JAGRAN
Josh
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SSC Data Entry & Lower Division Clerk
Exam 2011: Solved Question Paper

PART I General Intelligence & Reasoning

Directions (Q.Nos. 1 to 9) *Select the related words/letters/numbers from the given alternatives.*
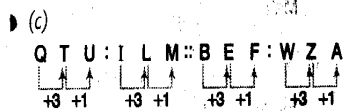
1. Horse : Hoof :: ?
(a) Man : Foot   (b) Dog : Black
(c) Paise : Rupee   (d) Pen : Pencil

▶ *(a) Hoof is related to horse, in the same way, foot is related to man.*

2. LO : PK :: IR : ?
(a) GT   (b) SH   (c) MN   (d) FU

▶ *(c)*

3. Night : Morning :: ? : Night
(a) Noon   (b) Forenoon
(c) Afternoon   (d) Evening

▶ *(d) Morning comes after night and night comes after evening.*

4. QTU : ILM :: BEF : ?
(a) PSZ   (b) CFH
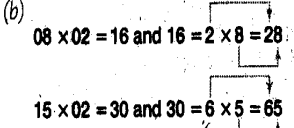(c) WZA   (d) UXB

▶ *(c)*

5. 6524 : 6465 :: 9638 : ?
(a) 9825   (b) 9736   (c) 9697   (d) 9579

▶ *(d)* $6524 - 59 = 6465$
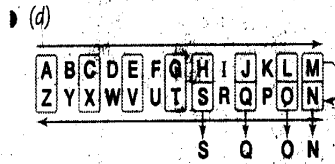$9638 - 59 = 9579$

6. 64 : 144 :: 256 : ?
(a) 16   (b) 32   (c) 400   (d) 336

▶ *(c)* $8^2 = 64$ and $(8 + 4)^2 = 12^2 = 144$
In the same way,
$16^2 = 256$ and $(16 + 4)^2 = 20^2 = 400$

7. 08 : 28 :: 15 : ?
(a) 63   (b) 65   (c) 126   (d) 124

▶ *(b)*
$08 \times 02 = 16$ and $16 = 2 \times 8 = 28$
$15 \times 02 = 30$ and $30 = 6 \times 5 = 65$

8. ACEG : ZXVT :: HJLM : ?
(a) QOMK   (b) SRPO
(c) RPNL   (d) SQON

▶ *(d)*

9. Oxygen : Burn :: Carbon dioxide : ?
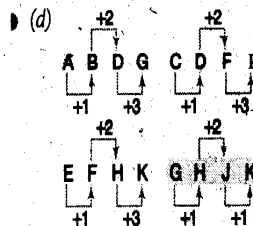(a) Isolate   (b) Foam
(c) Extinguishes   (d) Explode

▶ *(c) The fire burns due to presence of oxygen and the fire extinguishes due to carbon dioxide.*

Directions (Q.Nos. 10 to 18) *Select the one which is different from the other three responses.*

10. (a) Pen   (b) Marker
(c) Paper   (d) Pencil

▶ *(c) We can write with pen, marker, pencil on paper. So, paper is different out of them.*

11. (a) ABDG   (b) CDFI
(c) EFHK   (d) GHJK

▶ *(d)*

Therefore, GHJK is different from the other three.

12. (a) Graph   (b) Chart
(c) Model   (d) Drawing

▶ *(c) Model is different from the other three responses.*

13. (a) 73   (b) 53
(c) 87   (d) 67

▶ *(c) All are prime numbers while 87 is divisible by 3.*

14. (a) Peak   (b) Mountain
(c) Hillock   (d) Valley

▶ *(d) All have peak except valley.*

15. (a) 919-949   (b) 646-686
(c) 828-848   (d) 434-464

▶ *(a) In all the given numbers, the middle digit is twice in second group.*

16. (a) NML   (b) QPQ
(c) XWV   (d) HGE

▶ *(d) All the letters are arranged alphabetically in right or left order, except (d).*

17. (a) E   (b) I
(c) O   (d) V

▶ *(d) All are vowels except V.*

18. (a) 24-47   (b) 38-61
(c) 74-98   (d) 54-77

▶ *(c) In all the pairs, first numbers are even and second numbers are odd.*

19. Arrange the following words according to English Dictionary.
1. Gargle   2. Garden
3. Garbo   4. Garnish
5. Garland
(a) 2, 3, 4, 1, 5   (b) 3, 2, 1, 5, 4
(c) 3, 2, 4, 5, 1   (d) 4, 3, 2, 1, 5

▶ *(b) The required order of the given words is Garbo, Garden, Gargle, Garland and Garnish.*

Directions (Q.Nos. 20 to 21) *Which one of the given responses would be a meaningful order of the following words in ascending order?*

20. 1. Vegetable   2. Market
3. Cutting   4. Cooking
5. Food
(a) 1, 2, 3, 4, 5   (b) 2, 1, 3, 4, 5
(c) 3, 1, 2, 5, 4   (d) 5, 2, 1, 3, 4

▶ *(b) The required ascending order of given words is Market, Vegetable, Cutting, Cooking and Food.*
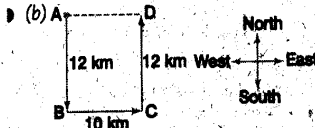
21. 1. Honey   2. Flower
3. Honey Bee   4. Wax
(a) 1, 3, 4, 2   (b) 2, 1, 4, 3
(c) 2, 3, 1, 4   (d) 4, 3, 2, 1

▶ (c) *The required ascending order of given words is Flower, Honey Bee, Honey and Wax.*

22. Which one of the set of letters when sequentially placed at the gaps in the given letter series shall complete it?

__b b __ c __ b g __ b __ g
(a) c b g b c (b) c g b c b
(c) c g b c c (d) g b c b b

▶ (b) c b b g c b b g c b b g = c g b c b

Directions (Q.Nos. 23 to 26) *Choose the correct alternative from the given ones that will complete the series.*

23. 169, 144, 121, 100, ?
(a) 99 (b) 74 (c) 81 (d) 101

▶ (c)

169 144 121 100 ?
$(13)^2$ $(12)^2$ $(11)^2$ $(10)^2$ $(9)^2$

−1 −1 −1 −1

24. FLU, GMV, HNW, IOX, ?
(a) JYP (b) WYP
(c) WPY (d) JPY

▶ (d)

+1 +1 +1 +1
F L U G M V H N W I O X J P Y
+1 +1 +1 +1
+1 +1 +1 +1

25. A, P, C, Q, E, R, G, ?, ?
(a) SI (b) HI (c) IS (d) TJ

▶ (a)

+1 +1 +1
A P C Q E R G S I
+2 +2 +2 +2

26. 5, ?, 23, 47, 95, 191
(a) 13 (b) 10 (c) 17 (d) 11

▶ (d) 5 + (5 + 1) = 11   11 + (11 + 1) = 23
23 + (23 + 1) = 47   47 + (47 + 1) = 95
95 + (95 + 1) = 191

27. From the given alternatives, select the word which cannot be formed using the letters of the given word.
Educational
(a) National (b) Next
(c) Dean (d) Lion

▶ (a) *The word National cannot be formed using the given letters.*

28. Find the wrong number in the given series.
20, 40, 200, 400, 2000, 4000, 8000
(a) 200 (b) 2000 (c) 8000 (d) 4000

▶ (c)

20 40 200 400 2000 4000 8000
×10 ×10 ×10
×10 ×10 ×10

So the term 8000 is wrong.

29. Which of the following interchanges of signs would make the given equation correct?

$5 + 6 + 3 - 12 \times 2 = 17$
(a) + and × (b) + and ×
(c) + and + (d) + and −

▶ (a) *Replacing the signs + and ×,*

⇒ $5 + 6 \times 3 - 12 + 2 = 17$
⇒ $5 + 18 - \dfrac{12}{2} = 17$
⇒ $23 - 6 = 17$
⇒ $17 = 17$

30. If SPANK is coded as PSNAK then how will THROW be coded?
(a) HTORW (b) HTWOR
(c) HTWRO (d) HTROW

▶ (a)

S P A N K
P S N A K

In the same way,

T H R O W
H T O R W

31. Some equations are solved on the basis of a certain system. On the same basis, find out the correct answer for the unsolved equation.
$5 + 3 + 7 = 573$ $6 + 3 + 9 = 693$
$6 + 4 + 8 = 684$ $9 + 4 + 5 = ?$
(a) 594 (b) 945 (c) 459 (d) 954

▶ (d) 5 3 7   6 8 9
       5 7 3   6 9 3

In the same way,

9 4 5

32. If Anil runs less fast than Sunil and Sunil runs as fast but not faster than Suraj, then Suraj runs
(a) as fast as Anil
(b) faster than Sunil
(c) faster than Anil
(d) less fast than Anil

▶ (c) Sunil > Anil
(Sunil = Suraj) > Anil
Therefore, (Suraj > Anil) and hence, Suraj runs faster than Anil.

