Inorganic Chemistry :

i) **Nuclear Chemistry :** (*4 periods*)

Consequences of a-, b- and g-emissions - the group displacement law, kinetics of radioactive decay, half-life and average-life period, nuclear stability and neutron-proton ratio, mass-energy conversions, the binding energy, carbon dating, artificial radioactivity induced by alpha particles and neutrons, elementary idea on nuclear fission and fusion, application of radioisotopes. Numerical problems.

ii) **þ-Block Elements :**

a) **Group 16 elements :** (*3 periods*)

General characteristics of oxygen family, preparation, properties and uses of ozone, hydrogen sulfide, sulfur dioxide and sulfuric acid.

b) **Group 17 elements :** (*6 periods*)

General characteristics of halogen family, preparation, properties and uses of fluorine, HF, HCl, HBr & HI, brief idea about interhalogen compounds.

c) **Group 18 elements :** (*3 periods*)

Position in the periodic table, general characteristics, properties and uses of noble gases, properties and structure of XeF_2, XeF_4 and XeF_6.

***iii*) d-Block Elements :**   (*4 periods*)

Transition metals : General characteristics, principle of extraction (industrial details excluded), properties and uses of Cu and Fe.

***iv*) Co-ordination Compounds :**   (*8 periods*)

Introduction, ligands and their types, Werner's theory of co-ordination compounds, nomenclature and isomerism of coordination compounds, colour, magnetic properties and shapes, elementary idia of valence-bond and crystal field theory importance of coordination compounds in qualitative analysis, extraction of metals and in biological systems.

Unit-III : Organic Chemistry :

***i*) Aldehydes and Ketones :**   (*6 periods*)

Preparation (Oxidation and dehydrogenation of alcohols, dry distillation of calcium salts, from carboxylic acids, ozonolysis, from acid chlorides & Grignard's reagents, hydration of alkynes), properties (additions of HCN, $NaHSO_3$, ROH to carbonyl groups, blocking of carbonyl group by cyclic acetal formation, addition-elimination reactions with hydrazine, phenyl hydrazine, DNPH, semicarbazide and ammonia), reactions with Tollen's reagent, Fehling's solution, oxidation and reduction, action of PCl_5, halogenation & haloform reactions, aldol reaction and Cannizzaro's reaction.

***ii*) Monocarboxylic Acids :**   (*3 periods*)

General formula, methods of preparation (oxidation of primary alcohols and aldehydes, hydrolysis of nitriles and esters, carboxylation of Grignard's reagent), properties - physical, chemical (acidic nature, formation of acid derivatives, alkanes, reaction of formic acid with Tollen's reagent).

***iii*) Derivatives of monocarboxylic acids :**   (*3 periods*)

***a*) Amides :** Preparation (pyrolysis of ammonium salts, partial hydrolysis of nitriles), reactions (dehydration, action of HNO_2, Hoffmann's bromamide reaction).

***b*) Acid chlorides :** Preparation from acids, reactions with alcohols and sodium salts of acids.

***c*) Esters :** Preparation from acids and acid derivatives, reactions (hydrolysis, with alkali and reduction).

***iv*) Aliphatic nitrogen compounds :**   (*4 periods*)

***a*) Nitroalkanes :** Preparation by nitration of alkanes & substitution of alkyl halides, reaction (reductions, action of HNO_2).

b) **Aliphatic amines :**

Types of amines, basic nature of amines, preparation of primary amines only reduction of nitroalkanes, cyanides, Hoffmann bromamide reaction ,Properties; Physical, Chemical : basicity, reaction with alkyl halides, acid chlorides and carbylamine reaction.

v) **Aromatic compounds :** (*16 periods*)

a) **Aromatic hydrocarbons : Preparation :** General methods of preparation. Aromaticity (Huckel's rule), graphic formula of benzene, toluene and xylenes. Properties : Electrophilic substitution reactions with mechanism (halogenation, nitration, sulfonation and Friedel-Craft's reactions), addition reactions, oxidation and ozonolysis. Directive influence of substituents in aromatic substitution reactions.

b) **Haloarenes :** Nature of C—X bond (sp^3C—X and sp^2C—X bonds), Preparation by substitution reaction and Sandmeyer's reaction, Reactions : Nucleophilic and electrophilic substitution reactions (directive influence of the halogen atom), Fitting and Wurtz-Fitting reactions

b) **Phenols : Preparation :** From haloarenes, sodium arene-sulphonates, diazonium salts, phenol from cumene (principle only). **Properties :** Physical, Reactions-acidic nature, esterification, electrophilic substitution reactions (nitration & halogenation), oxidation, reaction with zinc dust & Reimer-Tiemann reaction.

c) **Aromatic aldehydes :** General methods (From acid chlorides, nitriles, arenes, by side chain halogenation followed by hydrolysis, Gatterman-Koch reaction), Preparation of benzaldehyde by Etard's reaction. Properties : Reaction with HCN, phenyl hydrazine, electrophilic substitution reaction (nitration, halogenation), Cannizzaro reaction.

d) **Aromatic Carboxylic acids :** General methods of preparation by oxidation of arenes (alkyl benzenes), from nitriles and amides, acyl halides, esters & anhydrides, carboxylation of Grignard reagents. Properties : Acidic character, reaction with PCl_5 alcohol, decarboxylation, electrophilic substitution reaction (nitration, halogenation).

e) **Arylamines :** General methods of preparation of aniline from nitroarenes, Properties: basic character, reaction with alkyl halide, acyl halide, nitrous acid & electrophilic substitution reaction (halogenation & sulfonation).

f) **Aryl diazonium salts:** Preparation of arene diazonium chloride from arylamines, its use in synthesis of arenes, phenols, nitroarenes, fluoroarenes, chloroarenes, bromoarenes, aryl cyanides, coupling reaction.

vi) **Interconversion of organic compounds :** (*4 periods*)

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Interconversion of organic compounds involving *a*) Ascending and descending carbon series without changing functional group and *b*) Changing functional group without changing the number of carbon atoms in both aliphatic and aromatic systems.

vii) **Chemistry in the service of mankind :**   (*6 periods*)

:a) **Chemicals in Medicines :** Analgesics, antipyretics, antibiotics and antiseptics (only characteristics and few important examples, structure and preparation are not required).

b) **Polymers :** Classification of polymers; natural and synthetic polymers, important uses and formula of polythene, PVC, neoprene, teflon, Buna-S, nylon 6, nylon 6,6, terylene and bakelite.

c) **Pesticides :** Definition, classification, insecticides, fungicides and rodenticides (only the names of few commercial compounds be mentioned).

d) **Soaps and Detergents :** General idea about Soap and detergent, some important examples.

viii) **Biomolecules :** The Cell and energy cycle, photosynthesis and energy, preliminary idea about carbohydrates, proteins, aminoacids, polypeptides, lipids, hormones and vitamins.

CHEMISTRY PRACTICAL

Mark Distribution

Full Mark : 30   **Time : 3 hrs**

1.	**Salt Analysis (Identification of basic radical only)**		**12 mark**
	Dry Test	**05 mark**	
	Wet test	**07 mark**	
2.	Crystallisation / Double Titration /		
	Bench Acid Titration		**10 mark**
	OR		
	Redox Titration		**06 mark**
	Organic compound		**04 mark**
3.	**Viva-voce**		**05 mark**
4.	**Record**		**03 mark**

Experiments :

1. **Crystallisation :**

a) Preparation of Mohr's Salt [$FeSO_4$, $(NH_4)_2SO_4$, $6H_2O$] crystal.

b) Preparation of potash alum [K_2SO_4, $Al_2(SO_4)_3$, $24H_2O$] crystal.

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2. **Quantitative Analysis :**

   a) **Double titration :** Two experiments to be done - *i*) one acid two alkalies double titration *and* *ii*) two acids one alkali double titration.

   b) **Bench Acid Titration :** Strong acid of approximately $2 \cdot 0$ N be supplied.

   c) **Redox Titration :** Titration between potassium permanganate and oxalic acid.

3. **Qualitative Inorganic Analysis :**

   Wet tests for basic radicals : Wet tests for the following basic radicals be done.

   Group-I basic radicals : Ag^+, Pb^{2+}, Hg_2^{2+}

   Group-II basic radicals : Hg^{2+}, Cu^{2+}, Bi^{3+}, As^{3+}, Sb^{3+}, Sn^{2+} & Sn^{4+}.

   Group-IIIA basic radicals : Fe^{3+}, Al^{3+} & Cr^{3+}.

   Group-IIIB basic radicals : Co^{2+}, Ni^{2+}, Zn^{2+} & Mn^{2+}.

   Group-IV basic radicals : Ba^{2+}, Ca^{2+} & Sr^{2+}.

   Group-V basic radicals : NH_4^+, Mg^{2+}, K^+, Na^+.

   Identification of unknown basic radicals.

   [For identification of unknown basic radicals both dry and wet tests are to be performed]

4. **Qualitative Organic Analysis :**

   Tests for unsaturation, distinction between aromatic and aliphatic compounds by copper foil test, tests for carboxylic, phenolic, aldehydic, ketonic and alcoholic groups.

GEOLOGY

+2 1st Year (or Class XIth Class) Course.

There shall be a theory paper of three hours duration carrying 70 marks and one practical paper carrying 30 marks and of three hours duration. At the end of +2 1st year, the examination will be conducted by the Colleges/ Schools. To maintain uniformity and sanctity of examination, CHSE to prepare and supply the +2 1st year questions to different Colleges/Schools. The pass marks for the theory paper is 30% and for practical paper is 40%. The +2 1st year Annual marks will neither be reflected in H.S. Mark sheet not added to It. The motto of this examination is to know the standard of students and prepare them for the H.S. examination, accordingly.

FOR 2014 AD -COLLEGE EXAMINATION

+2 1st year course (Class-XIth)

Theory Paper - I   Full marks -70 marks   Time- 3 hours

Practical Paper - IIFull Marks - 30 marks   Time -3 hours

Scheme of Examination:

Theory paper

Time - 3 hours

Unit -I :   General Geology and Geomorphology

Unit -II :   Crystallography

Unit-III: Mineralogy

Unit - IV :   Palaeontology

Practical Paper

Time - hours

Full Marks - 30

Marks

1.   Crystallography

2.   Mineralogy

3.   Palaeontology

4.   Practical Record & Viva- Voice

Detailed Syllabus in GEOLOGY -

Paper - I

Time- 3 hours

UNIT - I   **20 Periods**

A.   General Geology:-

1.   Subdivision and Scope of Geology.

2.   Origin of the earth

3.   Age of the earth

4.   Internal constitution of the earth: crust, mantle, outer core, Inner core.

5.   Depth Zone of oceans.

B.   Geomorphology:-

1.   Definition of geomorphology

2. Weathering and Erosion.
3. Geological work of the following Exogenetic processes with respect to weathering. Transportation and deposition with their important land forms:-
    a) River
    b) Glacier
    c) Wind
4. Orogeny & Epeirogeny (Definition only)
5. Definition, classification, causes and effects of the following endogenetic processes.
    a) Earthquake
    b) Volcanoes

UNIT - II
Crystallography:-
1. Crystalline and Amorphous substances.
2. Morphology of Crystals Form, Face, Edge, Solid angle.
3. Symmentry Elements of Crystals:- Plane of symmetry, Axis of symmetry, centre of symmetry.
4. Crystallographic axes, their relationship and classification of crystals into six systems.
5. Parameters, Indices and symbol of the crystal.
6. Description of Normal Class of different crystal systems
    (Except Triclinic) with respect to
    a) axial relationship,
    b) Symmetry Elements,
    c) Forms present (Both Tabular and description of each) and
    d) Mineral crystallised in this system (at least Five).

UNIT - III
Mineralogy   15 Periods
1. Definition of Minerals
2. Physical properties of Minerals:-
    Form, Colour, Lustre, Streak, :Hardness, Cleavage, Fracture, Specific gravity, any other special property.
3. Description of following minerals with respect to their chemical composition, physical properties and uses:-
    i) Oxides :-   Quartz, Corundum, Haematite Magnetite, Chromite, Bauxite,
    ii) Carbon :-   Graphite
    iii) Carbonates :- Calcite, Magnesite.
    iv) Silicates :- Orthoclase, Microcline, Plagioclase, Biotite, Muscovite, Olivine, Topaz, Talc, Garnet, Beryl, Hornblende, Augite, Sillimanite, Kyanite.
    v) Sulpides:-   Pyrite, Chalcoprite
    vi) Sulphates:- Gypsum, Apatite
    vii) Fluoride :- Fluorite.

UNIT - IV
Palaeontology -   12 Periods
1. Definition, mode of preservation and uses of fossils.
2. Index fossils- with examples
3. Morphology of Brachiopoda, Lamellibranchia. Gastropoda, Cephalopoda.
4. Plant Fossils :- Glossopteris, Gangamopteris, Vertebraria, Ptillophylum with reference to systematic position, Morphology, Indian occurrence and Age.

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Books Recommended:

1. **Bureau's Higher Secondary (+2) Geology, Part-I**
    Published by Orissa State Bureau of Textbook Preparation and Production, Bhubaneswar.

PAPER - I
PRACTICAL

Full Marks -30

Time -3 hours

To be covered in the first year & to be conducted at the end of +2 1st real :

1. **Crystallography: -**   **10 Marks**

    Study of crystal models of normal classes -Isometric, Tetragonal, Hexagonal and Orthorhombic system with respect to axial relationship, symmetry elements and forms present.

2. **Mineralogy: -**   **10 Marks**

    Study of physical characters of rock -forming and ore forming minerals listed in the theory.

3. **Palaeontology: -**   **6 Marks**

    Drawing, Labelling, Age and description of the following fossils: -

    Productus, Spirifer, Rhynchonella, Pecten, Arca, Conus, Physa, Natica, Nautilus, Ceratites, Glossopteris, Gangamopter is, Vertebrarla, ptyllophyllum.

4. **Laboratory Records and Viva-Voce -**   **4 marks**

    To be examined by Examiners.

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GEOLOGY
(+2 IInd year Course)
CHSE Examination

There shall be one theory paper of 3 hours duration carrying 70 marks and one practical paper carrying 30 marks of 3 hours duration. At the end of +2 IInd year the examination will be conducted by CHSE, Orissa.

The students reading Geology as an (3rd & 4th) Optional subject required to undertake a field training programme for getting an idea about the field aspect of the subject with a minimum period of 3 days. The Geological Field Training will be conducted by the respective Colleges and the students will be allowed to appear the Practical examination only after the completion of the field training programme.

Scheme of Examination :-

THEORY PAPER - II

Time - 3 hrs.

Full marks - 70 Marks

Short questions will be set for 50 marks(fifty marks) end rest 20 (twenty marks) will be of long type. At least two long questions of 10 marks each, should be set covering all uits of the syllabus. There should be uniform distribution of marks for every unit for short questions two.

PRACTICAL PAPER - II

Time- 3 hrs.

Full marks -30

Marks

1. Petrology
2. Structural Geology

3. Economic Geology
4. Field Report
5. Viva Voce
6. Laboratory Record

The pass marks for theory paper is 30% and the pass marks for practical paper is 40%. The candidate has to secure the pass marks individually in each paper to be successful in the HS Examination.

Detailed Syllabus in Geology
(+2 IInd Year)
Theory Paper

Full Marks-70
Time - 3 hrs.

