IIFT 2006 Set B (Quant)

Section I (Part I)

Direction for Question 1 to 13: Read the information carefully and answer the questions:

1. Vijay has been invited for dinner in a club. While walking through the garden path towards the club, he observe that there is an electric rod on the top of the building. From the point where he is standing, the angles of elevation of the top of the electric rod and the top of the building are ϕ and θ respectively. If the heights of the electric rod and the building are p and q respectively, mark <u>all</u> the correct statements.

   a. The height of the tower is $\frac{p \tan\theta}{\tan\phi - \tan\theta}$

   b The height of the electric rod is $\frac{q \tan\theta}{(\tan\theta - \tan\phi)}$

   c. The height of the tower is $\frac{p \tan\phi}{\tan\theta - \tan\phi}$

   d. The height of the electric rod is $\frac{q(\tan\phi - \tan\theta)}{\tan\theta}$

2. If the sum of the roots of the quadratic equation $px^2 + qx + r = 0$ is equal to the sum of the squares of their reciprocals, mark <u>all</u> the correct statements.
   a. r/p, p/q and q/r are in A. P.
   b. p/ r, q/p and r/q are in G. P.
   c. p/r, q/p and r/q are in H. P.
   d. p/r, q/p and r/q are in A. P.

3. The area of an isosceles triangle is 12 sq. cm. If one of the equal sides is 5 cm long, mark <u>all</u> the options which can give the length of the base.
   a. 4 cm
   b. 6 cm
   c. 8 cm
   d. 9 cm

4. A trader forms a mixture of cement and sand weighing 40 kgs. In the mixture, cement and sand are in the ratio of 4 : 1 in weight terms. Later, when he adds more sand to the mixture, the new ratio becomes 4 : 3. Given this, mark <u>all</u> the correct statements.
   a. The second mixture formed is one and a half times heavier than the original mixture.
   b. In order to arrive at the second mixture, the trader had to add a quantity of sand weighing 16 kg.
   c. Had the original mixture been in the ratio of 8 : 3, the weight of the sand in the original mixture would have been 12 kg.
   d. If the trader sells 7 kg of the second mixture formed by him, and adds 11 kg of a new mixture of cement and sand in the ratio 7 : 4 to the residual, then the new ratio of cement to sand will become 7 : 5.

5. Ankit is appearing in an entrance examination for a professional course. In the General Knowledge section, the students are asked to match certain years in which the soccer world cup was held with the name of the champion team in that particular year. The information given was as follows:

Champion	Year
West Germany	1966
Italy	1982
France	1990
England	1998

Now, Ankit not being a football fan, does the matching randomly. If X denotes the number of correct answer his random matching generates, mark <u>all</u> the correct probabilities.

a. $P(X \geq 1) = \frac{5}{8}$ b. $P(X = 1) = \frac{1}{4}$ c. P (x = 3) = 0 d. $P(X = 4) = \frac{1}{24}$

6. Joshi has purchased a small shop in a city by paying an amount of Rs. 20,000. He decides to decorate the shop before starting business for which he spends Rs. 8,000 in the first month and Rs. 2,000 in the next month. However, at the beginning of the third month, he gets a good offer from Wadhwa and sells she shop to him at a profit of 20 percent. Wadhwa shortly afterwards decides that he will be better off by doing business in another location and decides to sell the shop back to Joshi. Given this, mark <u>all</u> the correct options.
   a. If Wadhawa loses a total of Rs. 7,200, his loss is not more than 20%.
   b. If Joshi had originally purchased the shop at Rs. 14,000, then by selling the shop to Wadhwa at the same price, he could have made a profit of 50%.
   c. If Joshi had sold the shop to Wadhwa at a profit of 40%, his monetary gain would have been Rs. 12,000.
   d. If Joshi had sold the shop to Wadhwa at a profit of 40%, and Wadhwa sold the shop back to him at a loss of 40%, then Joshi would have acquired the shop with a net investment of Rs. 13,200.

7. If $\frac{\log x}{b-c} = \frac{\log y}{c-a} = \frac{\log z}{a-b}$, mark <u>all</u> the correct options

a. xyz = 1 b. $x^a y^b z^c = 1$ c. $x^{b+c} y^{c+a} z^{a+b} = 1$ d. $x^{b+c} y^{c+a} z^{a+b} = 0$

8. In a pizza stall, Ajay and Mohan, being the lucky customers, were given the option of drawing tickets from a pot containing x number of tickets for the knife-throwing show and y number of tickets for the talking-doll show. Both Ajay and Mohan being excited about the knife-throwing show, start drawing tickets from the pot until they get one for the show, replacing any drawn ticket for the talking-doll show in the pot. Ajay draws the ticket first, followed by Mohan.Given this, mark <u>all</u> the correct options.
   a. If the probability of Ajay first getting a ticket for the knife-throwing show is four times that for Mohan, the ratio between x and y is 3 : 1
   b. If the probability of Ajay first getting a ticket for the knife-throwing show is five times that for Mohan, the ratio between y and x is 1 : 4
   c. If the probability of Ajay first getting a ticket for the knife-throwing show is two times that for Mohan, the ratio between x and y is 1 : 1
   d. If the probability of Mohan first getting a ticket for the knife-throwing show is six times that for Ajay, the ratio between x and y is 5 : 1