33. Select the correct combination of mathematical signs to replace * signs and to balance the given equation.
$16 * 4 * 3 * 4 * 13$
(a) + × − = (b) × − + =
(c) + = + × (d) − × + =

▶ (d) *Using signs −, ×, + and = respectively we get the equation*
$16 - 4 \times 3 + 4 = 13$
⇒ $16 - 3 = 13$
⇒ $13 = 13$

34. If BANGALORE is written as 987685432, how is ELLORA written in the same code?
(a) 245538 (b) 255438
(c) 245348 (d) 254538

▶ (b) B A N G A L O R E
       9 8 7 6 8 5 4 3 2

In the same way,

∴ E L L O R A
   2 5 5 4 3 8

35. A group of alphabets are given with each being assigned a number. These have to be unscrambled into a meaningful word and correct order of letters may be indicated from the given responses.
E O C N A
1 2 3 4 5

(a) 3 4 5 2 1 (b) 2 3 1 5 4
(c) 4 3 1 2 5 (d) 1 3 2 5 4

▶ (b)

E O C N A → O C E A N
1 2 3 4 5

Meaningful word

36. Looking at a photograph, a person said "I have no brother or sister but that man's father is my father's son". At whose photograph was the person looking at?
(a) His son's (b) His nephew's
(c) His father's (d) His own

▶ (d)

By diagram, it is clear that the photo is of his own.

Directions (Q.Nos. 37 and 38) *Select the missing number from the given responses.*

37. 5 4 9 6
7 5 2 4
1 3 4 5
35 60 72 ?
(a) 116 (b) 136 (c) 120 (d) 126

▶ (c) $5 \times 7 \times 1 = 35$
$4 \times 5 \times 3 = 60$
$9 \times 2 \times 4 = 72$
$6 \times 4 \times 5 = 120$

38. 64 36 2
81 25 4
144 16 ?
(a) 6 (b) 8 (c) 3 (d) 16

▸ (b) $\sqrt{64} - \sqrt{36} = 8 - 6 = 2$

$\sqrt{81} - \sqrt{25} = 9 - 5 = 4$

$\sqrt{144} - \sqrt{16} = 12 - 4 = 8$

39. Mitan travelled 12 km southward, then turned left and travelled 10 km, then turned left and travelled 12 km. How far was Mitan from the starting point ?

(a) 8 km   (b) 10 km

(c) 12 km   (d) 14 km

▸ (b)

The required distance is

AD = BC = 10 km.

40. Six friends A, B, C, D, E and F are sitting in a row, facing East. C is between A and E. B is just to the right of E but left of D, F is not at the right end. Which pair is sitting by the side of D?

(a) CE   (b) FA   (c) EB   (d) FD

▸ (c)
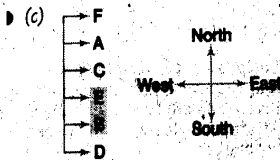
The pair EB is setting by the side of D.

41. The question below has a statement followed by two assumptions. You have to decide whether the assumption is implied in the statement. Indicate your answer.

Statement Rich people are more prone to have heart attacks.

Assumptions

I. Most of the deaths among rich people are due to heart attacks.

II. Poor people do not have heart attacks.

(a) Only I is implicit

(b) Only II is implicit

(c) Both I and II are implicit

(d) Neither I nor II is implicit

▸ (a) Only I is implicit.

42. Mohan starts from point A and walks 1 km towards South, turns left and walks 1 km. Then, turns left again and walks 1 km. Now, which direction he is facing?

(a) East

(b) West

(c) North

(d) South-West

▸ (c)
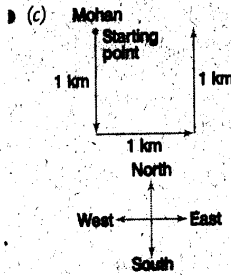
43. A solid cube of 4 inches has been painted red, green and black on pair of opposite faces. It has been cut into one inch cubes. How many cubes have only two faces painted?

(a) 8   (b) 16   (c) 24   (d) 32

▸ (c) $n = \dfrac{4}{1} = 4$ inches

Hence, number of cubes have only two faces painted

$$= (n - 2) \times 12$$

$$= (4 - 2) \times 12$$

$$= 24$$

44. Three statements are given followed by four conclusions I, II, III and IV. You have to consider the statements to be true even if they seem to be at variance from commonly known facts. You are to decide which of the given conclusions, if any, follow from the given statements. Indicate your answer.

Statements

All dogs are rats.

All rats are crows.

All crows are parrots.

Conclusions

I. All dogs are parrots.

II. Some parrots are dogs.

III. Some crows are dogs.

IV. All rats are dogs.

(a) I and II follow

(b) I, II and III follow

(c) Either II or IV follows

(d) Either I or II or III follows

▸ (d)
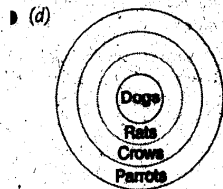
I → ✓   II → ✓

III → ✓   IV → ✗

45. Which answer figure will complete the pattern in the question figure?

Question Figure

Answer Figures

(a)   (b)   (c)   (d)

▸ (c)
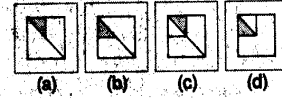
46. Select the answer figure in which the question figure is hidden/embedded.

Question Figure

Answer Figures

(a)   (b)   (c)   (d)

▸ (b)
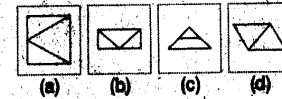
47. A piece of paper is folded and cut as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?

Question Figures
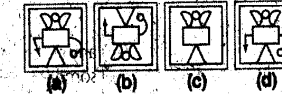

Answer Figures

(a)   (b)   (c)   (d)

▸ (a)
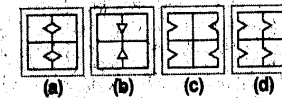
48. Which of the answer figure is exactly the mirror image of the given figure, when the mirror is held on the line AB?

Question Figure

Answer Figures

(a)   (b)   (c)   (d)

▸ (d)

49. A word is represented by only one set of numbers as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of

alphabets as in two matrices given below. The columns and rows of Matrix I are numbered from 0 to 4 and that of Matrix II are numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column, e.g., 'A' can be represented by 55, 67, 86, etc and 'R' can be represented by 04, 23, 30, etc. Identify the set for the word DOOR.

	0	1	2	3	4
0	R	W	W		
1	S	R	F	O	M
2	O				
3	R	F	O	M	S

	5	6	7	8	9
5	A				
6	I	P	A	T	D
7					A
8	P	A	T	D	I
9	D			P	A

(a) 69, 44, 20, 43   (b) 76, 01, 44, 24
(c) 95, 20, 44, 12   (d) 57, 13, 32, 23

▶ (d) According to matrices,
D = ●, 69, 76, 88, 95
O = 01, ●, 20, ●, 44
R = 04, 11, ●, 30, 42
DOOR = 57, 13, 32, 23

50. Which one of the following diagrams best depicts the relationship among horses, parrots and birds?

(a)   (b)   (c)   (d)

▶ (b)

Parrots   Horses
Birds
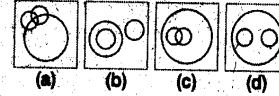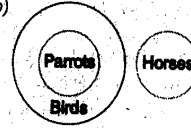
PART II   English Language

Directions (Q.Nos. 51 to 55) *In these questions, part of the sentences have errors and some have none. Find out which part of a sentence has an error. If there is no error, mark (d) as your answer.*

51. Due to the heavy rains, (a)/ the ship drowned (b)/in the middle of the ocean.(c) / No error (d)
▶ (b) Use 'sank' in place of 'drowned'.

52. Death of (a)/ his only son (b)/made Mohan desolate. (c)/ No error (d)
▶ (c) Add 'feel' before 'desolate'.

53. He fell heavily (a)/ and this caused (b)/ him great pain. (c)/ No error (d)
▶ (c) Use 'acute' in place of 'great'.

54. When I met him (a)/ the couple of days back (b)/ he was writing a new book. (c)/ No error (d)
▶ (b) Use 'a' in place of 'the'.

55. In his old age, (a)/ a person is likely to get (b)/ more weak day-by-day. (c)/ No error (d)
▶ (c) Use 'weaker' in place of 'more weak'.

Directions (Q.Nos. 56 to 60) *In these questions, sentences are given with blanks to be filled in with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four.*

56. Our teacher........several points before the exams.
(a) cleared off   (b) cleared away
(c) cleared up   (d) cleared out
▶ (c)

57. Let me give you ....
(a) an advise   (b) any advice
(c) some advice   (d) some advises
▶ (c)

58. The cart was driven .... bullocks.
(a) with   (b) off
(c) to   (d) by
▶ (d)

59. Simon .... very polite at the moment, because he wants to make a good impression.
(a) was being   (b) has been
(c) is behaving   (d) is being
▶ (d)

60. If I don't ...... advantage of this platform, then how dare I be a film maker?
(a) make   (b) take
(c) bring   (d) find
▶ (b)

Directions (Q.Nos. 61 to 65) *In these questions, out of the four alternatives, choose the one which best expresses the meaning of the given word.*

61. Meticulous
(a) Correct   (b) Clean
(c) Methodical   (d) Painstaking
▶ (c) 'Meticulous' means paying careful attention to every detail. 'Methodical' means done in a careful and logical way.