Unit - I

Petrology

A. Igneous Petrology

1. Definition and classification of rocks.
2. Classification of igneous rock based on depth of cooling.
3. Forms of igeous rock -a) Concordant -Sill, Laccolith, Lopolith, Phacolith.
   Discordant -Dyke, Batholith.
4. Texture & Structure of Igneous rocks.
5. Description of the following rocks with respect to the textural, structural & mineralogical composition.
   a) Intrusive rocks - Granite, Pegmatite, syenite, Diorite, Gabbro, Dolerite, Periodotite
   b) Extrusive rocks -Basalt.

B. Sedimentary Petrology

1. Brief idea about mode of formation of sedimentary rocks.
2. Texture and structure of sedimentary rocks.
   Description of the following sedimentary rocks
   Conglomerate, Breccia, Sandstone, Shale, Limestone.

C. Metamorphic Petrology:

1. Definition, Agents & kinds of metamorphism.
2. Metamorphic texture & structure.
3. Description of the following metamorphic rocks, Gneiss, Schist, Quartzite, Marble, Khondalite.

Unit -II

Economic Geology & Applied Geology   **Marks -25**

   Economic Geology:

1. Definition of ore, Gangue, Tenor, & Grade of ore.
2. Elementary idea about the process of formation of mineral deposits with special reference to magmatic concentration and Hydrothermal processes.
3. Mineralogy, Mode of occurrence, uses and Indian distribution of the following ores.
   a) Iron ores, b) Copper ore, c) Aluminium ore, d) Chromium ore, e) Coal, f) Petroleum, g) Manganese

Applied Geology

A. Ground Water

1. Definition of ground water.
2. Hydrologic cycle
3. Advantages of using ground water.
4. Porosity, Permeability
5. Aquifers & water table.

B. Engineering Geology:

1. Geological consideration of the damsite.
2. Geological consideration of the Bridge site.
3. Soil erosion & methods of soil conservation.

Unit - III

Stratigraphy & Structural Geology   **Marks -25**

A. Stratigraphy :

1. Definition, scope, units & principles of stratigraphy.
2. Standard stratigraphic time scale.
3. Principles of stratigraphic correlation.
4. Dharwar super Group.
5. Type Areas of Cuddapah & Vindhyan Super Group.
6. Gondwana Super Group.
7. A general idea about Geology of Orissa.

B. Structural Geology :

1. Attitude of beds :   Dip and strike
2. Fold   :   Antiform, Synform, Anticline,
Syncline, Symmetrical, Isoclinal   & Recumbent fold.
3. Fault   :   Normal fault & Reverse fault
                              Horst and Graben.
4. Unconformity & its types.

Books Recommended:

1. **Bureau's Higher Secondary (+2) Geology, Part-II**
   Published by Orissa State Bureau of Textbook Preparation and Production, Bhubaneswar.

SECOND YEAR (PRACTICAL)

Time -3 hours

Full marks -30

1. Petrology
2. Structural Geology
3. Economic Geology
   (Ore minerals)

4.   Field Report

5.   Viva-Voce

6.   Laboratory Records

Detailed Syllabus of Practical:

1.   <u>Petrology:</u>

Megascopic identification of rocks as given in theory.

2.   <u>Structural Geology</u>

Study of geological maps and drawing of profiles.

3.   <u>Economic Geology</u>

Megascopic identification of the following economic minerals:- Hematite Pyrite Magnetite, Pyrolusite, Psilomelane, Chalcopyrite, Bauxite, Chromite, Magnesite.. Coal, Graphite.

4.   <u>Field Training</u>

1.   Use of clinometer compass

2.   Study of structure and rock types, mineral assemblages during the course of field training.

3.   Preparation of Field Report and it is to be submitted at the time of Practical Examination.

5.   <u>Viva-voce</u>

Oral questions to be answered by the students.

6.   <u>Laboratory Records</u>

The laboratory records are to be examined by the examiners at the time of Practical Examination.

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BIOLOGY

(Paper-I Botany and Paper-II Zoology, each Year)

There shall be two theory papers. Examination for each theory paper shall be of **two hours** duration carrying **35 marks**. In addition, there shall be two practical papers in Biology in each year: one for Botany and one for Zoology. Examination for each **practical paper shall be of three hours** duration carrying **15 marks.**

Examination pattern:

Questions on each theory paper of 35 marks shall consist of 3 groups covering all units of the paper as given in the syllabus. Number and nature of questions in each theory paper and marks distribution would be as follows.

Group - A: Objective Type Compulsory

1.	Multiple choice / One word answer	1 mark each x 5 = 5 marks
2.	Correct the sentences / Fill up the blanks	1 mark each x 4 = 4 marks

Group - B: Short Answer Type

3.   Answer within two / three sentences   2 marks each x 4 = 8 marks

(Out of 8 bits - one has to answer 4 bits)

4.   Short answer type II. (Differentiate) 3 bits to be

answer from 6 bits, each carrying 2 marks   2 marks each x 3 = 6 marks

Group - C: Long Answer Type

5.   Out of 4 questions from all units,

one has to answer 2 questions   6 marks each x 2 = **12** marks

Long answer type questions are to be set only from the portions underlined in the syllabus.

BIOLOGY

PAPER - 1 (BOTANY) FOR 1ST YEAR THEORY

Full Marks: 35

Time: 2 hours

Detailed syllabus for first year

UNITS		Periods
I.	Diversity of Plant Life	12
II.	Cell Biology	16
III.	Morphology, Anatomy, Reproduction & Classification	12

UNIT - 1   Diversity of Plant Life: **12 Periods**

Classification: (Two Periods)

Diversity of plant life: Classification of living organisms and five kingdom system with their merits and demerits; Status of Bacteria & Viruses, Binomial nomenclatures, Classification of plant kingdom with salient features.

Salient features of various plant groups: (Seven periods)

Life history of representative members of different plant groups (No anatomical details) and their economic importance.

Algae	-	*Spirogyra*
Fungi	-	*Saccharomyces*
Bryophyta	-	*Funaria*
Pteriodonphyta	-	*Dryopteris*
Gymnosperms	-	*Cycas*

Structure, reproduction and economic importance of Bacteria and Viruses (including bacteriophage & TMV)

Plant Nutrition: (One Period)

Elementary idea of modes of nutrition

Plant Diseases: (Two Periods)

Elementary idea on symptoms and control measure of following plant diseases: Powdery mildew of peas, Bacteria blight of rice, Papaya mosaic disease.

UNIT-II Cell Biology   **16 Periods**

Cell: (Two Periods)

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Cell as a basic unit of life: discovery of cell, cell theory, exceptions to cell theory, Tools and techniques (Principle of compound microscope and electron microscope), <u>Ultrastructure of eukaryotic cell, Basic differences between prokaryotic and eukaryotic cell.</u>

Structural components : (Six Periods)

Cell wall, <u>Plasma membrane: structural models and function;</u> protoplasm, vacuole, nucleus, <u>chromosome: structure and function,</u> nucleosome concept, Cell organelles: plastids, mitochondria, endoplasmic reticulum, Golgi complex, ribosome, lysosome, peroxisome, spherosome, microtubules, cilia and flagella; Excretory & secretory products.

Biomolecules: (Three Periods)

General structure and importance of carbohydrates, amino acids, proteins, lipids and nucleic acids.

Enzymes: (Two periods)

<u>Properties, chemical nature, mode of action.</u>

Cell Cycle: (Three Periods)

Cell division and its significance, cell cycle and its control, amitosis, mitosis, meiosis.

UNIT-III Morphology, Anatomy, Reproduction and Classification   **12 Periods**

Morphology: (To be taught in practical classes)

Typical angiospermic plant, Root, Stem and Leaf, their structure and modifications; Types of inflorescences, Flower and floral parts, Fruits and Seeds, (To be taught in practical classes).

Anatomy of Angiosperms: (Four Periods)

<u>Tissues (meristematic and permanent):</u> Tissue system. Anatomy of root, stem and leaf of monocot and dicot plants. <u>Secondary growth (normal) of dicot stem.</u>

Reproduction in Angiosperms: (Four Periods)

Modes of reproduction in flowering plants: asexual & sexual; microsporogenesis, megasporogenesis, male and bisporic female gametophyte, <u>Pollination: types, agents; contrivances for cross pollination,</u> double fertilization, endosperm, embryo, apomixis and polyembryony.

Classification of Angiosperms: (Two Periods)

Units of classification, Different types of classification of angiosperms, Bentham and Hooker's system of classification and its merits & demerits; concept of Botanical Gardens and Herbaria.

Studies of important Families: (To be taught in practical classes)

<u>Malvaceae, Solanaceae, Fabaceae, Brassicaceae, Asteraceae, Liliaceae</u> (To be taught in practical classes and **long questions are to be set in theory paper).**

Uses of plants (Economic Botany): (Two Periods)

Botanical name, family, habit, habitat and parts of the plant used for economic purposes; Cereals (Rice); Pulses (Green gram); Oil-yielding seed (Ground nut); Fruits (mango, banana); Fibers (jute, cotton) Medicine (Tulsi, neem).

PRACTICAL FOR 1ST YEAR

1. Study of parts of dissecting & compound microscopes.
2. Study of a typical angiospermic plant.

Major Experiments

3. Study of mitosis in onion root tip.
4. Study of meiosis in onion flower bud.
5. Study and description of flowers belonging to the families: Malvaceae, Solanaceae, Fabaceae, Brassicaceae, Asteraceae and Liliaceae.
6. Preparation and study of transverse section of dicot and monocot root, stem & leaf.

Minor Experiments

7. Study of cell: onion scale leaf, Rhoeo discolor epidermal peel.
8. Study of cell inclusions: starch grains & raphides.
9. Qualitative test for catalase activity by leaf disc method.
10. Study of modifications of roots, stems and leaves.
11. Study of identification of different types of inflorescences.
12. Study of flower and its parts.
13. Study of parenchyma, collenchymas, sclerenchyma, xylem and phloem through permanent slides.

Spottings

14. Identifications with reasons of the following specimens/permanent slides of
    A. *Spirogyra* (vegetative filament, scalariform & lateral conjugation). Saccharomyces (cell & budding)
    B. *Funaria, Dryopteris, Cycas*
15. Botanical name, family, habit and parts of the plant used for economic purpose of rice, green gram, ground nut, banana, jute, cotton, Tulsi and neem.
16. Identification with reasons of the following permanent slides:
    A. T.S. of a typical angiospermic anther
    B. L.S. of ovules: Anatropous/Orthotropous/Campylotropous
    C. Monocot & dicot embryo

PRACTICAL EXAMINATION (BOTANY)

Full Marks - 15
Time - 3 hours

Major Experience (One)   -   7 marks
(Sl No. 3 to 6) (Theory & Procedure = 3, experiments results = 4)
Minor Experiment (One)   -   3 marks
(Sl No. 7 to 13)
Spottings: Three: 3x 1 (Three minutes each   -   3 marks
(Sl No. 14 to 16)
Class Record   -   2 marks   Total -15 marks

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1. All the above experiments should be conducted by individual student.

2. Questions for major and minor experiments are to be set by drawing lots.

PAPER - 1 (BOTANY) FOR 2nd YEAR
THEORY

Full Marks - 35
Time - 2 hours

Detailed syllabus for Second year

UNITS		Periods
1.	Physiology	14
2.	Ecology and Genetics.	14
3.	Biotechnology, Growth and Development	12

UNIT - I   Physiology: **14 Periods**

Plant and Water: (One Period)

Cell as a physiological unit, imbibition, diffusion, osmosis, water potential, osmotic potential and pressure potential.

Water Relation (Three Periods)

Availability of soil water. Mechanism of active and passive absorption; apoplast-symplast concept, Theories of ascent of sap - root pressure, transpirational pull; Transpiration - types, significance; factors affecting rate of transpiration; mechanism of stomatal opening and closing (Starch-sugar hypothesis, potassium pump theory).

Mineral nutrition: (Two Periods)

Essential elements; Macroelements and micro (trace) elements: their functions & deficiency symptoms.

Elementary idea on Biological nitrogen fixation (One Period).

Photosynthesis: (Four Periods)

Site and significance of Photosynthesis; Chlorophyll structure; Light and dark phases; Photosystems, Photophosphorylation (cyclic and non-cyclic); C3 and C4 pathway; CAM plants, photorespiration; Factors affecting photosynthesis.

Respiration: (Three Periods)

Cellular respiration; (Aerobic, Anaerobic and Fermentation); Respiratory substrates, Respiratory quotient, Glycolysis; TCA cycle; Electron transport system and oxidative phosphorylation.

UNIT- II Ecology and Genetics: **14 Periods**

Ecology: (Four Periods)

Autoecology, Synecology, Ecological factors: climatic, edaphic, topographic and biotic; Broad ecological classification of plants: mesophytes, hydrophytes and xerophytes. Ecosystem: components of ecosystem, types of ecosystem: terrestrial and aquatic; energy flow in ecosystem, food chain and food web, ecological pyramids; Ecosystem services; Plant succession (hydrosere and xerosere).

Genetics:

Continuity of Life: (Four Periods)

Heredity & variation; Mendel's laws of inheritance, chromosomal basis of inheritance; other patterns of inheritance: incomplete dominance, multiple allelism, quantitative inheritance.

Molecular basis of Inheritance: (Five Periods)

The search for genetic material: Griffith and Avery's experiments on transformation: DNA: its structure, function and replication; RNA world; Gene expression: central dogma, genetic code, transcription and translation in prokaryotes and eukaryotes; Regulation of gene expression: induction and repression.

Plant breeding: (One Period)

Hybridization; Breeding for crop improvements.

UNIT - III Biotechnology, Growth & Development: **12 Periods**

Biotechnology: (Five Periods)

Recombinant DNA technology: tools, techniques, steps and applications; Tissue culture: totipotency; techniques, steps and applications of plant tissue culture; Production of Transgenics with examples from plants, animals & microbes.

Microbes in human welfare: household and industrial products, sewage treatment, biogas production, biocontrol agents and biofertilizers.

Growth & Development:

Phytohormones: (Three Periods)

Characteristics of plant growth; Elementary idea on Phytohormones; Physiological effects of Auxins, Gibberellins and Cytokinins.

Seed Germination: (One Period)

Mechanism of seed germination, factors affecting seed germination, seed dormancy.

Senescence and abscission (Elementary idea): (One period)

Process of Flowering: (One Period)

Elementary idea on photoperiodism and vernalisation.

Plant movement: (One Period)

Elementary idea on phototropism, geotropism, tropic and nastic movements.

PRACTICAL FOR   2nd YEAR

Major Experiments

1. Study of the effect of temperature and chemicals (ethanol, acetone, formaldehyde) on leaching of pigments in beet root.

2. Study of plants pigments by paper chromatography.

3. Study of the effect of different wavelength of light on photosynthesis by Wilmott's bubbler.

4. Study of effect of dissolved carbon dioxide on photosynthesis by wilmott's bubbler.

5. Study of transpiration by Ganong's or Farmer's photometer.

6. Study of relation between transpiration and absorption by T/A apparatus.

7. Comparative study of rate of transpiration from upper and lower surface of a dicot leaf.

8. Study of plasmolysis in cells of epidermal peels of Rhoeo discolor and to find out the concentration of isotonic condition.

Minor Experiments

9. Qualitative test for the presence of carbohydrates (glucose, starch, cellulose)/ proteins / and fats in seeds of rice/wheat/gram or potato tuber.