9. Madan is going from Mumbai to Dehi in order to join a new job there. He has a glass memento of right circular conic shape under his possession and he does not want it to break during transportation. So, he purchases a cubic metal box from the market spending Rs. 500. The cone is exactly fitted in the metal cube in such a way that while the edges of the base of the cone are touching the edges of all the sides of the cube, the vertex of it touches the opposite face of he cube. After inserting the memento in the box, he packed the metal box from outside with wallpaper costing Rs. 1.5 per sq cm. Given that the volume of the glass memento is $718\frac{2}{3}$ cc, mark <u>all</u> the correct statements.

a. Madan had incurred total expenditure of Rs. 2,264 on the metal box.
b. Madan had incurred an expenditure of Rs. 1,754 on packing the metal box.
c. The area of any one side of the metal box is 196 sq. cm
d. The volume of the metal box is 2,644 cc.

10. Ranjan goes to a countryside lake for a boat ride. Standing at the ferry counter, he looked at the opposite bank and observed a tall tower on a hill downstream, the angle of elevation being 45°. Ranjan comes to know from the bystanders that the tower is a historical ruin and decides to visit it. The boat takes him directly to the opposite bank, from where the angle of elevation to the top of the tower becomes 60°. While exploring the site, he comes to know that the combined height of he tower and the hill is 300 m. If the speed of the boat by which Ranjan travelled was 2 km/hr in still waters, mark <u>all</u> the correct observations.

a. It took Ranjan $3\sqrt{6}$ minutes to cross the lake by the boat.
b. The breadth of the lake is $100\sqrt{6}$ m .
c. It took A. Ranjan $4\sqrt{3}$ minutes to cross the lake by the boat.
d. If the combined height of the hill and the tower was 450 m and the speed of the boat was 1 km/hr (the angles of elevation remaining unchanged), the time taken by Ranjan to cross the lake by boat would have been $9\sqrt{6}$ minutes.

11. Sunil goes to small city in Europe on vacation, where he enjoys walking along the streets in the afternoon. He observes that there are 6 parallel roads running East - West and 5 parallel roads running North-South in the city. In order to observe the landmarks in the city, he takes different routes every time he goes out. He also observed that the distance between every consecutive pair of roads is equal. Given this, mark <u>all</u> the correct options.

a. The number of shortest possible routes that Sunil can take to travel from one corner of the city to the other diagonal end is 126.
b. The total number of possible routes that Sunil can take to travel from one corner of the city to the other diagonal end is 196.
c. The number of rectangles that can be formed with their sides along the roads is 150.
d. If the number of parallel roads running East-West and North - South increase by one each, the number of shortest possible routes that Sunil can take to travel from one corner of the city to the other diagonal end would go up by 336.

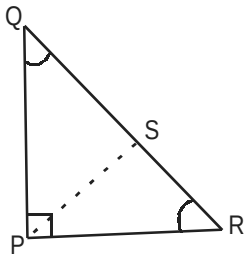
12. Laxman and Bharat decide to go from Agra to Delhi for watching a cricket match and board two different trains for that purpose. While Laxman takes the first train that leaves for Delhi, Bharat decides to wait for some time and take a faster train. On the way, Laxman sitting by the window-seat noticed that the train boarded by Bharat crossed him in 12 seconds. Now the faster train can travel 180 km in three hours, while the slower train takes twice as much time to do it. Given this, mark all the correct options.
    a. If the faster train has taken 30 seconds to cross the entire length of the slower train, the difference between the lengths of the two trains is 50 m.
    b. If the faster train had been running twice as much faster, it would have taken 10 seconds to overtake the slower train.
    c. Had the faster train taken 24 seconds to cross the entire length of the slower train, the length of the slower train would have been 100 m.
    d. If the slower train had been running at one and a half times of its current speed, the faster train would have taken 24 seconds to overtake Laxman.

13. A contractor takes up an assignment that 20 men can complete in 10 days. The same assignment could be finished by 15 women in 20 days. The contractor decides to employ 10 men and 10 women for the project. Given this, mark all the correct options.
    a. If the wage rate for men and women are Rs. 50 and Rs. 45 respectively, the total wage bill for the project will be Rs. 11,400.
    b. If the wage rate for men and women are Rs. 45 and Rs. 40 respectively, the total wage bill for the project will be Rs. 10,200.
    c. If the wage rate for men and women are equal at Rs. 40, the total wage bill for the project will be Rs. 9,100.
    d. If the contractor decides to employ 20 men and 30 women for the project and the wage rate for men and women are Rs. 40 and Rs. 35 respectively, the total wage bill for the project will be Rs. 9,250.