62. Abundant
(a) Sufficient   (b) Plentiful
(c) Significant   (d) Vibrant
▶ (b) 'Abundant' means existing in large quantities.

63. Anticipate
(a) Antagonise   (b) Expect
(c) Accept   (d) Hope
▶ (b) 'Anticipate' means to expect something.

64. Restrict
(a) Curtail   (b) Prohibit
(c) Retain   (d) Retail
▶ (a) 'Restrict' means to limit size, amount, range of something. 'Curtail' means to limit something.

65. Tremendous
(a) Awesome   (b) Remarkable
(c) Considerable   (d) Excessive
▶ (a) 'Tremendous' means very great; extremely good.

Directions (Q.Nos. 66 to 70) *In these questions, choose the word opposite in meaning to the given word.*

66. Make
(a) Liberate   (b) Break
(c) Emancipate   (d) Bind
▶ (b) 'Make' means to create or prepare.

67. Praise
(a) Heckle   (b) Accuse
(c) Hate   (d) Scold
▶ (d) 'Praise' means to express your approval or admiration.

68. Terminate
(a) Hasten   (b) Depart
(c) Begin   (d) Change
▶ (c) 'Terminate' means to end.

69. Rapidly
(a) Lazily   (b) Secretly
(c) Slowly   (d) Firmly
▶ (c) 'Rapidly' means quickly.

70. Successor
(a) Failure   (b) Loser
(c) Predecessor   (d) Predator
▶ (c) 'Successor' means a person or thing that comes after somebody/ something else. 'Predecessor' means a person or thing that comes before somebody/ something else.

Directions (Q.Nos. 71 to 75) *In these questions, four alternatives are given for the idiom/phrase underlined in the sentence. Choose the alternative which best expresses the meaning of the idiom/phrase.*

71. The officer called for an explanation from the cashier for the shortage of cash.
(a) asked   (b) begged
(c) served a notice   (d) demanded
▶ (d) Here 'called for' means demanded.

72. The actress took cue from her brother and became successful.
    (a) some help   (b) a hint
    (c) some money   (d) learnt acting
▶ (d) 'Took cue from' means to copy or follow.

73. We wanted the gift to be a surprise for my mother, but my sister gave the game away.
    (a) lost the game
    (b) gave out the secret
    (c) gave away the gift
    (d) withdrew from the plan
▶ (b) 'Gave the game away' means gave out the secret.

74. Let us have a heart to heart talk to solve this problem.
    (a) good talk
    (b) emotional talk
    (c) frank talk
    (d) loving talk
▶ (c) 'Heart to heart talk' means frank talk.

75. His speech fell short on the audience.
    (a) had no effect
    (b) moved the audience
    (c) impressed the audience
    (d) was quite short
▶ (a) 'To fall short' means to fail to reach the standard or effect that you expected or need.

Directions (Q.Nos. 76 to 80) In these questions, a part of the sentence is underlined. Below are given alternatives to the underlined part at (a), (b) and (c) which may improve the sentence. Choose the correct alternative. In case no improvement is needed, your answer is (d).

76. He said that he saw him last year, to discuss the documents.
    (a) met
    (b) had seen
    (c) seen
    (d) No improvement
▶ (a) It should be 'met'.

77. Them shoes are mine.
    (a) Those
    (b) That
    (c) Their
    (d) No improvement
▶ (a) It should be 'Those'.

78. Unity in diversity is the most noticeable quality of India.
    (a) popular
    (b) remarkable
    (c) famous
    (d) No improvement
▶ (b) It should be 'remarkable'.

79. He is addicted to alcohol and exerts a bad influence for his family.
    (a) on   (b) in   (c) about
    (d) No improvement
▶ (a) It should be 'on'.

80. Kalidasa is the Shakespeare of India.
    (a) Shakespeare
    (b) a Shakespeare
    (c) like Shakespeare
    (d) No improvement
▶ (d) No improvement is required.

Directions (Q.Nos. 81 to 85) In these questions, out of the four alternatives, choose the one which can be substituted for the given words/sentence.

81. Book giving information about every branch of knowledge.
    (a) Directory   (b) Dictionary
    (c) Encyclopaedia (d) Dissertation
▶ (c)

82. Member of a tribe that wanders from place to place with no fixed home.
    (a) Vagabond   (b) Nomad
    (c) Wanderer   (d) Truant
▶ (b)

83. Fit to be chosen.
    (a) Eligible   (b) Capable
    (c) Suitable   (d) Valuable
▶ (a)

84. An animal or plant living in or upon another.
    (a) Master   (b) Dependant
    (c) Insect   (d) Parasite
▶ (d)

85. Sum of money to be paid for freeing a person from captivity.
    (a) Ransom
    (b) Compensation
    (c) Tribute
    (d) Penalty
▶ (a)

Directions (Q.Nos. 86 to 90) In these questions, groups of four words are given. In each group, one word is correctly spelt. Find the correctly spelt word.

86. (a) Skaleton   (b) Sekeleton
    (c) Skelaton   (d) Skeleton
▶ (d)

87. (a) Mischeivous   (b) Mischevous
    (c) Mischievous   (d) Mischivous
▶ (c)

88. (a) Defenitly   (b) Definately
    (c) Definitely   (d) Defenitely
▶ (c)

89. (a) Exhilirate   (b) Exhilarate
    (c) Exhiliret   (d) Exhilerate
▶ (b)

90. (a) Maintenance
    (b) Maintanance
    (c) Maintenence
    (d) Maintanence
▶ (a)

Directions (Q.Nos. 91 to 100) In the following passage, some of the words have been left out. First read the passage over and try to understand what it is about. Then, fill in the blanks with the help of the alternatives given.

Twenty million years ago, our immediate ancestors probably still lived in the trees. After we came 91 from the trees, we evolved an upright 92 our hands were more useful, being 93. We possessed agility and an excellent binocular 94. We had, in course of time, 95 many of the preconditions required for 96 tools. Moreover, there was now a real 97 in possessing a large brain and 98 communicating complex thoughts. Anyway, other things 99 equal, it is better to be smart 100 to be stupid.

91. (a) across
    (b) under
    (c) into
    (d) down
▶ (d)

92. (a) posture   (b) position
    (c) pose   (d) posterior
▶ (a)

93. (a) free   (b) tight
    (c) loose   (d) lazy
▶ (a)

94. (a) vision   (b) skill
    (c) tools   (d) ability
▶ (a)

95. (a) lost   (b) acquired
    (c) demanded   (d) forgotten
▶ (b)

96. (a) making   (b) doing
    (c) sharpening   (d) breaking
▶ (a)

97. (a) use
    (b) pride
    (c) advantage
    (d) right
▶ (b)

98. (a) in   (b) about
    (c) upon   (d) on
▶ (a)

99. (a) was   (b) being
    (c) been   (d) are
▶ (b)

100. (a) not
     (b) rather
     (c) than
     (d) unless
▶ (c)

PART III   Quantitative Aptitude

101. If x, y are acute angles, $0 < x + y < 90°$ and $\sin(2x - 20°) = \cos(2y + 20°)$, then the value of $\tan(x + y)$ is
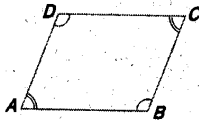
(a) $\dfrac{1}{\sqrt{3}}$ (b) $\dfrac{\sqrt{3}}{2}$ (c) $\sqrt{3}$ (d) 1

▶ (d) Given, $\sin(2x - 20°) = \cos(2y + 20°)$
$\Rightarrow \sin(2x - 20°) = \sin[90° - (2y + 20°)]$
$\Rightarrow 2x - 20° = 90° - 2y - 20°$
$\Rightarrow 2x + 2y = 90°$
$\Rightarrow x + y = 45°$
$\Rightarrow \tan(x + y) = \tan 45° = 1$

102. The ratio of the angles $\angle A$ and $\angle B$ of a non-square rhombus $ABCD$ is $4 : 5$, then the value of $\angle C$ is
(a) 50° (b) 45° (c) 80° (d) 95°

▶ (c) Let $\angle A = 4x$,
and $\angle B = 5x$
In the rhombus $ABCD$,

$\angle A + \angle B = 180°$
$\Rightarrow \quad 4x + 5x = 180°$
$\Rightarrow \quad 9x = 180°$
$\Rightarrow \quad x = 20°$
$\therefore \quad \angle C = \angle A = 4x$
$= 4 \times 20° = 80°$