10. Study of osmosis by potato osmometer.

11. Study of distribution of stomata on upper and lower surface of a dicot and monocot leaf.

12. Analysis of samples of verification of Mendelian ratio using pea seeds or colour beads.

Spottings

13. Identification with morphological adaptations of the following specimens:

    A.   Hydrophytes: Hydrilla, Pistia, & Eichhornia

    B.   Xerophytes: Opuntia, & Casuarina

14. Experimental set up showing conditions necessary for germination (air and water).

15. Experimental set up showing types of germination: epigeal/hypogeal.

16. Experimental set up showing phototropism or geotropism.

PRACTICAL EXAMINATION

Full Marks - 15
Time - 3 hours

1.   Major Experiment (One)   7   marks
      (Sl No. 1 to 8)

2.   Major Experiment (One)   3   marks
      (Sl No. 9 to 12)

3.   Spotting: three: 3 x 1 =   3   marks
      (Each 3 minutes duration, Sl. no 13 to 16)

4.   Class Record   2 marks = Total -15 marks

1.   All the above experiments should be conducted by individual student.

2.   Questions for major and minor experiments are to be set by drawing lots.

3.   For each major and minor experiments, candidates have to write the requirements as per their questions which may be verified and signed by the external examiner only.

4.   One observation for major experiment may be verified and signed by the external examiner only.

❖❖❖

BIOLOGY

(Paper-1 Botany and Paper-II Zoology) each year

Theory-   **35**   **Total- 50**

Practical-   **15**

       There shall be two theoretical papers. Examination for each theory paper shall be of two hours duration carrying 35 marks in addition, there shall be two practical papers in Biology in each year one for Botany and one for Zoology. Examination for each practical paper shall be of three hours duration carrying 15 marks.

Examination Pattern:

       Question on each theory paper of 35 marks shall consist of three groups covering all units of the paper as given in the syllabus. Number and nature of questions in each theory paper and mark distribution would be as follows.

       Group A: (Objective Type Compulsory)

Q.1-   Multiple choice/ one word answer   :   1 mark each x 5 =   5 marks

Q.2-   Correct Sentences/Fill up the blanks   :   1 mark each x 4 =   4 marks

       Group B: (Short Type Answer)

Q.3-   Answer within two or three sentences   :   2 marks each x 4 =   8 marks

       (out of eight bits on has to answer 4 bits)

Q.4-   Short answers type" (Differentiate) 3 bits to be

       answered out of 6 bits each carrying 2 marks   2marks each x 3 =   6 marks

Q.5-   Group C: (Long Type Answer)   :   6 mark each x 2 =   12 marks

       (out of four questions from all units

One has to answer two questions)

N.B: Long answer type questions are to be set only from the portions underlined in the syllabus.

BIOLOGY
PAPER-II (ZOOLOGY) FOR 1ST YEAR
THEORY

Detailed syllabus for First Year

Units		Periods
I.	Introduction to Zoology and Biological Classification	05
II.	Organic Evolution	06
III.	Animal Tissue	06
IV.	Locomotion and Movement in Man	03
V.	Digestion and Absorption	05
VI.	Animal Respiration	04
VII.	Circulation of Body Fluid	06
VIII.	Excretory Products and Elimination	05

Total - 40 Periods

I.   Introduction to Zoology: (04 Periods)

Brief History, Branches of Zoology, Scope of Zoology.

Biological Classification: (03 Periods)

Classification (Artificial, Natural, Phylogenetic), Two Kingdom and Five Kingdom-their merits and demerits, Binomial nomenclature. Scientific name of Rohu, Frog, Toad, Wall Lizard, Garden Lizard, Pigeon, Peacock, Rat, Man. Broad outline classification of animals (non-chordate up to phylum and chordate up to class level).

II.   Organic Evolution: (06 Periods)

Origin of Life, Oparin-Haldane theory, Miller's experiment, Theories of evolution (Lamarckism and Darwinism), Evidences of evolution (Anatomical, embryological, paleontological and biochemical).

III. Animal Tissue: (06 Periods)

Structure and functions of Epithelial, Connective (detailed about blood and bones) Muscular and Nervous Tissues.

IV.   Locomotion and Movement in Man: (03 Periods)

Locomotion-joints and muscles in movement of Man, Mechanism of muscle contraction, Disorders-Arthritis and Osteoporosis.

V.   Digestion and Absorption: (05 Periods)

Intracellular and extracellular digestion, digestive system of cockroach, digestive system in human and physiology of digestion and absorption, role of hormones in digestion, malnutrition and under-nutrition.

VI.   Animal Respiration: (04 Periods)

Respiration and types (Cutaneous, tracheal), Respiration in Human: respiratory organs, mechanism of breathing, transport of respiratory gases, common respiratory disorders-prevention and cure)

VII. Circulation of Body Fluid: (06 Periods)

Types of Circulation : Open circulation in Cockroach, closed circulation in human, structure and working of human heart, heart beat, cardiac cycle, pulse, blood groups ("ABO" and Rh), blood coagulation, Blood related disorders-hypertension, atherosclerosis, arteriosclerosis and pace maker.

VIII. Excretory Products and Elimination: (5 Periods)

Types: Ammonotelism, ureotelism, and uricotelism, Malpighian tubules in Cockroach, Septal nephridia in Earthworm.

Excretion in Human-excretory system, formation of urine, Role of kidney in osmoregulation.

Disorders related to excretion: kidney failure, dialysis, Role of ADH. Role of liver in excretion, Ornithine Cycle.

N.B.: Long answer type questions are to be set only from the portions underlined in the Syllabus.

PRACTICAL FOR 1ST YEAR

EXPERIMENTS/ OBSERVATIONS:

1.   Tests for carbohydrate and fat (Qualitative)

2.   Habit, Habitat, External features of specimens and identification with reasons-Amoeba, Hydra, Sycon, Planaria, Liver fluke, Ascaris, Earthworm, Leech, Prawn, Cockroach, Silkworm, Honeybee, Snail, Starfish, Shark, Rohu, Frog, Wall lizard, Cobra, Krait, Pigeon and Rat.

3.   Study of squamous epithelium, muscle fibres, nerve cells and mammalian blood film (temporary/ permanent slides)

4.   Microscopic Preparation of striated muscle fibre of Toad.

PRACTICAL EXAMINATION
Mark Distribution

1.	Experiment			One experiment to be set:
	Theory & Procedure	-	03	
	(To be set from Sl.No.1 &4)			
	Experiment, Observation & Results	-	04	
2.	Spotting	-	06	Four spotting each carrying 1.5 mark.
	(To b e set from Sl No. 2 & 3)			(three museum specimens and one slide)
3.	Record	-	02	
	Total	-	15	

BIOLOGY
PAPER-II (ZOOLOGY) FOR 2ND YEAR
THEORY

Detailed syllabus for Second Year

Units		Periods
I.	Neural Control and Coordination	06
II.	Chemical Coordination and Regulation	04
III.	Animal Reproduction	08
IV.	Reproductive Health & Human development	08
V.	Genetics	07
VI.	Human Health and Diseases	04
VII.	Strategies for Enhancement of Food Production	02
VIII.	Biodiversity	01
IX.	Environmental Issues	04
		Total - 40

I. Neural Control and Coordination: (06 Periods)

Neural control and coordination: Broad outline of Nervous System of Earthworm and Cockroach. Human brain and spinal cord (structure and function), Mechanism of transmission of nerve impulse, reflex action and autonomic nervous system (elementary idea).

II. Chemical Coordination and Regulation: (04 Periods)

Chemical coordination and regulation of Human endocrine system-Endocrine glands (name, location, hormones, their functions and hormonal disorders), feedback controls.

III. Animal Reproduction: (04 Periods)

Reproduction types: Asexual reproduction-binary fission, multiple fission, Gemmule in Sponges, Budding in hydra, Sexual reproduction in human-male and female reproductive system, Menstrual cycle.

Human Development: (04 Periods)

Gametogenesis (spermatogenesis, oogenesis), Fertilization, Implantation, Pregnancy & Embryonic development (brief), Parturition and Lactation.

IV. Reproductive Health: (02 Periods)

Problems and Strategies, Population Explosion and Birth Control, Medical Termination of

Pregnancy(MTP), Sexually Transmitted Diseases(STD) and Infertility.

V.   Genetics: (07 Periods)

Mendelism,, Linkage and crossing over, <u>Sex determination, Sex linked inheritance</u>, Chromosomal aberrations (Structural), Elementary idea about Recombinant DNA Technology, Human Genome Project, DNA Fingerprinting, Pedigree analysis of Haemophilia Genetic disorders (Haemophilia, Sickle-cell anaemia, Phenylketonuria, Down's syndrome, Klinefelter's Syndrome and Turner's Syndrome).

VI.   Human Health and Diseases: (06 Periods)

Common Diseases in Humans: Typhoid, Pneumonia, Common Cold, Malaria, Amoebiasis, Ascariasis, Filariasis, Ringworm.

Immunity: <u>Innate immunity, Acquired immunity, Cell mediated immunity, Humoral immunity,</u> Active and Passive immunity, Vaccination and Immunization, Allergies, Autoimmune Diseases, Immune System of our body. AIDS, Cancer.

Problems of Adolescence : Drug and Alcohol abuse, Effect of Drug/ Alcohol abuse (prevention and control).

VII.   Strategies for enhancement of Food Production: (02 Periods)

Animal Husbandry : Management of Farm animals (Diary Farm Management, Poultry Farm Management, Animal Breeding), Bee Keeping, Fisheries.

VIII.   Biodiversity :   (01 Period)

Its importance, Biosphere reserve, National Parks, Zoos, Sanctuaries

IX.   Environmental Issues: (04 Periods)

Air pollution and its control, Water pollution and its control, Solid wastes, Agro-chemicals and their effects, Radioactive wastes, Green house Effect and Global Warming, Ozone Depletion in the Stratosphere, Degradation Environmental, Improper resource utilization & maintenance and Deforestation.

N.B.:   Long answer type questions are to be set only from the portions underlined in the Syllabus.

PRACTICAL FOR 2ND YEAR

Section –A : Major Experiments

1.   Study of action of salivary amylase on starch-effect of pH and temperature.
2.   To test the presence of urea in urine/ given sample solution.
3.   To test the presence of sugar and bile salts in urine/ given sample solution.
4.   Study of Mendelian trait in man-Tongue Rolling, Hitchickers thumb, Ear lobe, Widows peak.

Section –B : Minor Experiments

1.   Preparation of Blood Smear of Toad/ Man
2.   Study of haemolysis and crenation from human blood cells.
3.   Study of heart beat of Frog/ Toad and effect of temperature on heart beat.
4.   Working principle of Haemoglobinometer.

Section –C : Spotting –Slides, Bones and Models (mammalian)

1.   T.S/VS through spinal cord, ovary, testis, artery, vein, kidney, stomach.
         Axial and appendicular skeleton (excluding skull)
         Models- Human Eye, Ear, Heart and Brain

PRACTICAL EXAMINATION
Mark Distribution

1. Major Experiment (one) - 06 Theory and Procedure - 03
                                 Experiment Observation & Results - 03
2. Minor Experiment (one) - 2.5
3. Spotting (Three to be set) - 4.5 One Slide, One bone, One model.
4. Record - 02
   _____
   Total - 15

Arts Stream

GEOGRAPHY

The course consists of one theory paper and one practical paper for first year. The theory paper in first year carries 70 marks and the practical paper carries 30 marks. The students are to appear first year examination in the college as internal examination.

In the second year, which will be Council Examination, the theory paper carries 70 marks and the practical paper carries 30 marks.

The students are required to maintain proper practical record and Field book which are to be produced at the time of Practical examination. The practical record and Field book need to be signed by the student and concerned teacher during the Practical classes.

In the first year, there will be three essay type questions, each carrying 10 marks. The short and objective type of questions will carry 40 marks. The practical will carry at least two exercises for the year and examination.

In the second year, there will be three long questions in theory paper each carrying 10 marks. These three questions will be set from the three units with alternatives. There will be 40 marks for short and objective type questions with each type carrying 20 marks. The Practical paper will carry 30 marks with 10 marks for practical record and viva. There will be three exercises with no option in the second year Practical examination conducted by CHSE.

TYPES OF QUESTIONS AND DISTRIBUTION OF MARKS

1ST YEAR   **Full Marks-100**

Question pattern	No. of Questions	Marks per Question	Total marks
Long Answer Type	03 (With Alternatives) One from each unit	10	30
Short Answer Type	08 (4 of 3 marks and 4 of 2 marks)	03 and 02	20
Objective Answer Type	20	01	20
Practical	20+ Practical Record	10	20+10

2ND YEAR   **Full Marks-100**

Question pattern	No. of Questions	Marks per Question	Total marks
Long Answer Type	03	10 (With Alternatives) One from each unit	30
Short Answer Type	10		02 20
Objective Answer Type	20		01 20
Practical	02+ Practical Record	10	20+10

FIRST YEAR
THEORY

	Theory 70 Marks
Unit-I	**Practical- 30 Marks**
Nature of Geography and Lithosphere:	**30 marks**
1.1 Meaning an scope of Geography, Branches of Geography	2
1.2 Origin and evolution of the Earth: Nebular, Tidal, Big-Bang	3
1.3 Interior of the Earth	2
1.4 Earthquakes and volcanoes	3
1.5 Major types of Rocks and their characteristics	3
1.6 Major types of Soils and their world distribution	3
1.7 Weathering and erosion	2
1.8 Works of River, Wind and Glacier.	5

Unit-II	
Hydrosphere and Biosphere:	**20 marks**
2.1 General relief of the Ocean floor	2
2.2 Distribution of Temperature and salinity of Ocean water	2
2.3 Movements of Ocean water- Tides and Currents (Atlantic & Indian)	4
2.4 Environment- Types and Conservation, Man-Environment Relationship, Bio-Sphere- Concept, importance of Plants and Animals in the Biosphere.	4

Unit-III	
Regional Geography of Orissa:	**20 marks**
3.1 Physiography, Climate and Natural Vegetation	6
3.2 Agriculture: Problems and Prospects	2
3.3 Industry: Iron and Steel, Aluminium	3
3.4 Population: Distribution and Density	2
3.5 Transportation.	2
	50 Classes

PRACTICAL

Unit-I	**Full Marks-30**
Fundamentals of Maps:	**20 Marks**
1.1 Maps- Types, Scale- Types- Construction of Linear And Diagonal Scale	4
1.2 Drawing of parallels of latitudes and meridian of longitudes	2
1.3 Contour and cross-section: Hill, Waterfall, Plateau, Col,	

'V'-shaped valley	4
1.4 Identification of topographical symbols and weather symbols	2
1.5 Function and use of Meteorological Instruments	2
	14 Classes
1.6 Practical Record and Viva-Voce.	10 Marks

SECOND YEAR
THEORY

	Theory-70 Marks
	Practical-30 Marks
Unit-I	
Atmosphere:	**20 Marks**
1.1 Atmosphere –Composition and Structure	2
1.2 Elements and factors of Weather and Climate	1
1.3 Insolation, Temperature- Horizontal and Vertical Distribution	3
1.4 Atmospheric Pressure and Pressure belts, Winds- Planetary, Periodical and local	4
1.5 Humidity- Evaporation, Condensation and Precipitation, Types of Rainfall.	2
Unit-II	
Resource and Human Geography:	**20 Marks**
2.1 Resource: Concept of Resource, Types of Resource and Conservation of Natural Resource, Resource Development	3
2.2 Human Activities:	
a. Primary: Agriculture and allied activities, Types of Agriculture: Subsistence and Commercial	2
b. Secondary: Manufacturing Industries; Types- Household, Small Scale, Large Scale (Iron and Steel)	2
c. Tertiary: Transport and Communication (Roads & Railways)	2
2.3 Distribution of Population and Factors influencing pattern of distribution	2
2.4 Settlements: Types and Factors influencing growth and development of settlements.	2
Unit-III	
Regional Geography of India:	**30 Marks**
3.1 Physiography	2
3.2 Drainage	1

3.3 Climate	2
3.4 Natural Vegetation	1
3.5 Soils	1
3.6 Population: Distribution and Density	2
3.7 Agriculture: Distribution of Rice and Wheat	2
3.8 Industry: Distribution of Iron and Steel Industries	2
3.9 Transport: Road and Railway Network.	2
	40 Classes

PRACTICAL

Full Marks-30

Unit-I **10 Marks**

1.1 Map Projection- Construction of Simple Cylindrical,
   Cylindrical equal-area, Simple conical with one standard
   parallel, Gnomonic, Stereographic (Polar Case) Projections 5

1.2 Computation of Mean, Median and Mode
   (Grouped and Ungrouped data) 3

1.3 Construction of Vertical Bar, Horizontal Bar
   and Wheel Diagram 3

Unit-II **10 Marks**

Chain and Tape Survey

Unit-III **10 Marks**

Practical Record and Viva-Voce.
Total: 13 Classes

MATHEMATICS
+2 first Year

Unit-I   **25 periods**

(A)   Logic: **(6 periods)**

(i)   Statements, negation, conjunction, disjunction, conditional, biconditional and their truth tables.