103. A straight line parallel to BC of $\triangle ABC$ intersects AB and AC at points P and Q, respectively. $AP = QC$, $PB = 4$ units and $AQ = 9$ units, then the length of AP is
(a) 2.5 units   (b) 3 units
(c) 6 units   (d) 6.5 units

▶ (c) Let $AP = QC = x$
Since, $PQ \parallel BC$
$\therefore \quad \dfrac{AP}{PB} = \dfrac{AQ}{QC}$
$\Rightarrow \quad \dfrac{x}{4} = \dfrac{9}{x}$
$\Rightarrow \quad x^2 = 36$
$\Rightarrow \quad x = 6$
$\therefore \quad AP = 6$ units
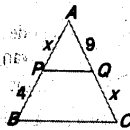
104. If $x + y = a$ and $xy = b^2$, then the value of $x^3 - x^2 y - xy^2 + y^3$ in terms of a and b is
(a) $(a^2 + 4b^2)a$ (b) $a^3 - 3b^2$
(c) $a^3 - 4b^2a$ (d) $a^3 + 3b^2$

▶ (c) Given, $x + y = a$, $xy = b^2$
$\therefore \quad (x - y)^2 = (x + y)^2 - 4xy$
$= a^2 - 4b^2$

Now, $x^3 - x^2 y - xy^2 + y^3$
$= x^2(x - y) - y^2(x - y)$
$= (x - y)(x^2 - y^2)$
$= (x - y)(x - y)(x + y)$
$= (x - y)^2(x + y)$
$= (a^2 - 4b^2)(a)$
$= a^3 - 4b^2 a$

105. From a right circular cylinder of radius 10 cm and height 21 cm, a right circular cone of same base-radius is removed. If the volume of the remaining portion is 4400 cm³, then the height of the removed cone (taking $\pi = \dfrac{22}{7}$) is

(a) 15 cm   (b) 18 cm
(c) 21 cm   (d) 24 cm

▶ (c) Let the height of removed cone be h.
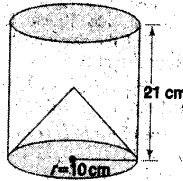
Then,
Volume of cylinder − Volume of cone $= 4400$
$\pi \times 10 \times 10 \times 21 - \dfrac{1}{3} \pi \times 10 \times 10 \times h$
$= 4400$
$100\pi \left(21 - \dfrac{h}{3}\right) = 4400$
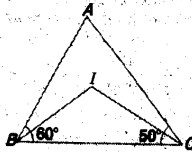$\Rightarrow \quad 21 - \dfrac{h}{3} = \dfrac{4400}{100} \times \dfrac{7}{22}$
$\Rightarrow \quad 21 - \dfrac{h}{3} = 14 \quad \Rightarrow \quad \dfrac{h}{3} = 21 - 14 = 7$
$\Rightarrow \quad h = 21$ cm

106. I is the incentre of $\triangle ABC$, $\angle ABC = 60°$ and $\angle ACB = 50°$. Then, $\angle BIC$ is
(a) 55° (b) 125° (c) 70° (d) 65°

▶ (b) In $\triangle ABC$,

$\angle B = 60°$, $\angle C = 50°$
$\therefore \quad \angle A = 180° - (60° + 50°) = 70°$
Now, $\angle BIC = 90° + \dfrac{\angle A}{2}$
$= 90° + 35° = 125°$

107. If $(3a + 1)^2 + (b - 1)^2 + (2c - 3)^2 = 0$, then the value of $(3a + b + 2c)$ is equal to
(a) 3   (b) −1   (c) 2   (d) 5

▶ (a) Given,
$(3a + 1)^2 + (b - 1)^2 + (2c - 3)^2 = 0$

Since, sum of the three terms in given equation cannot be zero, therefore these are separately equal to zero.
$\therefore \quad 3a + 1 = 0, b - 1 = 0, 2c - 3 = 0$
$a = -\dfrac{1}{3}, b = 1, c = \dfrac{3}{2}$
$\therefore \quad 3a + b + 2c = 3\left(-\dfrac{1}{3}\right) + 1 + 2\left(\dfrac{3}{2}\right)$
$= -1 + 1 + 3 = 3$

108. Among the numbers $\sqrt[6]{12}, \sqrt[3]{4}, \sqrt[4]{5}, \sqrt{3}$, the least one is
(a) $\sqrt[6]{12}$ (b) $\sqrt[3]{4}$ (c) $\sqrt[4]{5}$ (d) $\sqrt{3}$

▶ (c) LCM of 6, 3, 4 and 2 = 12

Now, $\sqrt[6]{12} = (12)^{\frac{1}{6}} = (12^2)^{\frac{1}{12}} = (144)^{\frac{1}{12}} = \sqrt[12]{144}$
$\sqrt[3]{4} = (4)^{\frac{1}{3}} = (4^4)^{\frac{1}{12}} = (256)^{\frac{1}{12}} = \sqrt[12]{256}$
$\sqrt[4]{5} = (5)^{\frac{1}{4}} = (5^3)^{\frac{1}{12}} = (125)^{\frac{1}{12}} = \sqrt[12]{125}$
$\sqrt{3} = (3)^{\frac{1}{2}} = (3^6)^{\frac{1}{12}} = (729)^{\frac{1}{12}} = \sqrt[12]{729}$

Clearly, the least of the given numbers is $\sqrt[12]{125}$ i.e. $\sqrt[4]{5}$.

109. A trader marks his goods 45% above the cost price and gives a discount of 20% on the marked price. The gain percentage on goods he makes, is
(a) 15   (b) 14   (c) 29   (d) 16

▶ (d) Let CP = ₹ 100
Then, MP = ₹ 145
$\therefore \quad SP = \dfrac{80}{100} \times 145 = ₹ 116$
$\therefore \quad$ Gain $= ₹(116 - 100) = ₹ 16$
$\therefore$ Gain percentage $= \dfrac{16}{100} \times 100\% = 16\%$

110. The simplified value of
$(\sec x \sec y + \tan x \tan y)^2 - (\sec x \tan y + \tan x \sec y)^2$ is
(a) −1   (b) 0
(c) $\sec^2 x$ (d) 1

▶ (d) $(\sec x \sec y + \tan x \tan y)^2 - (\sec x \tan y + \tan x \sec y)^2$
$= \sec^2 x \sec^2 y + \tan^2 x \tan^2 y$
$\quad + 2 \sec x \sec y \tan x \tan y$
$\quad - \sec^2 x \tan^2 y$
$\quad - \tan^2 x \sec^2 y - 2 \sec x \tan y \tan x \sec y$

$$= \sec^2 x \sec^2 y + \tan^2 x \tan^2 y$$
$$\qquad - \sec^2 x \tan^2 y - \tan^2 x \sec^2 y$$
$$= \sec^2 x (\sec^2 y - \tan^2 y)$$
$$\qquad + \tan^2 x (\tan^2 y - \sec^2 y)$$
$$= \sec^2 x - \tan^2 x$$
$$= 1$$

111. Speed of a boat is 5 km/h in still water and the speed of the stream is 3 km/h. If the boat takes 3 h to go to a place and come back, the distance of the place is
(a) 3.75 km   (b) 4 km
(c) 4.8 km   (d) 4.25 km

▶ (c) Speed of boat, $u = 5\,km/h$
Speed of stream, $v = 3\,km/h$
If distance of the place be d, then

$$\frac{d}{5+3} + \frac{d}{5-3} = 3$$
$$\Rightarrow \qquad \frac{d}{8} + \frac{d}{2} = 3$$
$$\Rightarrow \qquad d\left[\frac{1+4}{8}\right] = 3$$
$$\Rightarrow \qquad d = \frac{3 \times 8}{5} = 4.8\,km$$

112. The single discount equivalent to the discount series of 20%, 10%, 5% is
(a) 11.66%   (b) 31.6%
(c) 31.66%   (d) 32%

▶ (b) Discount equivalent to 20% and 10% is
$$\left(-20 - 10 + \frac{20 \times 10}{100}\right)\%$$
$$= (-30 + 2)\% = -28\%$$
Now, discount equivalent to 28% and 5%
$$= \left(-28 - 5 + \frac{28 \times 5}{100}\right)\%$$
$$= (-33 + 1.4)\%$$
$$= -31.6\%$$
Hence, required single discount is 31.6%.