(ii)   Tautology and equivalence of statements, implications and double implications.

(iii)   Converse, Inverse, Contrapositive.

(iv)   Different methods of proof with emphasis on method of mathematical induction.

(B)   Sets :   **(3 periods)**

Proofs of commutative, associative and distributive properties of set union and intersection, Difference and symmetric difference of sets.

De Morgan's laws.

Cardinality of sets, similar sets, cartesian product of sets, cartesian plane and its representation by IR x IR. Representation of 3-dimensional space by IR x IR x IR.

(C)   Real number system and Inequalities :   **(6 periods)**

Natural numbers and Integers, Arithmetic of Integers, Prime numbers, Rational and Irrational numbers, Real numbers, Algebraic properties of real numbers, ordering in R, Absolute value, Triangle inequality, AM $\geq$ GM, Inequality (simple cases).

Solution of linear inequation in one variable.

(D)   Quadratic Polynomials :   **(4 periods)**

(i)   Roots of quadratic polynomial, factorisation of quadratic polynomial.

(ii)   Maximum and minimum values of quadratic ploynomial for all real values of the variable.

(iii)   Sign of quadratic polynomial for real values of the variable.

(iv)   Solution of quadratic inequations.

(v)   Graph of Quadratic polynomial of the form $ax^2 + bx + c = 0, \ a \neq 0 \in R$.

(E)   Complex number system :   **(6 periods)**

(i)   Complex number and their algebraic properties, Argand plane and geometrical representation of complex numbers, modulus, argument and conjugate of complex numbers. Triangle inequality.

(ii)   Square roots of a complex number, cube roots of unity and their properties.

(iii)   Statement and proof of De-Moivre's theorem for integral index : Statement for rational index and its application.

Unit-II **(25 periods)**

(A)   Relation (6 periods)

(i)   Definition, domain and range of a relation, inverse of a relation, types of relation.

(ii)   Relation in a set, equivalence relation, congruence modulo relation on the set of integers.

(iii)   Equivalence classes and partition of a set through examples only.

(B)   Function : (6 periods)

(i)   Definition, domain, range of a function, injective, surjective and bijective functions.

(ii)   Equality of functions, composition of functions, inverse of a function, odd and even functions,

(iii)   Real valued function of a real variable.

(iv)   Domain, range and graph of the following functions with simple properties, trigonometric and inverse trigonometric functions,

a^x, $\log_a x$ for a > 1 and 0 <a<1, e^x; lnx, |x| [x], sgn (x).

(C)   Limit and continuity : (7 periods)

Limit of function ($\hat{\imath}$-d definition only), left-hand limt, right hand limit, infinite limit, limit at infinity, Algebra of limits (without proof), continuity, limits and continuity of trigonmetric functions, a^x, $\log_a x$ and composite functions. (Details of proof for continuity, of a^x, $\log_a x$ and composite functions excluded)

(D)   Differentiation :(6 periods)

Derivatives, its geometrical and physical meaning, algebra of derivatives, derivatives of algebraic polynomial and trigonometric functions from first principle, relation between continuity and differentiality.

Unit-III **(25 periods)**

(A)   Trigonometry :   (11 periods)

(i)   Periodicity of trigonometric functions.

(ii)   Trigonometric ratios of compound, multiple and submultiple angles and standard trigonometric formulae.

(iii)   Trigonometric equations and their general solutions,

(iv)   Properties of triangles,

(v)   Inverse trigonometric functions.

(B)   Sequence and series :(6 periods)

(i)   Definition of sequence and series.

(ii)   Infinite geometric series, Arithmetico-geometric series.

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(iii) Exponential and logarithmic series.

(C)   Statistics : (4 periods)

Measures of dispersion, mean deviation, standard deviation and variance, co-efficient of variation, co-efficient of co-rrelation.

(D)   Number system : (4 periods)

(i)   Decimal, binary, octal and hexadecimal number systems,

(ii)   Conversion of a number from one system to the other,

(iii)   Binary arithmetic.

Unit-IV   **(25 Periods)**

Co-ordinate Geometry of two Dimensions.

(a)   Straight line : (11 periods)

Rectangular co-ordinate system, distance and division formula, Area of a triangle, slope of a line, Angle between lines.

Locus of an equation and equation of a locus.

Equation of a straight line in different forms. Reduction of the general form to different forms.

Distance of a point from a line. Condition for concurrency of three straight lines.

Family of straight lines, equation of bisectors of angles between two straight lines,

Pair of straight lines of the forms :

$ax^2 + 2hxy + by^2 = 0$

and $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

Angle between the pair of straight lines.

Change of axes (translation only).

(b)   Circle : (6 periods)

Definition and equation of a circle. Tangent and Normal to a circle. Condition of tangency. System of circles, (Angle between two circles and condition of orthogonality) Equation of a circle in parametric form.

(c)   Conic Section : (8 periods)

Standard cartesian form of equation of parabola, ellipse and hyperbola, and their equations in parametric form. Equations of tangents and normals. Condition of tangency, rectangular and conjugate hyperbolas.

DISTRIBUTION OF QUESTIONS

FIST YEAR (MATHEMATICS)

Unit/Topic		Objective type (1 marks each) (Compulsory)	Short Answer (3 marks each) (Compulsory)	Long type (6 marks each) internal choice
Unit-I				
a.	Logic	1	1	1
b.	Set	1	1	-
c.	R & Ineq	1	1	1
d.	Qua. Poly	1	-	1
e.	Complex num.	1	1	1
Unit-II				
a.	Relation	1	1	1
b.	Function	1	1	1
c.	Limit & cont.	2	1	1
d.	Diff.	1	1	1
Unit-III				
a.	Trigon	2	1	2
b.	Seqs series	1	1	1
c.	Statistics	1	-	1
d.	Numb. sys.	1	2	-
Unit-IV				
a.	St. line	2	2	2
b.	Circle	1	1	1
c.	Conic Sect.	2	1	1
		20	16	16

To Answer

Objective type	20 x 1 marks	=	20 marks	Q 1 & Q 2.
Shortanswer	16 x 2 marks	=	32 marks	Q 3, 4, 5, 6
Long type	8 x 6 marks	=	48 marks	Q 7, 8, 9, 10
		=	100 marks	

+2 IInd Year

Unit-I   **25 periods**

(A)   Differential Calculus : (12 periods)

Derivatives of composite functions (chain rule), Inverse trigonometric functions, Implicit functions, exponential and logarithmic functions, Logarithmic differentiations, Derivatives of functions represented by parametric forms, successive differentiation. Leibnitz theorem (Statement only) Partial derivatives, Euler's theorem (without proof) and its simple applications.

(B)   Applications of Derivatives : (13 periods)

Rate of change, Increasing and decreasing functions, tangents and normals, approximations, maxima and minima (simple problem), Rolle's theorem, Lagrange's and Cauchy's Mean value Theorem (without proof) Geometrical interpretations of Rolle's and Lagrange's theorem and their simple applications, Indeterminate forms, L Hospital's rule (without proof) and its applications.

Unit-II   **(25 periods)**

(A)   Integral Calculus (10 periods)

Anti derivatives, Indefinite integrals, Standard integration formulae, algebra of integrals, Integration by method of substitution, by parts, by partial fractins and integration of rational and irrational algebraic functions and trigonometric functions. Definite-integral, fundamental theorem of integral calculus (Statement only), Elementary properties of definite integrals, Walli's formula. Evaluation of areas of plane regions bounded by simple curves using definite integral.

(B)   Differential Equations : (6 periods)

Definition, order, degree, general and particular solutions of a differential equation, formation of differential equation. Solutions of differential equations by method of separation of variables, homogeneous differential equations of first order and first degree, linear differential equations of the form.

$\frac{dy}{dx} + p(x)y = \left| q(x) \right|$ solutions of differential equations of the form $\frac{d^2y}{dx^2} = f(x)$.

Unit-III   **(25 periods)**

(A)   Vectors : (8 periods)

Vectors and scalars, Types of vectors, algebra of vectors, position vector of a point. Resolution of a vector into components.

Scalar (dot) product of two vectors and its geometrical meaning, Commutative and distributive properties of dot product, vector (cross) product and its geometrical meaning, properties of vector product (without-proof)

Scalar triple product and vector triple product with simple applications.

(B)   Three Dimensional Geometry (10 periods)

Co-ordinate axes and co-ordinate planes, co-ordinates of a point, distance between two points, division formula. Direction cosines and direction ratios of a line.

Projection of line segment on another line, Angle between two lines.

Definition of a plane and its equations in different forms. Transformation of the general form to normal form. Angle between two planes, Distance of a point from a plane, System of planes.

Equation of a plane bisecting the angle between two planes. Symmetrical and un-symmetrical form of equation of a line and transformation of unsymmetrical form to symmetrical form.

Condition of co planarity of two lines, Angle between a line and a plane, Distance of a point- from a line.

Definition and equation of a sphere in standard form. Sphere through four non-coplanar points.

Equation of a sphere when end points of a diameter are given.

(C)   Linear Programming (7 periods)

Introduction to Linear Programming Problem (LPP), Graphical solution of system of linear equations in two variables. (upto three constraints)

Unit-IV   (25 periods)

(A)   Determinants and Matrices : (9 periods)

(i)   Determinants upto order three, Minors and Co-factors, properties of determinants, Cramer's rule.

(ii)   Matrices, Algebra of matrices, transpose and inverse of a matrix, solution of system of linear equations in two or three variables by matrix inversion method.

(B)   Permutation, Combination and Binomial Theorem : (8 periods)

(i)   Counting principle, Permutations and combinations (with and without repetition)

(ii)   Statement of Binomial theorem for any rational index and proof of this theorem for positive integral index and identities involving binomial co-efficients.

(C)   Probability : (8 periods)

(i)   Basic concepts of probability

(ii)   Conditional probability and independence

(iii)   Compound events

(iv)   Random variable and probability Distribution (Binimial distribution only)

DISTRIBUTION OF QUESTIONS
SECOND YEAR (MATHEMATICS)

Unit-I

a.	Diff calc	1		5/7		a or b
b.	Appl	1				

Unit-II

a.	Int. Calc	1		5/7		a or b
b.	Diff Equ	1				

Unit-III

a.	Vectors	1				
b.	3 D	2		5/8		a or b
c.	LP	-				or c

Unit-IV

a.	Det. & Mat.	1		a or b
b.	Perm. & Comb.	1	5/8	or c
c.	Probability	1		
	Total	**10**	**20**	**16**

To Answer

Objective type	10 x 1 marks	=	10 marks
Short answer	20 x 3 marks	=	60 marks
Long type	4 x 7½ marks	=	30 marks
		=	100 marks

Books Prescribed :

1. **Elements of Mathematics : Vol - I & II**
    Published by Orissa State Bureau of Textbook Preparation and Production.

PHYSICS

COUNCIL OF HIGHER SECONDARY EDUCATION, ODISHA
REVISED SYLLABUS
(Effective from 2012 Admission Batch)

Marking Scheme :

There shall be one theory paper carrying 70 marks in each year for which examination will be of 3 hours duration. The detailed distribution of marks with respect to the pattern of questions is given below.

Group-A

Q. 1 Compulsory :

Ten multiple choice answer type questions, each carrying one mark, covering all units. **10 mark**

Q. 2 Compulsory :

Ten one word answer / very short answer / correct sentences / fill in the blank type questions, each carrying one mark, covering all units. **10 mark**

Group-B

Q. 3 Short Answer Type Questions with alternatives :

Twelve short answer type questions, each carrying two marks, covering all units, out of which ten are to be answered. (Some of the questions should be of reasoning type, answers of which are to be written in two or three sentences) **20 mark**

Q. 4 Short Answer Type Questions with alternatives :

Five short answer type questions (answers of which will be within six sentences), each carrying three mark, covering all units, out of which three are to be. **9 mark**

Group-C

Long Answer Type Questions with alternatives :

Q.5 to Q.7 :

Six long answer type questions, each carrying seven mark, covering all units, out of which three are to be answered unit wise. **21 mark**

PHYSICS THEORY
PAPER I, 100 Periods
2012-2013
(Course to be covered in class XI or Ist year Higher Secondary Science of +2)
House Examination after completion of Ist year
(only SI units are to be adopted)

FULL MARK-70
33 Periods

Unit I
UNITS, DIMENSIONS, MECHANICS OF PATICLE AND PROPERTIES OF MATTER.

1(A)

1. UNITS AND DIMENSIONS

    Physics and its scope. Measurement: need for measurement, units of measurement. Fundamental and derived units. SI units. Advantages of SI units. Practical units for measurement of microscopic and macroscopic lengths (A.U, Light year, Parsec, micrometer, nanometer, Angstrom and fermi). Metric prefixes. Dimension of physical quantities, dimensional analysis and its applications.

    Errors in measurement: absolute and relative error, percentage of error, combination of errors.
    (6 periods)

2. TYPES OF MOTION

    Rest and motion. Frame of reference. Translational and rotational motion. Motion in one, two and three dimensions.

    Distance and displacement. Scalars and vectors. Unit vector. Components of a vector along the co-ordinate axes. Addition and subtraction of vectors. Triangle, parallelogram and polygon law method of vector addition. Dot and cross product of two vectors.   (6 periods)

3. KINEMATICS OF A PARTICLE

    Simple introduction to elementary concepts of differentiation and integration for describing motion.

    Average and instantaneous speed and velocity. Average and instantaneous acceleration. Displacement-time and velocity- time graph. Area under velocity-time graph. Equations of motion for uniformly accelerated rectilinear motion by both graphical and calculus method. Relative velocity.
    (6 periods)

1(B)

4. LINEAR MOMENTUM, FORCE.

    Concept of force. Newton's Ist law. Inertia. Momentum and Newton's 2nd law. Impulse. Impulse-momentum theorem. Newton's 3rd law. Statement of law of conservation of linear momentum and its applications. Equilibrium of concurrent forces.

    Work done by a constant force and a variable force. Conservative and non-conservative forces. Kinetic energy. Work- energy theorem. Power.

    Potential energy, conservation of mechanical energy (K.E & P.E). Elastic collision in one dimension and elementary idea of inelastic collision. Frictional forces. Static and kinetic friction. Rolling friction. Laws of friction.   (8 periods)

5. PROJECTILE MOTION.

    Equation of trajectory of a projectile. Range, time of flight and maximum height of a projectile fired i) at an angle with horizontal and ii) horizontally from a height   (3 periods)

6. DEFORMABLE BODIES AND ELASTIC DEFORMATION

Elasticity and plasticity. Stress and strain. Hook's law. Elastic limit. Stress- strain diagram. Young's modulus, Bulk's modulus and modulus of rigidity. Poissn's ratio. (4 periods)

Unit II

33 Periods

CIRCULAR AND ROTATIONAL MOTION, GRAVITATION, OSCILLATIONS AND WAVES.

II (A)

1. CIRCULAR MOTION.

Angular displacement and velocity. Angular acceleration. Relation of angular displacement, velocity and acceleration with corresponding linear parameters. Uniform circular motion in a horizontal plane. Centripetal and centrifugal forces. Banking of tracks (without friction).Motion in a vertical circle.

(5 periods)

2. ROTATIONAL MOTION OF A RIGID BODY.

Centre of mass of a two-particle system. Centre of mass and centre of gravity of rigid bodies.

Torque. Angular momentum. Conservation of angular momentum with some examples.

Equilibrium of rigid bodies, Couple. Principle of moments. Equations of rotational motion. Comparison between linear and rotational motion. Rotational K.E. Moment of inertia. Radius of gyration. Parallel and perpendicular axis theorems (statement only). Moment of inertia of thin ring and disc.

(6 periods)

3. GRAVITATIONAL MOTION

Newton's law of gravitation. Kepler's laws of planetary motion (statement only). Gravitational field and potential. Gravitational potential energy. Acceleration due to gravity and its variation with altitude and depth. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites. (6 periods)

II (B)

4. OSCILLATORY MOTIONS.

Periodic motion: period, frequency, periodic function.

Simple Harmonic Motion and its equation. Expression for displacement, velocity and acceleration in SHM. Oscillation of a spring. Restoring force and force constant. Kinetic and potential energy in SHM. Simple pendulum and derivation for its time period. Free, damped and Forced vibration. Resonance (simple ideas). (6 periods)

5. TRANSVERSE AND LONGITUDINAL WAVES.

Wave motion: Displacement, amplitude, frequency, wavelength and sped of propagation. Characteristics of wave motion. Transverse and longitudinal waves. Equation of a progressive wave. Speed of longitudinal wave in an elastic medium and speed of transverse wave in a stretched string (dimensional analysis). Principle of superposition. Stationary waves. Nodes and antinodes. Standing waves in strings and organ pipes, faundamental mode & harmonics. Beats. Doppler's effect. (10 periods)

Unit III
LIQUIDS, HEAT AND THERMODYNAMICS.

34 Periods

III (A)

1. LIQUID AT REST

Pressure due to a liquid column. Pascal's law and its application (hydraulic lift and hydraulic brakes). Surface tension. Surface energy. Angle of contact. Excess pressure within a droplet and soap bubble. Capillary action. Expression for capillary rise. (4 periods)

2. FLOW OF LIQUIDS AND VISCOSITY

Streamline and turbulent flow. Equation of continuity. Bernoulli's theorem and its applications. Viscosity. Co-efficient viscosity. Raynold's number. Critical velocity. Terminal velocity. Stoke's law (dimensional analysis method). (6 periods)

3. Heat Phenomena

Concepts of heat and temperature. Scales of temperature (Celsius, Fahrenheit, Kelvin). Thermal expansion of solids. Relation between the co-efficients of expansion. Specific heat and heat capacity. Change of state: latent heat. (6 periods)

III (B)

4. HEAT TRANSFER

Heat transfer (conduction, convection and radiation). Thermal conductivity. Determinations of Termal corduchrity of a good conductor by serle's method Properties of heat radiation.Reflectance, absorptance and transmittance, Black body. Kirchhoff's and Stefan's law (statement only). Newton's law of cooling and its derivation from Stefan's law. (5 periods)

5. KINETIC THEORY OF GASES.

Postulates of kinetic theory of gases. Derivation for pressure due to an ideal gas. Mean and RMS speed. Kinetic interpretation of temperature. Degrees of freedom. Law of equipartition of energy (statement only) and its application to specific heat capacities of gases. (5 periods)

6. THERMODYNAMICS.

Thermal equilibrium and definition of temperature (zeroth of law of thermodynamics). Heat, work and internal energy. Mechanical equivalent of heat. First law of thermodynamics. Molar specific heat. Relation between Cp & Cv. Thermodynamic variables. Indicator diagram. Adiabatic and isothermal processes. Work done due to isothermal, isobaric and adiabatic process. Second law of thermodynamics. Reversible and irreversible processes. Carnot's engine and refrigerator (basic idea). Efficiency of Carnot's engine (statement only). (8 periods)

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PHYSICS THEORY
PAPER- 2 (100 Periods)
2013-2014

(Course to be covered in class XII or 2nd year Higher Secondary Science of +2)

(CHSE Examination after completion of 2nd year)

FULL MARK- 70

33 Periods

UNIT-I   ELECTROSTATICS, CURRENT ELECTRICITY AND MAGNETISM

I (A)

1. ELECTROSTATICS.

Electric charge and its quantization. Coulomb's law: force between two point charges. Electric permittivity.

Electric field, electric field lines, electric field due to a point charge, field due to a dipole at an axial and equatorialpoint. Torque on a dipole in a uniform electric field.

Electric flux, Gauss's law (statement only) and its application to uniformly charged infinite plane sheet. Derivation of Coulomb's law from Gauss's law. (8 periods)

2. ELECTRIC POTENTIAL

Electric potential, potential difference, electric potential due to a point charge , potential due to a dipole at both axial and equatorial point. Electrical potential energy of a point charge in an electrostatic field. Electron volt. Relation between electric field and potential difference. (4 periods)

3. CAPACITANCE

Capacitance and capacitors, capacitance of an isolated sphere, parallel plate capacitor, combinations of capacitors in series and in parallel. Dielectric and electric polarization. Capacitance of a parallel plate capacitor with a dielectric medium between the plates. Energy stored in a capacitor.

(4 periods)

I (B) CURRENT ELECTRICITY AND MAGNETISM

4. ELECTRIC CURRENT

Electric current, drift velocity and mobility and their relation with electric current. Current density, relation between current density and electric field intensity. Ohm's law, resistance, conductance, resistivity and conductivity, V-I graph (ohmic and non-ohmic), effect of temperature on resistance.

EMF and potential difference, internal resistance of a cell, combination of cells in series and parallel. Combinations of resistances in series and parallel.

Kirchhoff's laws and application to Wheatstone bridge.   (8 periods)

5. THERMAL EFFECT OF CURRENT

Heating effect of electric current, Joule's law of heating (statement only). Electrical energy and power. Killo-wath Hour.

(2 periods)

6. MAGNETISM

Concept of magnetic field, magnetic field intensity due to a magnetic dipole (bar magnet) at end-on and broad-side –on –position. Magnetic lines of force, field induction B, magnetic field intensity H, intensity of magnetization, susceptibility, permeability. Qualitative idea of para-,dia- and ferro-magnetism. Magnetic elements of earth.   (7 periods)

Unit II

MAGNETIC EFFECT OF CURRENT, ELECTRO-MAGNETIC INDUCTION, ALTERNATING CURRENT, ELECTRONICS, ELECTROMAGNETIC WAVE & SPACE COMMUNICATION.   **34 Periods**

II (A)

1. MAGNETIC EFFECT OF ELECTRIC CURRENT

Biot-Savart law, magnetic field on the axis and at the centre of a circular loop carrying current and due to a long straight current carrying conductor. Force on a charged particle moving in uniform magnetic field and electric field (Lorentz force).

Force on a current carrying conductor in a uniform magnetic field, force between two parallel current carrying conductors, definition of ampere.

Torque experienced by a current loop in an external magnetic field, moving coil dead beat galvanometer (pivoted type), conversion of galvanometer to ammeter and voltmeter.   (7 periods)

2. ELECTROMAGNETIC INDUCTION

Induced emf, Faraday's law of electromagnetic induction, Lenz's law, eddy currents. Self and mutual inductance, emf induced in a rotating coil in uniform magnetic field.   (4 periods)

3. ALTERNATING CURRENT

Alternating current, average, peak and rms value of alternating current and voltage. A.C circuits containing resistance only, capacitance only and inductance only, phasor diagram. Power in A.C circuits, wattles current. Principle and uses of Transformer.   (5 periods)

II (B) ELECTRONICS

4. VACUUM TUBES

Thermionic emission, idea of work function, statement of Richardson's and Child's law, vacuum di-

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ode and triode; their construction, action and characteristics, relation among valve constants.

(3 periods)

5. SOLIDS AND SEMICONDUCTOR DEVICES

Energy band in solids, difference between metals, semiconductors and insulators on the basis of energy band theory, intrinsic and extrinsic semiconductors, p-type and n-type semiconductors, p-n junction, forward and reverse biasing of a junction, characteristics of p-n junction, junction diode as a half and full wave rectifier(center-tap circuit), efficiency of half and full wave rectifier (no derivation for efficiency), Transistor, n-p-n and p-n-p transistor, transistor configurations (CB and CE mode), input and out put characteristics of a transistor.

Elementary idea about decimal and binary number system (no conversion). Logic gates: OR, AND, NOT, NAND and NOR, their symbol and truth table. Circuit of only OR and AND gates.

(10 periods)

6. ELECTROMAGNETIC WAVE

Qualitative idea about nature of electromagnetic wave, electromagnetic spectrum (radio waves, microwaves, infrared, visible, x-ray, gamma ray) including elementary idea about their uses.

(2 periods)

7. SPACE COMMUNICATION.

Need of modulation, Qualitative idea about amplitude and frequency modulation & detection. Space communication: sky and space wave propagation. Satellite communication (elementary idea).

(3 periods)

UNIT III OPTICS, ATOMIC PHYSICS & NUCLEAR PHYSICS.

33 Periods

III (A) OPTICS:

1. REFLECTION AND REFRACTION OF LIGHT

Reflection of light, reflection by spherical mirrors, mirror formula, lateral and longitudinal magnification, laws of refraction of light, refractive index and its relation with velocity of light (formula only), total internal reflection and its uses. Refraction at a spherical surface, thin lens formula, lens maker's formula, magnifying power of lenses, two thin lenses in contact.   (8 periods)

2. REFRACTION TGROUGH A PRISM AND OPTICAL INSTRUMENTS.

Refraction through a prism, I-D curve and expression for refractive index of the material of the prism. Dispersion produced in a prism.

Optical instruments: magnifying glass, compound microscope, astronomical telescope (refracting type) and their magnifying powers.   (5 periods)

3. WAVE OPTICS

Wave optics: wave front, Huygene's principle, interference of light, coherent sources, conditions of interference, idea of path difference, Young's double slit experiment and expression for fringe width.

(5 periods)

III (B)

4. ATOMIC PHYSICS

Rutherford's model of atom and its limitations, Bohr's atomic model, expression for radius of nth orbit and energy in the nth orbit, hydrogen spectra, energy level diagram.

Photoelectric effect, laws of photoelectric effect, Einstein's photoelectric equation, idea of work function, applications of photoelectric effect.

Dual nature of radiation and matter. Matter waves, de Broglie wavelength.   (8 periods)

5. NUCLEAR PHYSICS

Atomic nucleus, its composition, size, nuclear mass. Isotopes, isobars and isotones. Nature of nuclear force. Mass defect, Mass energy equivalence relation($E= mc^2$). Binding energy per nucleon and its variation with mass number, nuclear reaction, nuclear fusion, nuclear fission. Cyclotron.

Radioactivity (natural), properties of alpha, beta and gamma rays. Decay laws, half life and decay constant.   (7 periods)

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PHYSICS PRACTICAL
IST YEAR
(To be covered in class-XI or Ist year Higher Secondary +2 Science) (2012-13)

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<div align="right">Full Mark- 30</div>

Record	-	5 marks
Viva	-	7 marks
Experiment	-	18 marks
Total	-	30 marks

Unit I

Measurement:

1.   Measurement of volume of a solid/hollow cylinder by a slide callipers.

2.   Measurement of TT (pai) value by graphical method

3   Use of physical balance for measurement of mass by resting point method and equal oscillation method.

Unit II

Properties of Matter

4   Verification of laws of parallelogram of forces.

5   To find the weight of a given body using the parallelogram law of forces.

6.   Determination of specific gravity of solids and liquids using Nicholson   hydrometer.

7.   Measurement of co-efficient of static friction.

Unit III

Heat

8.   To determine the latent heat of fusion of ice.

9.   To determine the latent heat of vaporization of water.

10. To determine the co-efficient of linear expansion of metal.

11. To determine the water equivalent of a calorimeter by method of mixtures.

Unit IV

Optics

12. To verify the laws of reflection by using a plane mirror.

13. To find angle between two straight lines by using optical method.

14. To determine the focal length of a concave mirror by direct and p-q method.

AT LEAST 10 (TEN) EXPERIMENTS MUST BE DONE WITHOUT OMITTING ANY UNIT.

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PHYSICS PRACTICAL
SECOND YEAR

(To be covered in class XII or 2nd year Higher Secondary +2 Science)(2013-14).

Record	-	5 marks
Viva	-	7 marks
Experiment	-	18 marks
Total	-	30 marks.

Unit- I

Measurement

1. Measurement of the volume of an irregular lamina by using screw gauge.
2. Measurement of curvature of convex and concave surfaces of a watch glass by using spherometer.

Unit II

Properties of matter

3. Comparison of density of two liquids by using Hare's apparatus.
4. Determination of "g" by using simple pendulum.

Unit III

Heat and Sound

5. To determine the melting point of wax/ naphthalene by method of cooling.
6. To determine the velocity of sound by using resonance air column.

Unit IV

Optics

7. To find out a relation between the angle of rotation of plane mirror and the corresponding angle between the reflected rays.
8. To verify the laws of refraction using a glass slab.
9. To determine the refractive index of the material of the prism by measuring the angle A and Dm (symmetrical method).
10. To draw the I-D curve for a prism and there by to determine the refractive index of the material of the prism.
11. To determine the focal length of convex lens by direct and p-q method.

Unit V

Electricity, Electronics and Magnetism

12. To verify the laws of resistances in series and parallel by using meter- bridge.
13. To find out the specific resistance of a conductor by using a post office box.
14. To trace the magnetic lines of force due to a bar magnet with north pole pointing south and hence to locate the neutral points.
15. To trace the magnetic lines of force due to a bar magnet with north pole pointing north and hence to locate the neutral points.
16. To draw the V-I characteristics of a semiconductor diode/ diode valve.
17. To verify Ohm's law by voltmeter-ammeter method.
18. To trace magnetic lines of force avoiding earth's magnetic field and hence to verify the inverse square law of magnetism.

AT LEAST 12(TWELVE) EXPERIMENTS MUST BE DONE WITHOUT OMITTING ANY UNIT.

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STATISTICS

(FOR 2012-13 BATCH AND ONWARDS +2 ARTS/SCIENCE)

There shall be two theory papers in statistics, each of three hours duration, carrying 70 marks in first year and 70 marks in second year and two practical papers carrying 30 marks in first year and 30 marks in second year respectively, each of three hours duration.