113. If $xy\,(x + y) = 1$, then the value of $\dfrac{1}{x^3 y^3} - x^3 - y^3$ is

(a) 0   (b) 1   (c) 3   (d) −2

▶ (c) Given, $xy\,(x + y) = 1$
$$\Rightarrow \frac{1}{xy} = x + y$$
Now, $\dfrac{1}{x^3 y^3} - x^3 - y^3 = (x + y)^3 - (x^3 + y^3)$
$$= (x + y)^3 - (x + y)(x^2 + y^2 - xy)$$
$$= (x + y)[(x + y)^2 - (x^2 + y^2 - xy)]$$
$$= (x + y)[x^2 + y^2 + 2xy - x^2 - y^2 + xy]$$
$$= (x + y)(3xy) = 3$$

114. Two vessels A and B contain acid and water mixed in the ratio 2 : 3 and 4 : 3. In what ratio must these mixtures be mixed to form a new mixture containing half acid and half water?
(a) 5 : 7   (b) 1 : 2   (c) 2 : 1   (d) 7 : 5

▶ (a) Water in vessel $A = \dfrac{2}{5}$
Water in vessel $B = \dfrac{4}{7}$
And, water in mixture $= \dfrac{1}{2}$
Then, according to the rule of alligation,

$$\begin{array}{ccc} \overset{A}{\frac{2}{5}} & & \overset{B}{\frac{4}{7}} \\ & \frac{1}{2} & \\ \frac{1}{14} & & \frac{1}{10} \end{array}$$
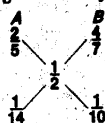
$\therefore$ Required ratio $= \dfrac{1}{14} : \dfrac{1}{10}$
$$= 10 : 14 = 5 : 7$$

115. The base of a right pyramid is a square of side 40 cm long. If the volume of the pyramid is 8000 cm³ then its height is
(a) 5 cm   (b) 10 cm
(c) 15 cm   (d) 20 cm

▶ (a) Volume of Pyramid = Area of base × height
$$\Rightarrow \qquad 8000 = 40 \times 40 \times h$$
$$\Rightarrow \qquad h = 5\,cm$$

116. If $\dfrac{x}{2x^2 + 5x + 2} = \dfrac{1}{6}$, value of $\left(x + \dfrac{1}{x}\right)$ is

(a) 2   (b) $\dfrac{1}{2}$ (c) $-\dfrac{1}{2}$ (d) −2

▶ (b) $\dfrac{x}{2x^2 + 5x + 2} = \dfrac{1}{6}$
$$\Rightarrow \qquad 2x^2 + 5x + 2 = 6x$$
$$\Rightarrow \qquad 2x^2 + 2 = x$$
$$\Rightarrow \qquad 2(x^2 + 1) = x$$
$$\Rightarrow \qquad \frac{x^2 + 1}{x} = \frac{1}{2}$$
$$\Rightarrow \qquad \left(x + \frac{1}{x}\right) = \frac{1}{2}$$

117. Each internal angle of regular polygon is two times its external angle. Then, the number of sides of the polygon is
(a) 8   (b) 6   (c) 5   (d) 7

▶ (b) In a regular polygon,
Internal angle + External angle = 180°
$\Rightarrow 2x + x = 180°$ (x = external angle)
$$\Rightarrow \qquad x = \frac{180}{3} = 60°$$
$\Rightarrow \qquad 2x = 120°$ (x = internal angle)
If there be n sides in the polygon, then
$$(2n - 4)\,90° = 120n$$

$$\Rightarrow \qquad (n - 2) \times 180° = 120n$$
$$\Rightarrow \qquad (n - 2) \times 3 = 2n$$
$$\Rightarrow \qquad 3n - 6 = 2n$$
$$\Rightarrow \qquad n = 6$$
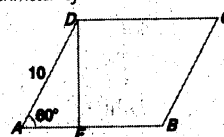Hence, number of sides in the polygon is 6.

118. The perimeter of a rhombus is 40 cm and the measure of an angle is 60°, then the area of it, is
(a) $100\sqrt{3}\,cm^2$ (b) $50\sqrt{3}\,cm^2$
(c) $160\sqrt{3}\,cm^2$ (d) $100\,cm^2$

▶ (b) Perimeter of rhombus

$$4a = 40$$
$$a = 10$$
Now, In $\triangle ADE$,
$$\sin 60° = \frac{DE}{AD}$$
$$\Rightarrow \qquad \frac{\sqrt{3}}{2} = \frac{DE}{10}$$
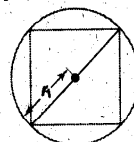$$\Rightarrow \qquad DE = 5\sqrt{3}$$
Now, area of rhombus = base × height
$$= AB \times DE$$
$$= 10 \times 5\sqrt{3}$$
$$= 50\sqrt{3}\,cm^2$$

119. The ratio of the areas of the incircle and the circumcircle of a square is
(a) 1 : 2   (b) 2 : 3   (c) 3 : 4   (d) 4 : 5

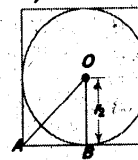▶ (a) Let side of square = a

For circumcircle, radius is given by
$$r_1 = \frac{diagonal}{2} = \frac{a\sqrt{2}}{2} = \frac{a}{\sqrt{2}}$$
For incircle, radius is given by
$$r_2 = \sqrt{OA^2 - AB^2}$$
$$= \sqrt{\left(\frac{a}{\sqrt{2}}\right)^2 - \left(\frac{a}{2}\right)^2}$$
$$= a\sqrt{\frac{1}{2} - \frac{1}{4}} = \frac{a}{2}$$

Ratio of the areas of incircle and circumcircle
= ratio of squares of the radii of incircle and circumcircle
$$= r_2^2 : r_1^2 = \left(\frac{a}{2}\right)^2 : \left(\frac{a}{\sqrt{2}}\right)^2 = 1 : 2$$

120. The ratio of the sum to the LCM of two natural numbers is 7 : 12. If their HCF is 4, then the smaller number is
(a) 20   (b) 16   (c) 12   (d) 8

▶ **(c)** Let the numbers be x and y. Then,

$$\frac{x+y}{L}=\frac{7}{12}$$

Let $x+y=7u, L=12u$

Also, we have $H=4$

Again, consider $x=3u$ and $y=4u$

Now, $L \times H = x \times y$

$12u \times 4 = 3u \times 4u$

$\Rightarrow \quad u=4$

Hence, smaller number

$=3u=3\times 4=12$

121. $\sin^2 5° + \sin^2 6° + ... + \sin^2 84°$
$+ \sin^2 85° =$

(a) $39\frac{1}{2}$ (b) $40\frac{1}{2}$

(c) 40 (d) $39\frac{1}{\sqrt{2}}$

▶ **(c)** $\sin^2 5 + \sin^2 6 + ... + \sin^2 84 + \sin^2 85$

$=\cos^2 85 + \cos^2 84 + ... + \sin^2 84 + \sin^2 85$

$=(\cos^2 85 + \sin^2 85)$

$+(\cos^2 84 + \sin^2 84)+ ...$ 40 times

$=1+1+1+ ...$ 40 times

$=40$

122. ABCD is a cyclic trapezium such that AD||BC, if ∠ABC = 70°, then the value of ∠BCD is
(a) 60°   (b) 70°   (c) 40°   (d) 80°

▶ **(b)** Draw perpendicular AE ⊥ BC.
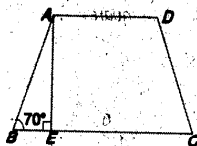
Since, ∠ABE = 70°

∠AEB = 90°

∴   ∠BAE = 20°

Also, ∠EAD = 90°

Therefore, ∠BAD = ∠BAE + ∠EAD

$=20°+90°=110°$

Now, ABCD is a cyclic quadrilateral.

∴   ∠BAD + ∠BCD = 180°

⇒ ∠BCD = 180° − 110° = 70°

123. A man sells 320 mangoes at the cost price of 400 mangoes. His gain per cent is
(a) 15   (b) 20   (c) 25   (d) 10

▶ **(c)** Let CP of 1 mango = ₹ 1

∴ CP of 400 mangoes = ₹ 400

∴ SP of 320 mangoes = ₹ 400

∴ SP of 1 mango $=\frac{400}{320}=₹\frac{5}{4}$

$\therefore$ Gain % $=\dfrac{\frac{5}{4}-1}{1}\times 100\%$

$=\frac{5-4}{4}\times 100\% = 25\%$

124. The value of the expression

$$\frac{(a-b)^2}{(b-c)(c-a)}+\frac{(b-c)^2}{(a-b)(c-a)}$$
$$+\frac{(c-a)^2}{(a-b)(b-c)}$$ is

(a) 0   (b) 3   (c) 1/3   (d) 2

▶ **(b)** $\dfrac{(a-b)^2}{(b-c)(c-a)}+\dfrac{(b-c)^2}{(a-b)(c-a)}$

$+\dfrac{(c-a)^2}{(a-b)(b-c)}$

$=\dfrac{(a-b)^3+(b-c)^3+(c-a)^3}{(a-b)(b-c)(c-a)}$

Let $a-b=x, b-c=y, c-a=z$

∴ $x+y+z=0$

∴ $x^3+y^3+z^3=3xyz$

⇒ $\dfrac{x^3+y^3+z^3}{xyz}=3$

⇒ $\dfrac{(a-b)^3+(b-c)^3+(c-a)^3}{(a-b)(b-c)(c-a)}=3$

125. A can do a certain job in 12 days. B is 60% more efficient than A. To do the same job, B alone would take

(a) $7\frac{1}{2}$ days   (b) 8 days

(c) 10 days   (d) 7 days

▶ **(a)** A′s one day′s work $=\dfrac{1}{12}$

∴ B′s one day′s work $=160\%$ of $\dfrac{1}{12}=\dfrac{2}{15}$

∴ B alone can complete the work in $\dfrac{15}{2}$

$=7\dfrac{1}{2}$ days

126. An ore contains 25% of an alloy, that has 90% iron. Other than this, in the remaining 75% of the ore, there is no iron. To obtain 60 kg of pure iron, the quantity of the ore needed, in kilograms, is approximately
(a) 250.57   (b) 266.67
(c) 275.23   (d) 300

▶ **(b)** Part of iron in the ore $=90\%$ of $\dfrac{1}{4}$

$=\dfrac{90}{100}\times\dfrac{1}{4}=\dfrac{9}{40}$

∵ $\dfrac{9}{40}$ kg of iron is needed in 1 kg ore.