The examination for paper-I and practical examination will be held at the end of the first year and examination for paper- II and practical examination will be held at the end of second year respectively.

DETAILED SYLLABUS

FIRST YEAR

(To be covered in first year: class-XI)

The following topics will be taught

THEORY (70 Marks)

DETAILED SYLLABUS

UNIT-I   **30 Marks (30 periods)**

(a)   Basic Mathematics:

Permutations and combinations, Binomial theorem, logarithmic and exponential series.

(b)   Probability -I :

Definition of probability:- classical, empirical and axiomatic approach, Sample space and events, Correspondence between sets and events, Probability by direct enumeration, Laws of addition and multiplication, Conditional probability and independent events.

(c)   Probability -II :

Bayes rule and its application, pairwise independence and mutual independence of events, Mathematical expectation of random variable, Laws of addition of expectation, Multiplication law of expectation for independent random variables, variance of sum of random variables.

UNIT - II

Statistical methods   **(30 Periods)**

Definition, Scope and limitations of statistics, Collection of data: Primary and secondary data, classification of data according to attributes and variables. Tabulation of data, one-way and two-way tables.

Presentation of data: Diagrams, graphs and charts, Simple, multiple, sub-divided and percentage bar diagram, pie diagram, pictogram and cartograms, histogram, frequency polygon, frequency curve and ogives.

Frequency distribution Measures of central tendency and measures of location: arithmetic mean, geometric mean, harmonic mean, median, mode, Quartiles, deciles and percentiles.

Measures of dispersion:

Range, Inter-quartile range, Quartile Deviation, mean absolute deviation, standard deviation, co-efficient of variation and Lorenz curve.

Moments, skewness and kurtosis:

Raw and central moments of various orders, skewness and its different measures, kurtosis, Beta one (β_1)

Beta two (β_2) Gamma one (γ_1) and gamma two (γ_2) measures.

UNIT - III

a) **Sampling methods:** (30 Periods)

Sample, population, sampling units, sampling frame, Principal steps in sample survey, Census versus sample survey, Idea about questionnaires and schedules, sampling & non-sampling errors, Elementary idea on simple random sampling with and without replacement.

Methods of drawing random sampling: Lottery method and random number tables, Estimation of population mean and population total, Variance of these estimates.

(b) Stratified sampling: Elementary idea on stratified random sampling, Proportional and optimum allocation, Estimation of population mean and population total, Variance of these estimates.

(c) Statistical system in India

Statistical organizations in the Union and State governments, Agricultural statistics (Area, yield and Land Utilization statistics), Population Census, National Sample Survey; Organization.

SECOND YEAR

[The following topics will be taught.

THEORY (70 Marks)

Pattern of Questions : **DISTRIBUTION OF MARKS**

Group - A Objective type

1. Multiple choice questions (Compulsory)

2. Very short questions (Compulsory)

Group - B Short answer questions

(8 questions to be answered out of 12)

Group - C Long answer questions

(3 questions to be answered unit wise

out of 6, 2 questions will be set up from each unit)

DETAILED SYLLABUS

(3 hours duration)

Unit - IV

TIME SERIES (15 periods)

Definition, uses and components of time series, measurement of trend : Freehand, semi-average, moving average and least squares methods, Measurement of Seasonal fluctuations: simple averages, Ratio to trend, Ratio to moving average and link relatives methods.

Unit - V

Index Number (20 Periods)

Need, meaning & uses of index number, important steps in the construction of Index Number. Problems in selection of items, base year, average and system of weighting. Weighted index number, Laspeyre's, Paasche's and Fisher's ideal index numbers. Time Reversal, Factor Reversal and circular tests, Base shifting, splicing and Deflating of index number, Cost of living index numbers-construction & uses.

Unit - VI (30 Periods)

a) Bivariate frequency distribution, simple correlation, Rank correlation (including ties), linear regression, Regression co-efficients and their properties.

Probability Distributions. Binomial and Poisson distributions with properties and applications (computation

of mean and variance only)

b) Normal probability distribution, its properties and applications (mathematical proof excluded), Elementary ideas on testing of hypothesis, large samples tests based on normal distribution (mean, variance and proportion).

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PRACTICAL   Full marks -30

(To be covered in the first year of +2 courses)

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(The candidate is required to answer any four out of six questions to be set. Each question carries six marks)

Practical - 24 Record - 03 Viva - 03

Graphical representation of data-Histogram, frequency polygon and cumulative frequency curve, Bar diagram, pie diagram, Arithmetic mean, median, Mode, G.M and Harmonic mean, partition values, standard deviation, mean absolute deviation, coefficient of variation, moments, skewness & kurtosis.

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PRACTICAL   Full Marks-30

(To be covered in the 2nd year of +2 courses)

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(The candidate is required to answer any three questions out of five to be set. Each question carries eight marks)

Practical - 24 Record - 03 Viva -03

Measurement of trend by moving averages and by least square (straight line only) method. Measurement of seasonal fluctuations (simple average, Ratio to moving averages, Ratio to trend and link relative methods)

Computation of index numbers by weighted average of price relatives, Laspeyres, Paasche's and Fisher's formula; coefficient of correlation, coefficient Regression co-efficients and regression lines.

N.B. Uniformly the practical records should be maintained in blue/black ink/ball pen by the students.

Book recommended :

1. **Bureau's Higher Secondary (+2)Statistics, Part-I & Part-II Published by Orissa State Bureau of Textbook Preparation and production, Bhubaneswar.**

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ELECTRONICS

THEORY PAPER - I (1ST YEAR)

- There will be a theory paper of 70 marks and a practical paper of 30 marks after completion of one year.
- Duration of examination of theory and practical paper will be 3 hrs.
- Each student will be eligible to appear the practical examination only if he/she has performed at least 5 (five) experiments.
- The grading in theory will be according to the following distribution of marks.

Group-A : very short questions including

MCQ (Compulsory)

Group -B : Short answer questions

(10 questions to be answered

out of 15)

Group -C : Long answer questions

(3 questions to be answered unit wise out of 6,

2 questions will be set up from each unit)

The grading in practical will be according to the following distribution of marks.

(a) Record

(b) Viva

(c) Experiment

THEORY PAPER (1st year)

UNIT - I

(a) **Resistance:-** Types of resistance, variable resistance, colour code, power rating, specific resistance, combination of resistance, principle of rheostat and potentiometer. Kirchhoff's law and wheatstone's bridge.

Capacitance:- Capacitance, Types of capacitors, variable Capacitors, colour codes, charging and discharging of capacitor, energy stored in a capacitor, DC and AC reactance (idea only) and their variation with frequency, combination of capacitors.

Inductance :- Faraday's and Len'z Law, self and mutual Inductance, types of inductors, inductance of a solenoid, energy stored in an inductor, DC and AC reactance (idea only) and variation with frequency, combination of inductors.

(b) **Circuits :-** DC Circuits -RC, RL and LC circuits for growth and Decay. AC Circuits -Pure R, L and C Circuits and RC, RL, LC and RLC series and parallel resonance circuits, Q factor.

Thermoionic Emission:- Types of electron emission, potential barrier, work function, thermo ionic emission, Richardson- Dushman equation (No Derivation), Child's law (No derivation).

Vacuum Tubes :- Diode valve working, characteristic and uses, Triode working, characteristic, constant of triode, relation between them, limitation of triode valve, use of triode as an amplifier, tetrode, characteristic, Dynatron effect and negative resistance, Pentode, characteristic, function of different grids.

Unit - II

(a) Semi- conductor: - Atomic structure, Band theory, Explanation of conductor, semiconductor and insulator, Intrinsic and Extrinsic semiconductor, P type and N type semiconductor, Energy band of extrinsic semiconductor.

PN Junction: PN Junction, Potential barrier, Depletion layer, Forward bias and Reverse bias, characteristic, Zenner diode, Characteristic of Zenner diode, Impedance of Zenner diode.

(b) Transistor :- PNP and NPN transistor, working, input, output and transfer characteristic of CB, CE and CC configuration, input and output impedance, current amplification factor and relation between them, leakage current, DC and AC load line, operating point, Q point.

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Transistor biasing : Thermal runaway, its elimination and stabilization of operating point, transistor biasing of base resistor, feed back resistor and potential divider method.

Unit - III

(a) **Rectifier and filters :-** Half wave, centre tapped full wave and bridge rectifier, efficiency, Ripple factor, capacitor filter, Inductor filter, L section filter and π section filter and RC filters (qualitative discussion of filters only). Zenner diode as voltage regulator for rectifier circuits.

Amplifiers :- CB, CE and CC amplifiers with their voltage. Current and Power gain, phase relationship between input and output of these amplifiers. Qualitative discussion of Class A, B, AB and C amplifiers with reference to load line, Q point, angle of conduction and efficiency.

(b) Instruments :- Multimeter -construction and working, VTVM- construction and working, Microphone - carbon and moving coil dynamic microphone, construction and working, Dynamic Loud speaker- construction and working, Public Address system and its use.

Integrated circuits:- IC, basic idea, IC Classification, Monolithic IC, making, fabrication of components, thick and thin film IC (idea only), Hybrid or multichip IC (idea only).

PRACTICAL (1st year)
EXPERIMENTS

1. Verification of ohm's law, determination of resistance using Voltmeter and Ammeter.
2. Verification of laws of combination of resistance by meter bridge method.
3. Determination of specific resistance of resistance wire by PO Box method.
4. To draw characteristic curve of diode valve for different filament voltage. Hence determine plate resistance.
5. To draw characteristic curve of PN Junction diode for forward bias only for two junction diodes.
6. To draw characteristic curve of Zenner diode for reverse bias only.
7. To calculate the value of carbon resistors from their colour code for at least 10 resistors.
8. Determination of efficiency and ripple factor with and without filter for half wave rectifier.
9. Recognition of electronics components like resistors, capacitors, inductors, transformers, diodes, triode, PN Junction, transistors and IC.
10. Practice of soldering:-
    a) Resistors in series. b) Resistors in parallel.
    c) Resistor- capacitor in series.
    d) Resistor- capacitor in parallel.

ELECTRONICS
THEORY PAPER (2ND YEAR)

- There will be a theory paper of 70 marks and a practical paper of 30 marks after completion of second year.
- Duration of examination of theory and practical paper will be 3 hour.
- Each student will be eligible to appear the practical examination only if he/she has performed atleast 8 (eight) experiments.
- The grading in theory will be according to the following distribution of marks.

Group A
   1. Multiple choice/Fill in the blanks/abbreviations.

   2. Answer in one sentence

Group B
   3. Showing difference/short answer within two sentences
      (Any 7 out of 10)
   4. Writing short notes/short answer within three sentences
      (any 5 out of 8)   **Group - C**
   5. Long Answer questions (Any 3 out of 6)

The grading in practical will be according to the following distribution of marks.
a)   Record
b)   Viva
c)   Experiment -

THEORY

UNIT - I

(a)   Amplifiers:- Voltage amplifiers -RC coupled transistor amplifiers, voltage gain, Frequency Response Curve, Band Width, Gain Band Width product, Advantages and Use: Power Amplifiers -Class B Push- Pull amplifiers, working principle, efficiency, output impedance, transformer coupled amplifier, gain and use.

Feed back amplifiers :- Feed back technique, gain, negative feed back, voltage feed back amplifiers, current feed back amplifiers, effect of negative feed back on input and output impedance, voltage gain, band width and frequency distortion.

(b) Oscillators :- Condition for sustained oscillation, Bark-haussen criterion, tank circuit with- positive feed back, Tuned collector oscillator, Hartley oscillator, Colpitt oscillator, RC phase shift oscillator, Crystal oscillator and its frequency stability. (Qualitative analysis of all these oscillators).

Unit - II

(a)   Modulation and Transmitters:- Types of modulation, amplitude modulation, side band, power dissipation in side band, modulation index and its significance, AM transmitter (explanation in block diagram), SSB transmitter (explanation in block diagram). Frequency modulation, side band frequency, FM index, FM modulator with varactor diode, FM transmitter (explanation in block diagram).

Demodulation and Receivers :- AM demodulator: Linear diode detector with capacitor filter, TRF receiver, AVC, Super heterodyne receiver (explanation in block diagram), FM Demodulation: FM detection, block diagram of FM receiver and explanation of each stage, AFC function, use and advantage of FM in communication.

(b)   Digital Electronics :- Decimal and binary numbers, conversion, binary arithmetic, Boolean algebra, De Morgan's theorems.

logic gates -OR, AND, NOT, NAND, NOR, XOR, Circuit symbol, use, truth table only.(No electronic circuit for NAND, NOR & XOR)

Antenna :- Principle and basic idea, types of antenna, dipole antenna, directional antenna, Morconi Yagi antenna, use in transmission, T.V. receiving antenna.

Unit - III

(a)   Propagation of Radio Waves: -Modes of propagation of radio waves ground waves, sky waves, space waves, skip distance, maximum usable frequency, general idea about satellite communication, propagation of Radio Waves in the Ionosphere.

TV:- Principle of TV transmission. scanning, TV Camera, Black & White, TV transmitter and Receiver (explanation in block diagram).

(b)   Power Electronics :- Idea about JFET, SCR, DIAC, TRIAC, UJT, their working, characteristics and uses.

RADAR and CRO:- Basic principle of Radar, Block diagram of Radar, its function and use, Cathode Ray Oscilloscope, Basic idea and use with working.

Books Recommended :

1.   Bureau's Higher Secondary (+2) Electronics, Part-II

Published by Orissa State Bureau of Textbook Preparation and Production, Bhubaneswar.

PRACTICAL

1.   Use of multimeter to measure resistance and compare them with colour code. Hence, verify the law of combination of resistance. Measurement of DC and AC voltage.

2.   Use of VTVM to measure resistance and compare them with colour code. Hence verify combination of resistance. Measurement of DC and AC voltage.

3. To draw characteristic curve for two junction diode in forward and reverse bias condition. Hence calculate forward bias resistance.

4. To draw characteristic curve for Zenner diode in reverse and forward bias condition.

5. To draw plate and mutual characteristic of triode valve and to determine the valve constants (r_p, g_m, μ) from graph.

6. Input, output and transfer characteristic of PNP/NPN transistor in CB configuration. Hence find out (α, r_i r_o) from graph (r_i -input resistance, r_0 -output resistance, α Current amplification factor).

7. Input, output and transfer characteristic of a PNP/NPN transistor in CE configuration, Hence findout, β, r_i r_0.

8. Determination of efficiency and ripple factor with and without filter for full wave and bridge rectifier.

9. To study the characteristics of FET and find its parameters from the graph.

10. To study the characteristic of SCR for different gate current and find out its parameters from graph.

11. Assembly of a single stage RC coupled amplifier and to draw frequency response curve to find out the band width.

12. Assembly of Hartley oscillator and measurement of frequency for different positions of variable inductor/ capacitor with a wave meter.

13. Assembly of a Colpilt oscillator and measurement of frequency for different positions of variable capacitor with a wave meter.

14. Study of variation of Impedance of a series LCR circuit with frequency and hence find out the resonant frequency.

15. Study of variation of impedance of a parallel LCR circuit with frequency and hence to find out the resonant frequency.

16. Study of Zenner diode as a voltage stabilizer.

17. Tuned Collector Amplifier, frequency response curve and band width.

18. Characteristic of UJT and find out Its parameter from graph.

19. Linear diode detector and its characteristics.

20. To study selectivity of MW receiver.

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COMPUTER SCIENCE (THEORY)

FIRST YEAR

Unit: I

Over view of computer system: Introduction, characteristics of computer, History of computer and generation of computer, Classification of computers, Anatomy of digital computer system, Input and output devices of computer, Primary and secondary memory.

Number system: Binary, Octal, Hexadecimal number system and their conversions, Binary arithmetic (Addition, subscription, Multiplication and division), Computer codes (BCD, EBCDIC and ASCII), Boolean algebra and Logic gates (AND, OR, NOT, NAND,NOR AND XOR) gates and their functions and truth tables.

Unit: II

Software: Classification of software, Operating system and its application, Programming languages-Machine language, Assembly language and high level language, Assembler compiler an Interpreter, Program planning and use of algorithms and Flow-charts in program developments.

Unit: III

Programming in C: data types, variables and Constants, Operators and Expressions, Input and output, Control functions, Control statements, IF, IF-ELSE, Nested IF-ELSE statements, Switch and Break statement, GOTO statements, Looping - WHILE loop, Do-WHILE, FOR Idop and nested loop, BREAK and Continue statements.

PRACTICAL

Grading of Practical paper

Record: 05 Marks

Viva: 05 Marks

Experiment: 20 Marks (Group-A 10 Marks and Group -B 10 Marks)

1. Use of DOS commands (Internal and External)
2. Working with Windows.
3. Development of C programs as per the Unit-111.

Students are required to perform the practical one -from Group- A and one from Group-B as

per the question given in the exam. Viva will be based on DOS,WINDOWS, C and computer

system.

Group - A Question will cover serial 1 & 2 as above and

Group -B Question will cover Serial 3.

Books recommended:

1. Fundamentals of Computer By P.K.Sinha ans Preeti Sinha, BPB Publication.
2. ANSI C by C Balaguruswami.
3. Let us C by Kanitakar.

COMPUTER SCIENCE (THEORY)
SECOND YEAR

Unit: I

Business data processing: Concept, Database management system, Introduction to Relational database management system, Different key concepts, C.F Codd's rule, Normalization, Computer in Business, Medicine, Entertainment, Office Automation, Research and Development and Electrons Commerce.

Unit: II

Data Communication and Computer Networks: Network topology, Multiplexer, Concentrator, Network types: LAN, WAN and MAN, Network devices, OSI model, Internet and its applications, WWW, websites and web pages, search engines E -mail and its features, VIRUS, Cyber Crime, Computer Ethics.

Unit: III

Functions and Built-in functions in C: Introduction to functions, Types of functions, writing functions, accessing the function, function prototypes, Passing the arguments, Recursion Void function, Lil iary functions.

Arrays: One dimensional and multidimensional array, Defining and initializing arrays, initialization of character arrays, String handling functions, Pointer: Introduction, Pointer array, Pointer operators.

Structure and Union: Introduction, Initialization, accessing the structure members, difference between the structure and union.

File handling operations in C: Data file, file .access, sequential and random access, Opening the file, reading and writing data in a file, closing a file.

PRACTICAL

Grading of Practical paper

Record: 05 Marks

Viva: 05 Marks

Experiment: 20 Marks (Group-A 10 Marks and Group -B 10 Marks)

1. Working with internet
2. Use of MS OFFICE
3. C programs based on Unit III

Group A questions will cover serial 1 & 2 as above and Group -B questions will cover serial no-3. Student' are requested to perform the practical one from GROUP -A and one from Group - -B as per the question given in the Examination.

Books prescribed:

1. Data Base management system by Bipin Desai.

2. Fundamentals of computer by P.K.Sinha and Preeti Sinha.

3. ANSI-C, By E. Bdagurusaimi.

4. Lotus C - By kanitakar

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INFORMATION TECHNOLOGY (Arts/Sc./Commerce)
FIRST YEAR
(THEORY)

UNIT-I   MARKS:70

a.   Overview of Information Technology:

Interdiction of I.T, Data & its different forms, Distinction between data and information, Data Processing System, Use of I.T in business, education, Medicine, Entertainment, Office Automation, Research & Development, Concept of hardware and Software.

b.   COMPUTER:

Characteristics of digital computer, evolution of computer, classification of computer, use of binary number system in computer (idea of bit, word , nibble & byte), Components of a computer, CPU & its working, Main Memory, static & dynamic RAM , Cache, ROM, Secondary Memory (hard disk, floppy, optical disk), Input-Output devices (keyboard, monitor, mouse, OCR, MICR, Barcode Reader, Scanner, Joystick), Printer (DMP, Ink-jet, Laser Printer), Plotter, Use of Smart Card.

c.   COMUNICATION:

Basic elements of communication system, Data Transmission Modes _____Simplex, Half-Duplex & Full Duplex, Transmission Media____ Twisted pair cable, Coaxial cable, Optical Fibre, Radio Link , Microwave Link & Satellite Link, Network Technology, Network Types ____ LAN, MAN & WAN 56kbps Modem, Cable Modern & DSL Modern, Client Server Concept.

UNIT-II

a.   SOFTWARE:

System Software & Application Software, Operating System, Types Of Operating System & Its Uses.

Programming Languages (Machine Level, Assemble Level, & High Level Languages), Assembler, Compiler and Interpreter.

Programming Tools: Use of Flowchart & Algorithm in Programming Development, Steps in Program Development.

b.   Multimedia:

Interdiction to Multimedia, Multimedia Components _____ Text, Graphics, Animation, Audio, Video, Multimedia Applications.

UNIT-III

a.   Programming in C:

Data Types, Variables & Constants, Operators & Expressions, Input & Output Control Function, Control Statements ----- IF, IF-----ELSE, Nested IF----ELSE Statements, Switch Statements, Conditional Operator & GOTO Statements, Decision Making & Looping   While Statement, Do While Statement, For-------Next Statement, BREAK & CONTINUE Statements, Arrays   One Dimensional & Multidimensional Arrays, Handing of Character Strings.

(PRACTICAL)

1. SAME AS EARLIRR   MARKS: 30

INFORMATION TECHNOLOGY (Arts/Sc/Commerce)
SECOND YEAR
(THEORY)

UNIT-I: MARKS: 70

a) Introduction To Internet :

Internet Backbones & Its Feathers, Internet Access   Dial-Up Connection, Direction Connection & Broadband Connection, Role of ISP , Function of Hub, Switch, Bridge, Router, Repeater & Gateways in Internet, Internet Protocols   TCP/IP, FTP, HTTP, TELNET, Gopher & WAIS, Internet Addressing IP address, domain names, E-mail Address & URLS, Distinction between Internet , Intranet & Extranet.

b) Internet Application :

WWW, Web Sites &Web Pages, Web Browsing & Web Browsers, Search Engine, File Down Loading & Uploading, Chatting, Internet Relay Chat(IRC), E-mail & its features, Mailing Lists & Newsgroups, Internet Telephony System.

UNIT-II:

a. Introduction to Database Management System :

Basic Concepts Of Database Design, Components Of Database Design, Database & Its Features, Data Normalization, Normal Forms   1st , 2nd & 3rd Normal Forms, DBMS & Its Types, Advantages Of DBMS, Data Warehousing   Definition, Different Layers, Components, Advantages, & Applications Area, Data Mining   Definition, Its Evolution, Technologies Used Data Mining, Advantages, Application Area ,Geographical Information System   Definition, Components, Advantages, Uses & Application Area, E-Commerce   Definition, Its Types With Advantages, Disadvantages, Application Area.

b. Network Security On Internet :

Threats & Prevention From Viruses, Worms Trojan Horse, Spans, Use of Cookies, Protection Using Firewall, Proxy Server , Concept of Public Keys & Private Key, Use of Digital signature, VPN.

c. Cyber Crime:

Definition & its Types   Cyber Talking, Hacking, software Piracy, On-line Fraud, Pornography, Spooling, Cyber Laws, India IT Act related to Cyber Laws, Intellectual Property Rights Issues.

UNIT – III

a) Introduction to Visual Basic & Development Environment:

Object-oriented programming feature, Visual Basic and the integrated development environment, VB programming process, projects Explorer, from layout, Creating application, Project & interface, VB intrinsic controls, Working with controls , From design , Development environment and customization, SDI & MDI customization & applications

b) Introduction to VB language :

Data Types, variable, Operators, Expressions, General statements & Control statements, Arrays, Built-in function & Procedures, Control Arrays & User-defined procedures, Creating & Calling Function.

(PRACTICAL)

1. SAME AS EARLIRR   MARKS: 30

BIOTECHNOLOGY(2014)

FIRST YEAR
THEORY (70 Marks)

UNIT I

A. Biotechnology – An overview

(a)   Definition and Historical perspective

(b)   Scope and application

(c)   Biotechnology – Indian and Global trends

B. Cell – The unit of life

(a)   Cell theory and Cell types (Prokaryotic and Eukaryotic)

(b)   Ultra structures of typical plant and animal cells.

(c)   Structures and functions of the following cell organelles

    (i)   Cell wall

    (ii)   Plasma membrane

    (iii)   Endoplasmic reticulum Golgi complex and Ribosome

    (iv)   Mitochondria

    (v)   Lysosome

    (vi)   Nucleus and Chomosomes

    (vii)   Normal chromosome complement of human

    (viii) Some abnormal human chromosome complements (Down syndrome, Turner syndrome and Klinefelter syndromes)

UNIT II

A. Cell Continuity

(a)   Cell cycle and its regulatioin (Elementary ideas only)

(b)   Mitosis

(c)   Meiosis

(d)   Mendel's laws of inheritance

(e)   Linkage and crossing over

(f)   Sex determination in human (Role of X and Y chromosomes)

(g)   Sex-linked inheritance (Criss-cross inheritance with reference to red-green colourblindness and haemophilia)

B. Biochemistry

(a)   Biomolecules (Fundamental structures and functions of the following)

    (i)   Carbohydrates (Glucose, Cellulose and Starch)

    (ii)   Lipids (Triglyceride and Phospholipid)

    (iii)   Proteins [Structure of a polypeptide {(Primary, Secondary and Tertiary structures)} and Structure of two or more interacting polypeptides (Quaternary structure)]

    (iv)   Enzymes as biocatalysts (Classification, Properties, Mechanism of action and Factors affecting the rate of an enzyme-catalyzed reaction)

    (v)   Nucleic acids as genetic material

(vi) DNA – Physical and Chemical structures and Properties

(vii) RNA – Structure, Types (mRNA, tRNA and rRNA) and Functions

(b) Photosynthesis

    (i) Conversion of light energy into chemical energy

    (ii) Carbondioxide assimilation (C3 and C4 Pathways)

(c) Cellular Respiration (Elementary ideas only)

    (i) Glycolysis

    (ii) Kreb's (TCS) Cycle and

    (iii) Electron Transport System and Oxidative Phosphorylation

UNIT III

A. Immune System

    (a) Innate vs Acquired (Adaptive) Immunity

    (b) Antigen and Antibody – Types and Structure of antibody (Ig G)

    (c) Antigen – Antibody Interaction

B. Molecular Biology

    (a) Gene Expression (Transcription and Translation)

    (b) Regulation of gene expression with particular reference to lac operon only

    (c) Elementary steps in gene cloning process

    (d) Polymerase Chain Reaction (PCR)

(e) Human Genome Project (Meaning, Objective, Achievements and Issues)

PRACTICAL (30 Marks)

1. Study of microscopic structure of living cells (Cheek epithelial / Onion peel / Rhoeo / Hydrilla) in respect to shape, colour and organelles.

2. Qualitative tests for carbohydrates, proteins and lipids

3. Cytological ppreparation of chromosomes during mitosis and meiosis by squashing technique (Onion root tip and Grasshopper testis).

4. Blood grouping and differential counting of leucocytes.

5. Enzyme activity determination of catalase and urease.

6. Preparation of models of macromolecules.

SECOND YEAR
THEORY (70 Marks)
UNIT I

Microbiology

(a)   Microbial diversity and their applications (Eubacteria, Cyanobacteria, Protista and Fungi)

(b)   Microbial culture and its maintenance

(c)   Microbial Growth

(d)   Fermentation

     (i)   Meaning and fundamental process

     (ii)   Batch and Continuous fermentation

(e)   Downstream processing

(f)   Application of fermentation (Production of organic acids, enzymes and antibodies)

UNIT II

Cell and Tissue Culture

(a)   Totipotency of cells (Also the meaning of unipotency, pleuripotency and multipotency)

(b)   Techniques ans applications of animal cell culture.

(c)   Transgenic animals [Meaning, Fundamental gene transfer techniques (Microinjection, Electroporation, Microprojectile bombardment and Lipofection) and making of transgenic animals with some examples]

(d)   Animal cloning with reference to Dolly

(e)   Techniques and applications of plant tissue culture

(f)   Transgenic plants (Making of transgenic plants with some examples)

UNIT III

Biotechnology in human welfare

(a)   Production of drought-resistant and disease-resistant plants

(b)   Biofertilizer (Rhizobium, Mycorrhizae and Blue-Green Algae)

(c)   Biopesticides (Bacillus thuringiensis, and Trichoderma)

(d)   Biotechnological production of renewable energy [Biomass energy (Bioalcohol, Biogas and Biodiesel)

(e)   Genetically engineered vaccine (Hepatitis vaccine) and Hormone (Insulin)

(f)   Biotechnology in waste management

(g)   Biosensor and Biochip

(h)   Gene Replacement Therapy

(i)   Bioinformatics (Elementary ideas)

PRACTICAL (30 Marks)

1.   Culture Techniques: Sterilization of glass ware, Preparation of liquid and solid media (PDA media and Nutrient agar media)

2.   Preparation of pure culture of microbes

3.   Measurement of cell dimensions of microorganisms by micrometry and drawing diagrams using camera lucida in a magnifying scale

4.   Measurement of growth of different microbes by haemocytometry / turbidometry and calculation of generation time

5. Determination of antibiotic sensitivity of microbes
6. Fundamental techniques of plant tissue culture
7. Preparation of models of macromolecules
8. Project Work: A student is required to submit a project work report in around 1000 words in any one of the following topics in the practical examination.
   (a)   Genetic Engineering
   (b)   Transgenic Plants
   (c)   Human Genome Project
   (d)   Transgenic Animals
   (e)   Gene Therapy
   (f)   Industrial Production of Beneficial Enzymes
   (g)   Mushroom Cultivation
   (h)   Immunodiagnosis Methods
   (i)   Biopesticides
   (j)   Biofertilizer
   (k)   Bioprocess Engineering

SANSKRIT

ELECTIVE
FIRST YEAR

There shall be one paper carrying 100 marks.
The examination shall be of 3 hours duration.

COURSE STRUCTURE

UNIT		CLASSES REQUIRED	MARKS ALLOTTED
Unit - I	Poetry	25	26 Marks
Unit - II	Prose	20	26 Marks
Unit - III	History of Sanskrit Literature and Translation	15	23 Marks
Unit -IV	Grammar	10	25 Marks

Total 80 Classes   **Total 100 Marks**

PORTIONS TO BE STUDIED

Unit -I

Poetry : Kumarasambhavam of Kalidasa
[Canto V]

कुमारसम्भवम् – पञ्चमः सर्गः

Unit - II

Prose :

Samskrutamandakini (Gadyabagah)

संस्कृतमन्दाकिनी (गद्यभागः)

The following prose pieces from the above mentioned book are to be studied.