∴ 1 kg of iron is needed in $\dfrac{40}{9}$ kg ore.

∴ 60 kg of iron is needed in $\dfrac{40}{9}\times 60$ kg ore

$=266.67$ kg ore

127. If $\sin\theta + \csc\theta = 2$, then the value of $\sin^{100}\theta + \csc^{100}\theta$ is equal to
(a) 1   (b) 2   (c) 3   (d) 100

▶ **(b)** $\sin\theta + \csc\theta = 2$ is true only when

$\sin\theta = \csc\theta = 1$

∴ $\sin^{100}\theta + \csc^{100}\theta = 1^{100} + 1^{100} = 2$

128. A telegraph post is bent at a point above the ground due to storm. Its top just meets the ground at a distance of $8\sqrt{3}$ m from its foot and makes an angle of 30°. The height of the post is
(a) 16 m   (b) 23 m
(c) 24 m   (d) 10 m

▶ **(c)** In Δ ABD,

$\tan 30° = \dfrac{AB}{8\sqrt{3}}$

$\Rightarrow AB = 8\sqrt{3}\times\dfrac{1}{\sqrt{3}}$

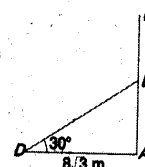$=8$ m

And, $\sin 30° = \dfrac{AB}{BD}=\dfrac{8}{BD}$

$BD = \dfrac{8}{1/2}=16$ m

∴ Height of the post = AB + BC

$=AB+BD$

$=8+16=24$ m

129. A number when divided by 91 gives a remainder 17. When the same number is divided by 13, the remainder will be
(a) 0   (b) 4   (c) 6   (d) 3

▶ **(b)** When the number is divided by 91, gives remainder as 17.

∴ Number is of the form $91x+17$.

When it is divided by 13 i.e., $\dfrac{91x+17}{13}$,

then the remainder is 4.

130. When 60% of a number is subtracted from another number, the second number reduces to its 52%; the ratio of the first number to the second number, is
(a) 6 : 5   (b) 5 : 3   (c) 5 : 4   (d) 4 : 5

▶ **(d)** Let the first number be x.

And, the second number be y.

Then, according to the condition,

$y-60\% x = 52\%$ of y

$y - 52\%$ of $y = 60\%$ of x

⇒ 48% of $y = 60$ of x

⇒ $\dfrac{x}{y}=\dfrac{48}{60}=\dfrac{4}{5}$

Hence, required ratio is 4 : 5.

131. If the sum of the two numbers is 120 and their quotient is 5, then the difference of the two numbers, is
(a) 115 (b) 100 (c) 80 (d) 72

▶ (c) Let the two numbers be x and y. Then,
$x + y = 120$
and $\dfrac{x}{y} = 5 \Rightarrow x = 5y$

Solving these equations, we get
$x = 100, y = 20$
Then, required difference
$= 100 - 20 = 80$

132. The ratio of height and the diameter of a right circular cone is 3 : 2 and its volume is 1078 cm³, then (taking $\pi = \dfrac{22}{7}$) its height, is
(a) 7 cm (b) 14 cm
(c) 21 cm (d) 28 cm

▶ (c) Let height of cone = 3x
and diameter of cone = 2x
Now, volume = 1078
$\dfrac{1}{3}\pi r^2 h = 1078$

$\Rightarrow \dfrac{1}{3} \times \dfrac{22}{7} \times x \times x \times 3x = 1078$

$\Rightarrow x^3 = \dfrac{1078 \times 7}{22}$

$\Rightarrow x^3 = 343$

$\Rightarrow x = 7$

Hence, height $= 3x = 3 \times 7 = 21\,cm$

133. A person sold an article at 20% profit on the selling price. Afterwards, when the cost price reduced by 10%, then he also reduced the selling price by 10%. His percentage of profit on cost price will be
(a) 30 (b) 25 (c) 22.5 (d) 12.5

▶ (b) Let SP$_1$ = ₹100
Then, profit = ₹ 20
Then, CP$_1$ = (100 − 20) = ₹ 80
In the second condition,

$CP_2 = \dfrac{90}{100} \times 80 = ₹\,72$

$SP_2 = \dfrac{90}{100} \times 100 = ₹90$

∴ Profit percentage $= \dfrac{90 - 72}{72} \times 100\%$

$= \dfrac{18}{72} \times 100\% = 25\%$

134. If $\dfrac{2x - y}{x + 2y} = \dfrac{1}{2}$, then value of $\dfrac{3x - y}{3x + y}$ is
(a) $\dfrac{1}{5}$ (b) $\dfrac{3}{5}$ (c) $\dfrac{4}{5}$ (d) 1

▶ (b) $\dfrac{2x - y}{x + 2y} = \dfrac{1}{2}$

$\Rightarrow 4x - 2y = x + 2y$

$\Rightarrow 3x = 4y$

Now, $\dfrac{3x - y}{3x + y} = \dfrac{4y - y}{4y + y} = \dfrac{3y}{5y} = \dfrac{3}{5}$

135. A girl was asked to multiply a number by $\dfrac{7}{8}$, instead she divided the number by $\dfrac{7}{8}$ and got the result 15 more than the correct result. The sum of the digits of the number was
(a) 4 (b) 8 (c) 6 (d) 11

▶ (d) If number be x, then

$\dfrac{x}{7/8} - x \times \dfrac{7}{8} = 15$

$\Rightarrow \dfrac{8x}{7} - \dfrac{7x}{8} = 15$

$\Rightarrow \left(\dfrac{64 - 49}{56}\right) x = 15$

$\Rightarrow x = \dfrac{15 \times 56}{15} = 56$

∴ Sum of the digits $= 5 + 6 = 11$

136. The average age of 45 persons is decreased by $\dfrac{1}{9}$ yr when one of them having 60 yr is replaced by a new comer. Then, the age of the newcomer is
(a) 45 yr (b) 55 yr (c) 59 yr (d) 49 yr

▶ (b) Decrement in the age of new comer
$= \dfrac{1}{9} \times 45 = 5\,yr$

Hence, the age of newcomer
$= 60 - 5 = 55\,yr$

137. There are in all, 10 balls; some of them are red and the others white. The average cost of all balls is ₹ 28. If the average cost of red balls is ₹ 25 and that of white balls is ₹ 30, the number of white balls, is
(a) 3 (b) 5 (c) 6 (d) 7

▶ (c) Let number of red balls = x
Then, number of white balls = 10 − x
According to the question,
$10 \times 28 = x \times 25 + (10 - x) \times 30$

$\Rightarrow 280 = 25x + 300 - 30x$

$\Rightarrow 5x = 20$

$\Rightarrow x = 4$

Hence, number of white balls
$= 10 - 4 = 6.$

138. Either 8 men or 17 women can paint a house in 33 days. The number of days required to paint three such houses by 12 men and 24 women working at the same rate is
(a) 44 (b) 43 (c) 34 (d) 66

▶ (c) 8 men ≡ 17 women

1 man $\equiv \dfrac{17}{8}$ women

12 men $\equiv \dfrac{17}{8} \times 12$ women $= \dfrac{51}{2}$ women

∴ 12 men + 24 women

$\equiv \dfrac{51}{2}$ women + 24 women

$= \dfrac{99}{2}$ women

Now,
17 women paint the house in 33 days.
∴ 1 women paints the house in 33 × 17 days.
∴ $\dfrac{99}{2}$ women paint the house in

$\dfrac{33 \times 17 \times 2}{99} = \dfrac{34}{3}\,days$

Hence, $\dfrac{99}{2}$ women paint three such houses

in $\dfrac{34}{3} \times 3 = 34\,days.$

139. The difference between simple and compound interest on a sum of money at 5% per annum for 2 yr is ₹ 100. The sum of money must be
(a) ₹ 35000 (b) ₹ 41000
(c) ₹ 40000 (d) ₹ 45000

▶ (c) Using the formula,
Difference for 2 yr $= \dfrac{PR^2}{100^2}$

$\Rightarrow 100 = \dfrac{P \times 5 \times 5}{100 \times 100}$

$\Rightarrow P = ₹\,40000$

140. A right circular cylinder and a cone have equal base radius and equal heights. If their curved surfaces are in the ratio 8 : 5, then the radius of the base to the height are in the ratio
(a) 2 : 3 (b) 4 : 3 (c) 3 : 4 (d) 3 : 2