1. उपमन्युकथा   (Upamanyukatha)

2. परहितसाधनम्   (Parahitasadhanam)

3. मुद्रिकाप्राप्तिः   (Mudrikapraptih)

4. चन्द्रभूपतिकथा   (Candrabhupatikatha)

5. ससेमिराकथा   (Sasemirakatha)

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6. ध्रुवोपाख्यानम्   (Dhruvopakhyanam)

7. विभीषणस्य रावणं प्रति उपेदश: (Vibhisanasya Ravanam prati upadesah)

Unit - III

History of Sanskrit Literature and Translation

A) History of the following authors and their works are to be studied.

01.   वाल्मीकि   Valmiki

02.   व्यास   Vyasa

03.   कालिदास   Kalidasa

04.   भास   Bhasa

05.   विष्णुशर्मा   Visnusarma

06.   पण्डित नारायण   Pandita Narayana

07.   चाणक्य   Canakya

08.   जयदेव   Jayadeva

09.   विश्वनाथकविराज Visvanathakaviraja

10.   मुरारि मिश्र   Murari Misra

B) Translation of Textual Sanskrit Sentences into Odia/English are to be done

Unit - IV

Grammar: (Textual and out side the text /General)

A) Gramer (Textual)

i) समास   (Samasa)

ii) कारक-विभक्ति   (Karakavibhakti)

iii) प्रकृति-प्रत्यय   (Prakrtipratyaya)

B) Grammar (General/out side the text)   .

i) कृदन्त- (Krdanta) शतृ, शानच्, तव्य, अनीयर्, क्त, क्तवतु,

क्त्वा, ल्यप्, तुमुन्, क्तिन्, ल्युट्, घञ्, खल्

ii) तद्धित -(Taddhita) अण्, त्व, तल्, मयट्, इन्, मतुप्, यत्

iii) वाच्यपरिवर्तन   (Vacyaparivartana)

iv) वाक्यरचनम्   (Sentence formation)

v) भ्रमसंशोधन   (Correction of sentences)

vi) णिजन्त-(Nijanta) -भू, स्था, पठ्, गम्, कृ, दा, ज्ञा, पा, नी

BOOKS RECOMMENDED

01.   **संस्कृतमन्दाकिनी** – **Published by Odisha State Bureau of Textbook Preparation and Production.**

02.   **संस्कृत-साहित्य-इतिहास** – **History of Sanskrit Literature By A. B. Keith, Published by Odisha State Bureau of Textbook Preparation and Production.**

03.   **व्याकरणदर्पणः** **Published by Odisha State Bureau of Textbook Preparation and Production**

04.   **संस्कृत-कवि-परम्परा : -do-**

05.   **Kumarasambhavam(Canto-V) of Kalidasa.**

       कुमारसम्भवम् – पञ्चमः सर्गः

QUESTION PATTERN AND MARK-DIVISION

SANSKRIT (ELECTIVE)

GROUP -A

TIME:03 Hrs   **1st Year**   **FULL MARKS : 100**

Q.1. Multiple Choises :   1 x 15=15

        MARK-DIVISION   : PROSE   - 1X3 = 3

                                        : POETRY   - 1X2 = 2

                                        : History of Skt. Literature - 1x3 = 3

                                        :Sentence Formation   - 1x2 = 2

                                        : Karaka& Vibhakti   - 1x3 = 3

                                        : Taddhita / Krdanta   - 1x2 = 2

Q.2. One word Answer / Correction / Fill up the Blanks : 1x15 =15

        MARKDIVISION   :PROSE   - 1x2 =2

                                        :POETRY   - 1x3 =3

                                        : Grammar from the Text   - 1x6 = 6

                                        (Samasa, Karaka-Vibhakti

                                        and Prakrti Pratyaya)

                                        : Hist. of Sanskrit Literature - 1x4 = 4

GROUP -B

Q.3. Short Type Answer (within 2/3 sentences / 15words) : 2x11 = 22

    MARKDIVISION   : Correction of Sentence   - 2x2 = 4

                          :Vacya Parivartana   - 2x2 = 4

                          :Prakrti Pratyaya   - 2x2 = 4

                          :Translation from the Text - 5x2 = 10

                            (Prose and Poetry)

                         (From Sanskrit into Odia/ Eng.)

Q.4. Short Type Answer (within 06 sentences / 25words) : 3x6 = 18

    MARKDIVISION   :   (a)   PROSE   - 3x2 = 6

                                (b)   POETRY   - 3x2 = 6

                                (c)   Hist.of   - 3x2 = 6

                                        Skt. Literature

GROUP - C

Q.5. Long Type Answers (Within 08 sentences/40 words) $7^{1/2}$ x4 = 30 (04 out of 6 Qs.)

        a) PROSE (Long Question)

        b) POETRY (Long Question)

        c) Explanation (Prose/Poetry)

        d) Expansion of Ideas(Moral teachings from Prose/Poetry)

        e) Hist. of Skt. Literature (Authors)

        f) Hist. of Skt. Literature (Works)

N.B.- The questions may be answered in Sanskrit or Oriya or English if not otherwise specified.

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SANSKRIT
ELECTIVE
SECOND YEAR

Time - 3 hrs   F.M. -100

There shall be one paper carrying 100 marks.
The duration of Examination will be of 03 hours.

COURSE STRUCTURE

UNIT		CLASSES REQUIRED	MARKS ALLOTTED
Unit - I	Drama	20	25
	(Acts -1, 2, 3 & 4)		
Unit - II	Drama	15	25
	(Acts- V & VI)		
Unit - III	Poetry	20	25
Unit -IV	Grammar from and outside the text	15	15
Unit-V	Translation from outside the text	10	10

(From English/Odia into Sanskrit)

Total   80 Classes   100 Marks

PORTIONS TO BE STUDIED

Unit -I
Drama :
Svapnavasavadattam of Bhasa

स्वप्नवासवदत्तम्

(Act-I, II, III & IV)

Unit - II
Drama
Svapnavasavadattam of Bhasa

स्वप्नवासवदत्तम्

(Acts-V & VI)

Unit - III

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Poetry:

Samskrtamandakini(Padyabhagah)

संस्कृतमन्दाकिनी (पद्यभाग:)

The following poetry pieces from the above mentioned book are to be studied.

1. चाणक्यनीति: (Canakyanitih) Verses 01 to 24

2. रघुवंशम् (Raghuvamsam) Verses 01 to 20

3. दमयन्तीस्वयंवर: (Damayantisvayamvarah)

Unit - IV

Grammar from and outside the text.

A) Gramer (Textual)

    i) कारक-विभक्ति (Karakavibhakti)

    ii) सन्धि (Sandhi)

    iii) सन्धिविच्छेद (Sandhiviccheda)

    iv) समास (Samasah)

B) Grammar (General / out side the text) .

    1. शब्दरूप (Sabdarupa)

    i) पुंलिङ्ग -Pumlinga - देव, कवि, पति, सखि, भ्रातृ, पितृ, वणिक्, सम्राट्, गच्छत्, भवत्, महत्, सुहृद्,राजन्, गुणिन्, पथिन्

    ii) स्त्रीलिङ्ग - Strilinga- लता, मति, नदी, स्त्री, वधू, मातृ, दिश्, विपद्

    iii) क्लीवलिङ्ग -Klivalinga- फल, वारि, अक्षि, मधु, कर्मन्, नामन्, पयस्

    iv) सर्वनाम -Sarvanama- तद्, किम्, इदम्, सर्व, युष्मद्, अस्मद्

    v) संख्यावाचक-Samkhyavacaka - एक, द्वि, त्रि, चतुर्, पञ्चन्,

    2. धातुरूप (Dhaturupa) - भू, गम्, दृश्, कृ, पठ्, अस्, ज्ञा, नी, पा, प्रच्छ्, लभ्, दा, विद्, पूज्

    3. स्त्रीप्रत्यय (Stripratyaya)

Unit - V

Translation (General) from English/Odia into Sanskrit are to be worked out.

BOOKS RECOMMENDED

01. संस्कृतमन्दाकिनी – **Published by Odisha State Bureau of Textbook Preparation and Production.**

02. संस्कृत-साहित्य-इतिहास – **History of Sanskrit Literature By A. B. Keith, Published by Odisha State Bureau of Textbook Preparation and Production.**

03. व्याकरणदर्पण:– **Published by Odisha State Bureau of Textbook Preparation and Production**

04. संस्कृत-कवि-परम्परा : -do-

05.   स्वप्नवासवदत्तम् भासकृत

QUESTION PATTERN AND MARK-DIVISION

SANSKRIT (ELECTIVE)

TIME:03 Hrs   **2nd Year**   **FULL MARKS : 100**

GROUP - A

1. Multiple Choises :   1x15 = 15

MARK-DIVISION   : Drama   - 1x5 = 5

                                    :Poetry   - 1x4 = 4

                                    : Sabdarupa   - 1x2 =2

                                    :Dhaturupa   - 1x2 = 2

                                    : Karaka Vibhakti   - 1x2 = 2 (from the text)

Q.2. One word Answer / Correction / Fill up the Blanks :   1x15 =15

MARKDIVISION   : Drama   - 1x3 = 3

                                    : Poetry   - 1x3 = 3

                                    : Ekapadikaranam   - 1x2 = 2
                                      (Stripratya)

                                    : Sandhi   - 1x2 = 2

:Sandhiviccheda   - 1x2 = 2

: Samasa   - 1x3 = 3 (from the text)

GROUP -B

Q.3. Short Type Answer (within 2/3 sentences / 12words) : 2x11 = 22

MARKDIVISION   : Drama   - 2x4 = 8
                       : Poetry   - 2x2 = 4
                       : Translation from English
                       / Odia in to Sanskrit - 2x5 = 10

Q.4. Short Type Answers (with in 25words) : 3x6 = 18

   MARKDIVISION : (a)   Drama   - 3 x 4 = 12 (Out of 05 Qs)

                     (b)   Poetry   - 3x2 =06 (Out of 03 Qs)

GROUP - C

Q.5. LONG TYPE ANSWERS (with in 08 sentences / 40 words)

$$7 \frac{1}{2} \times 4 = 30 \ (04 \ out \ of \ 06Qs.)$$

            a,b,c)   Drama (Long Questions = 03 Nos)

            d)   Poetry (Long Question = 01 No)

            e)   Explanation (one from Drama)

            f)   Explanation (one from Poetry)

N.B.- The questions may be answered in Sanskrit or Oriya or English if not otherwise specified.

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ECONOMICS
ARTS AND SCIENCE
PAPER-I
Indian Economic Development and Elementary Statistics

1. **Status and Structure of Indian Economy** [10 periods]
   - ❖ Status of Indian Economy on the eve of Independence.
   - ❖ Basic characteristics of Indian economy.
   - ❖ Structural changes in the Indian economy; Relative contributions of Primary, Secondary and Tertiary sectors.
   - ❖ Infrastructure and its role in the Indian economy - Economic Infrastructure (Energy, Transport and Communications), Social Infrastructure (Education and Health).

2. **Sectoral Development, Planning and Economic Reforms.** [15 periods]
   - ❖ Agriculture - its importance, causes of low productivity, and Green Revolution; Present Agricultural situation.
   - ❖ Industry - its importance, Industrial policy of 1948, 1956 and 1991.
   - ❖ Foreign trade - its role, composition and direction, Export-import Policy.
   - ❖ Objectives goals of Five Year Plans.
   - ❖ Economic Reforms since 1991 - need, main features of Liberalisation, Privatisation and Globalisation.

3. **Current challenges facing the Indian Economy.** [15 periods]
   - ❖ The population problem - Demographic features, causes of population growth, adverse effects of population growth, and population control.
   - ❖ Poverty - Absolute and Relative poverty, causes of poverty, and poverty alleviation programmes.
   - ❖ Unemployment - Types of unemployment, causes of unemployment and measures to solve them.
   - ❖ Inflation - problems and policies.
   - ❖ Sustainable Development - Meaning, indicators, effects of economic growth on environment, and the problem of global warming.

4. **Introductory Statistics.** [15 periods]
   - ❖ Meaning, scope, importance and limitations of statistics.
   - ❖ Sources of statistical data - Primary and Secondary, NSSO and Census of India as sources of secondary data
   - ❖ Methods of data collection - census and sampling methods and their relative merits and demerits.
   - ❖ Meaning and types of variables, frequency distribution.
   - ❖ Tabular and Diagrammatic presentation of data, Bar diagram, Pie diagram, Histogram, Polygon, Ogive, Time series graph.

5. **Statistical Methods.** [15 periods]
   - ❖ Measures of Central Tendency —Simple and weighted arithmetic mean, median and mode.
   - ❖ Measures of dispersion -Absolute measures: Range, Quartile Deviation, Mean Deviation and Standard Deviation and their merits and demerits.
   - ❖ Relative Measures : Coefficient of Range, Quartile Deviation, Mean Deviation and Standard Deviation.
   - ❖ Lorenz Curve : Meaning and application.
   - ❖ Correlation - Meaning, Types, Karl Pearson's Method of computing correlation coefficient in the context of 2-variable ungrouped data.

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Elementary Micro and Macro Economics

1. **Basics of Microeconomics and Consumer Behaviour.** [13 periods]
   - Meaning of Economics and Microeconomics
   - Central problems of an Economy - Scarity and Choice: What, how and for whom to produce ?
   - Basic concepts - Human wants, Utility, Goods, Value, Price and Wealth
   - Laws of Consumption - Marginal and Total utility, Law of Diminishing Marginal Utility, Law of Equimarginal utility.
   - Demand - Meaning and determinants. Law of demand, Movement along and shifts in demand curve. Price elasticity of demand and its determinants.

2. **Production, Cost, Revenue, Supply and Forms of Market.** [15 periods]
   - Meaning of production and production function, Total, Average and Marginal Product Law of Variable Proportions.
   - Cost - Money and Real cost: Implicit and Explicit cost, Opportunity Cost; Fixed and Variable costs; Total, Average and Marginal costs in the short run and their relationship.
   - Revenue- Total, Average and Marginal Revenue and their relationship
   - Supply - Meaning and Law of supply.
   - Market - Meaning, Forms of Market : Pure and Perfect competition, Monopoly, Monopolistic Competition and Oligopoly. Price Determination under perfect competition: market price and normal price.

3. **Distribution.** [7 periods]
   - Meaning of Distribution, Ricardian Theory of Rent and Quasi-Rent. Money and Real Wages. Determinants of Real wage. Causes of Wage Differences. Gross and Net Interest. Gross and Net Profit, Constituents of Profit

4. **Introductory Macroeconomics.** [20 periods]
   - Meaning of Macroeconomics, Difference between Macro-and Micro-Economics
   - National Income - Meaning and Aggregates related to National Income (GNP, GDP, NNP and NDP at Factor Cost and Market Price), National Disposable Income (Gross and Net), Private Income, Personal Income, Personal Disposable Income, Real and Nominal GDP, GDP and Welfare. Circular Flow of Income in a Two sector Economy. Methods of Computing National Income : Product (Value added), Income and Expenditure Methods
   - Income Determination - Aggregate Demand and its Components, Aggregate Supply, Simple Keynesian Theory of Income Determination

5. **Money, Banking and Public Finance.** [15 periods]
   - Definition and functions of money.
   - Meaning and functions of commercial Banks, Functions of Central Bank
   - Meaning of Public Finance, Sources of Public Revenue, Concepts of Revenue and Capital Expenditure, Plan and Non-Plan Expenditure, Developmental and Non-Developmental Expenditure.
   - Meaning and objectives of Government Budget, Difference between balanced and unbalanced budgets, surplus and deficit budgets.

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N.B. : **Previously Published Syllabus of Science Streem for the H.S. Exam-2014 AD is hereby cancelled and that may be ignored.**