▶ (c) Let radius and height be r and h, respectively.
Then, $\dfrac{\text{curved surface of cylinder}}{\text{curved surface of cone}} = \dfrac{8}{5}$

$\dfrac{2\pi r h}{\pi r l} = \dfrac{8}{5}$

$\Rightarrow \dfrac{h}{l} = \dfrac{4}{5}$

$\Rightarrow \dfrac{h^2}{l^2} = \dfrac{16}{25}$

$\Rightarrow \dfrac{h^2}{h^2 + r^2} = \dfrac{16}{25}$
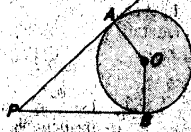
$\Rightarrow 25h^2 = 16h^2 + 16r^2$

$\Rightarrow 9h^2 = 16r^2$

$\Rightarrow 3h = 4r$

$\Rightarrow \dfrac{r}{h} = \dfrac{3}{4} = 3 : 4$

141. The tangents at two points A and B on the circle with centre O intersect at P, if in quadrilateral PAOB ∠AOB : ∠APB = 5 : 1, then, measure of ∠APB is
(a) 30° (b) 60° (c) 45° (d) 15°

▶ (a) $\angle PAO = \angle PBO = 90°$
(Angle made by tangent and perpendicular at any point A)
Now, in quadrilateral APBO,

$\angle APB + \angle PBO + \angle BOA + \angle OAP$
$= 360°$
$\Rightarrow \angle APB + \angle AOB = 360° - 90° - 90°$
$= 180°$
$\Rightarrow \angle APB + \angle AOB = 180° \dots (i)$
Also, we have
$\angle AOB : \angle APB = 5 : 1$
$\Rightarrow \qquad \angle AOB = 5x$
$\qquad \angle APB = x$
Putting these values in Eq. (i), we get
$\qquad x + 5x = 180°$
$\Rightarrow \qquad 6x = 180°$
$\Rightarrow \qquad x = 30°$
Hence, $\qquad \angle APB = 30°$

Directions (Q.Nos. 142 to 146) Read the following graph carefully and answer the given questions.
Result of Annual Examination in a High School

(All data in %)
(Success being considered)
Scale 1 Unit = 1 cm
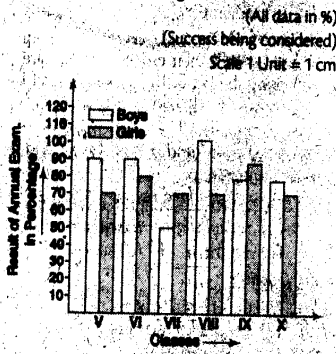
142. In which pair of classes are the results of girls and boys in inverse proportion?
(a) V and X
(b) VI and IX

(c) VI and VIII
(d) VII and X
▶ (b) It is clear from the graph that the results of girls and boys are in inverse proportion for the classes VI and IX.

143. In which class, is the failure of boys the lowest or nil?
(a) X
(b) IX
(c) VIII
(d) VII
▶ (c) In class VIII, the failure of boys is nil.

144. In which class, is the result of the girls more than the average result of the boys for the school?
(a) VIII
(b) X
(c) IX
(d) VI
▶ (c) Average result of boys for the school
$= \dfrac{90 + 90 + 50 + 100 + 80 + 80}{6}$
$= \dfrac{490}{6} = 81.67$
Clearly, for the class IX, the result of girls (= 90%) is more than the average result of boys for the school (= 81.67 %).

145. In which class, is the result of boys less than the overall average result of the girls?
(a) VII
(b) VIII
(c) IX
(d) X
▶ (a) Overall average result of the girls
$= \dfrac{70 + 80 + 70 + 70 + 90 + 70}{6} = 75$
For the class VII, result of boys (50%) is less than the overall average result of girls (75%).

146. In which class, is the difference between the result of girls and that of boys maximum?
(a) V
(b) VII
(c) VIII
(d) X
▶ (c) The difference between the results of girls and boys :
In class $V = 90 - 70 = 20$
In class $VI = 90 - 80 = 10$
In class $VII = 70 - 50 = 20$
In class $VIII = 100 - 70 = 30$
In class $IX = 90 + 80 = 10$
In class $X = 80 - 70 = 10$
Hence, difference is maximum for class VIII.

Directions (Q.Nos. 147 to 150) The following table shows production of cars (in thousands) in a company from 1999 to 2004. Study the table carefully and answer the given questions.

P	8	20	16	17	21	6
R	21	17	16	15	13	8
S						
T	25	18	19	30	14	27

147. In which year, the total production of cars of types P and Q together was equal to the total production of cars of types R and S together?
(a) 2000
(b) 2001
(c) 2003
(d) 2004
▶ (c) In the year 2003, total production of cars of types P and Q together was equal to the total production of cars of types R and S together.

148. In which year, the production of all types of cars taken together was approximately equal to the annual average of the total production during the period 1999 to 2004?
(a) 1999
(b) 2001
(c) 2003
(d) 2004
▶ (c) Annual average of the total production during the period 1999 to 2004
$= \dfrac{74 + 71 + 75 + 90 + 80 + 86}{6}$
$= \dfrac{476}{6} = 79.33$
which is approximately equal to the production of all types of cars taken together in the year 2003.

149. The production of which type of cars was 25% of the total production of all types of cars during the year 2003?
(a) P
(b) Q
(c) R
(d) S
▶ (d) 25% of the total production of all types of cars = 25% of 80 = 20
which is equal to the production of S type of cars.

150. There was a continuous increase in production of which type of cars during the period 1999 to 2004?
(a) P
(b) Q
(c) R
(d) S
▶ (d) For S type of cars, the production was in continuous increase.

PART IV General Awareness

151. Cost of production of the producer is given by
(a) sum of wages paid to labourers
(b) sum of wages and interest paid on capital
(c) sum of wages, interest, rent and supernormal profit
(d) sum of wages, interest, rent and normal profit

▶ (d) Sum of wages, interest, rent and normal profit.

152. 'Kesari', the newspaper, was started by
(a) GK Gokhale
(b) BG Tilak
(c) Sardar Patel
(d) Raja Ram Mohan Roy

▶ (b) BG Tilak Kesari is a Marathi Newspaper founded by Lok Nayak Bal Gangadhar Tilak in 1881 with the aim of national awakening

153. When was the Indian Constitution adopted?
(a) 15th August, 1947
(b) 26th November, 1949
(c) 26th January, 1950
(d) 2nd October, 1952

▶ *(b) 26th November, 1949.*
The Constitution of India was enacted by Constitution Assembly on 26th November 1949 and came into effect on 26th January, 1950.

154. Which one of the following is the smallest endocrine gland in human body?
(a) Adrenal   (b) Thyroid
(c) Pituitary   (d) Pancreas

▶ *(c) Pituitary*

155. Double is a .... data type.
(a) primitive
(b) user defined
(c) system defined
(d) local

▶ *(a) Primitive*

156. Yellow spots on citrus leaves is due to the deficiency of
(a) zinc   (b) magnesium
(c) boron   (d) iron

▶ *(b) Magnesium*

157. Rangaswami Cup is associated with
(a) wrestling   (b) football
(c) hockey   (d) golf

▶ *(c) Hockey*

158. The working of a rocket is based on the principle of
(a) conservation of momentum
(b) conservation of mass
(c) conservation of energy
(d) conservation of angular momentum

▶ *(a) Conservation of Momentum.*

159. Which one of the following is a wild life sanctuary?
(a) Jaldapara   (b) Garumara
(c) Corbett   (d) Chapramari

▶ *(d) Chapramari forest is located near NH31 connecting North-East with the rest of India.*

160. The river which is used for inland waterways in India is
(a) Ganga   (b) Cauvery
(c) Mahi   (d) Luni

▶ *(a) Ganga*

161. The atmospheric layer, closest to the Earth, is
(a) mesosphere   (b) hydrosphere
(c) troposphere   (d) ionosphere

▶ *(a) Troposphere is the layer closest to the Earth, approximately 11 km high. Weather occurs only in the troposphere because it contains most of the water vapour.*

162. 'Yellow Revolution' is associated with the production of
(a) poultry   (b) gold
(c) sunflower   (d) oil seeds

▶ *(d) Oil seeds.*

163. Under the "Indira Gandhi National Old Age Pension Scheme", the amount of pension for those above 80 years has been increased, per month from ₹ 200 to
(a) ₹ 300   (b) ₹ 400
(c) ₹ 500   (d) ₹ 1000

▶ *(c) ₹ 500.*

164. The state, which has recently overtaken Karnataka for the top rank in the production of bio-fertilizers, is
(a) Tamil Nadu   (b) Gujarat
(c) Maharashtra   (d) Punjab

▶ *(a) Tamil Nadu.*

165. The upper house of the State Legislature in India is called
(a) Legislative Council
(b) Legislative Assembly
(c) Executive Council
(d) Governor-in-Council

▶ *(b) Legislative Assembly*

166. Maximum number of sugar factories are located in
(a) Uttar Pradesh   (b) Tamil Nadu
(c) Bihar   (d) Asom

▶ *(a) Uttar Pradesh*

167. The All Women Expedition Team of the Indian Air Force, which scaled the Mt. Everest sometime back, was headed by
(a) Sqn Ldr D Panda
(b) Sqn Ldr Nirupama Pandey
(c) Flt Lt Nivedita Choudhary
(d) Flt Lt Rajika Sharma

▶ *(c) Flt. Lt. Nivedita Choudhary*

168. While computing national income estimates, which of the following is required to be observed?
(a) The value of exports to be added and the value of imports to be subtracted
(b) The value of exports to be subtracted and the value of imports to be added
(c) The value of both exports and imports to be added
(d) The value of both exports and imports to be subtracted

▶ *(a) The value of exports to be added and the value of imports to subtracted.*

169. If the Prime Minister of India submits his resignation to the President, it will mean the resignation of the
(a) Prime Minister only
(b) Prime Minister and the Cabinet Ministers
(c) entire Council of Ministers
(d) Prime Minister, Cabinet Ministers and the Speaker

▶ *(c) Entire Council of Minister*

170. A fuse wire is made of an alloy of
(a) tin and copper
(b) tin and lead
(c) tin and aluminium
(d) nickel and chromium

▶ *(b) An alloy of tin and lead.*
Fuse wire is made of tin (63%) and lead (37%).

171. Iltutmish established a centre of learning at
(a) Multan   (b) Kolkata
(c) Alwar   (d) Patna

▶ *(d) Patna*

172. The energy that can harness heat stored below the Earth's surface, is known as
(a) thermal energy
(b) nuclear energy
(c) tidal energy
(d) geo-thermal energy

▶ *(d) Geo-thermal Energy*

173. The temperature of boiling water in a steam engine may be high because
(a) there are dissolved substances in water
(b) there is low pressure inside the boiler
(c) there is high pressure inside the boiler
(d) the fire is at very high temperature

▶ *(c) There is high pressure inside the boiler.*

174. Konark, which has famous 'Sun Temple' with wonderful specimens of Hindu architecture, lies in the state of
(a) Odisha
(b) Gujarat
(c) Karnataka
(d) Madhya Pradesh

▶ *(a) Odisha— Konark which has famous for 13th century 'Sun God Temple' lies in Odisha. Konark is a small town in Puri district of state Odisha, Sixty-five kilometres from Bhubaneswar.*

175. AGMARK is a guarantee of standard
(a) quality   (b) quantity
(c) weight   (d) size

▶ *(a) Quality*

176. Vector of Kala-azar is
(a) Anopheles mosquito
(b) Culex mosquito
(c) Tse-Tse fly
(d) Sand fly

▶ *(d) Sandfly*

177. The World Day to Combat Desertification is observed every year on
(a) 4th May   (b) 17th June
(c) 14th August   (d) 3rd October

▶ *(b) The World Day to Combat Desertification is observed every year on 17th June all over the world. The aim of the United Nations in designating a day of observance is to sensitize the public and policymakers to the increasing dangers of desertification, land degradation and drought for the international community.*

178. In case no party enjoys absolute majority in the Legislative Assembly of a State, the Governor will go by
    (a) the advice of former Chief Minister
    (b) the advice of the Prime Minister
    (c) the advice of the President of India
    (d) his own discretion

▶ (d) His own discretion.

179. The planet that takes 88 days to make one revolution of the Sun is
    (a) Mercury   (b) Saturn
    (c) Jupiter   (d) Mars

▶ (a) Mercury

180. The chief raw material used for manufacturing rayon is
    (a) nylon
    (b) cellulose
    (c) silicon
    (d) radium and argon

▶ (b) Cellulose

181. 'Giddha' is a form of dance associated with the state of
    (a) Punjab
    (b) Himachal Pradesh
    (c) Haryana
    (d) Rajasthan

▶ (a) Punjab

182. The gas used to dilute oxygen for breathing by deep sea divers, is
    (a) neon   (b) argon
    (c) nitrogen   (d) helium

▶ (d) Helium is used in scuba tanks to dilute oxygen. It is chemically inert, it means it does not participate in chemical reactions. Another reason is it much less soluble in water than other gases such as nitrogen. The low solubility means it does not enter the bloodstream, even under pressure, commonly experienced by deep sea divers.

183. An instrument used to measure humidity is
    (a) anemometer   (b) hygrometer
    (c) thermometer (d) pyrheliometer

▶ (b) Hygrometer

184. Fat can be separated from milk in a cream separator because of
    (a) cohesive force
    (b) gravitational force
    (c) centripetal force
    (d) centrifugal force

▶ (d) Centrifugal force

185. The market price is related to
    (a) very short period
    (b) short period
    (c) long period
    (d) very long period

▶ (c) Long period

186. The airways company acquired by South India's 'Sun Group' is
    (a) Go Air   (b) IndiGo
    (c) Spice Jet   (d) Jet Airways

▶ (c) Spice Jet

187. India is a secular state because in our country
    (a) state has no religion
    (b) religion has been abolished
    (c) state patronizes a particular religion
    (d) None of the above

▶ (a) State has no religion.

188. Who was the mother of Mahavira?
    (a) Yashoda   (b) Trishala
    (c) Jameli   (d) Mahamaya

▶ (b) Trishala

189. Equilibrium price is the price when
    (a) supply is greater than demand
    (b) supply is less than demand
    (c) demand is very high
    (d) supply is equal to demand

▶ (d) Supply is equal to demand.

190. The third battle of Panipat was fought in the year :
    (a) AD 1526   (b) AD 1556
    (c) AD 1761   (d) AD 1776

▶ (c) AD 1761— The third Battle of Panipat took place on 14th January 1761, at Panipat (Haryana) between Maratha confederacy and Ahmad Shah Abdali. This battle is considered as one of the largest fought in 18th century and has the largest number of fatalities in a single day.

191. Which of the following years has been ranked as one of the three warmest years?
    (a) 2006   (b) 2008
    (c) 2009   (d) 2010

▶ (d) The year 2010 ranked as the warmest year on record together with 2005 and 1998, according to the World Meterological Organization. In 2010, global average temperature was 0.53° (0.95° F). This value is 0.01°C (0.02°F) above the nominal temperature in 2005 and 0.02°C (0.05°F) above 1998.

192. Cadmium pollution is associated with:
    (a) Minamata disease
    (b) black foot disease
    (c) dyslexia
    (d) itai-itai

▶ (d) Cadmium pollution is associated with itai-itai disease. Cadmium poisoning causes softening of the bones and kidney failure. The disease is named for the severe pain caused in joints and spine. Itai-itai disease is known as one of the four big pollution-diseases of Japan.

193. The Great Bath of Indus Valley Civilization is found at
    (a) Harappa
    (b) Mohen-jo-daro
    (c) Ropar
    (d) Kalibangan

▶ (a) Harappa

194. Who invented 'Helicopter'?
    (a) Cockrell
    (b) Brequet
    (c) Otis
    (d) Frank Whittle

▶ (b) Louis Brequet had invented helicopter.

195. Most of the computers available today are
    (a) third generation computers
    (b) fourth generation computers
    (c) fifth generation computers
    (d) sixth generation computers

▶ (b) 4th generation computers

196. Bleaching powder is prepared by passing
    (a) chlorine over slaked lime
    (b) oxygen over slaked lime
    (c) carbon dioxide over slaked lime
    (d) chlorine over quick lime

▶ (a) Bleaching powder is actually a mixture of calcium hypochlorite ($Ca(ClO)_2$) and the basic chloride $CaCl_2 \cdot H_2O$ with some slaked lime, $Ca(OH)_2$.

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$

197. Gas released during Bhopal tragedy was
    (a) sodium isothiocyanate
    (b) potassium isothiocyanate
    (c) ethyl isothiocyanate
    (d) methyl isothiocyanate

▶ It occurred on the night of December 2-3, 1984 at the Union Carbide Indian Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh, India.

198. 'National Botanical Garden' is located at
    (a) Shimla
    (b) Kolkata
    (c) Lucknow
    (d) Bengaluru

▶ (b) Kolkata

199. October and November months give more rainfall to
    (a) Malwa plateau
    (b) Chhota Nagpur plateau
    (c) Eastern hills
    (d) Coromandal coast

▶ (d) The Coromandal Coast falls in the rain shadow of the western ghats and receives a less rainfall during the summer South-West monsoon, which contributes heavily to rainfall in the rest of India. The region averages 800 mm/yr, most of which falls between October and December.

200. Which one of the following is considered as the nature's radar?
    (a) Hippopotamus (b) Pigeon
    (c) Vulture   (d) Owl

▶ (c) Vulture