SECTION I (Part II)

Direction for Question 14 to 30: Read the information carefully and answer the questions.

14. In the right-angled triangle QPR given below, PS is the altitude to the hypotenuse. The figure is followed by three possible inferences.



I. Triangle PQS and Triangle RPS are similar.
II Triangle PSQ and Triangle RSP are congruent.
III Triangle PSQ and Triangle RPQ are similar.
Mark the correct option

a. I and II are correct
b. I and III are incorrect
c. Only III is correct
d. All three are correct

15. The inverse of the sum of the following series up to n terms can be written as $\frac{3}{4}+\frac{5}{36}+\frac{7}{144}+.....$

a. $\frac{(n-1)^2}{n^2+2n}$
b. $\frac{n^2+2n}{(n-1)^2}$
c. $\frac{n^2+2n}{(n+1)^2}$
d. $\frac{(n+1)^2}{n^2+2n}$

16. The square root of the harmonic mean of the roots of the equation
$\left(5+\sqrt{2}\right)x^2-\left(4+\sqrt{5}\right)x+8+2\sqrt{5}=0$ is.

a. ± 3
b. ± 4
c. $\sqrt{2}$
d. None of these

17. If $\alpha \neq n\pi$ and tan α is the GM of sin α and cos α, determine the square of the expression $2-4\sin^2\alpha+3\sin^4\alpha-\sin^6\alpha$.

a. 1
b. 4
c. $\frac{1}{4}$
d. None of these

18. Which of the following is obtained after rationalization of the expression $\frac{1}{\left(\sqrt{5}+\sqrt{6}+\sqrt{11}\right)}$

a. $\frac{5\sqrt{6}+6\sqrt{5}-\sqrt{330}}{60}$

b. $\frac{6\sqrt{5}-5\sqrt{6}-\sqrt{330}}{30}$

c. $\frac{5\sqrt{6}+6\sqrt{5}+\sqrt{330}}{60}$

d. $\frac{6\sqrt{5}+5\sqrt{6}-\sqrt{330}}{60}$

19. If one root is the square of the other root in the equation $x^2 + px + q = 0$, mark the correct relationship in the following options.

a. $p^3 - q(3p + 1) + q^2 = 0$
b. $p^3 - q(3p - 1) + q^2 = 0$
c. $p^3 + q(3p - 1) + q^2 = 0$
d. $p^3 - q(3p - 1) - q^2 = 0$

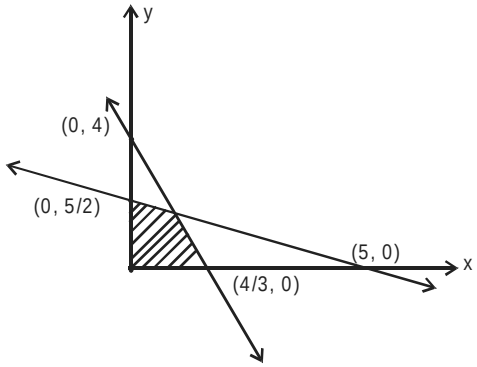
20. If α, β are the roots of the quadratic equation $x^2 + mx + 1 = 0$ and γ, δ are the roots of the equation $x^2 + nx + 1 = 0$, then the value $(\alpha - \gamma)(\beta - \gamma)(\alpha + \delta)(\beta + \delta)$ is equal to

a. $n^2 - m^2$.
b. $m^2 - n^2$.
c. $2m^2 - n^2$.
d. None of the above

21. A wire, if bent into a square, enclose an area of 484 cm^2. This wire is cut into two pieces; with the bigger piece having a length three-fourth of the original wire's length. Now, if a circle and a square are formed with the bigger and the smaller piece respectively, what should be the area enclosed by the two pieces?

a. 464cm^2
b. 544.25 cm^2
c. 376.75 cm^2
d. 424.25cm^2.

22. Find the solution set of the shaded region in the diagram below



a. $3x + y \le 4, x + 5y \le 5, x \ge 0, y \ge 0$
b. $x + y \le 3, x + 4y \le 5, x \ge 0, y \ge 0$
c. $3x + y \le 4, x + 2y \le 5, x \ge 0, y \ge 0$
d. $3x + 2y \le 2, x + 2y \le 5, x \ge 0, y \ge 0$

23. Pavan builds an overhead tank in his house, which has three taps attached to it. While the first tap can fill the tank in 12 hours, the second one takes one and a half times more than the first one to fill it completely. A third tap is attached to the tank which empties it in 36 hours. Now one day, in order to fill the tank, Pavan opens the first tap and after two hours opens the second tap as well. However; at the end of the sixth hour, he realizes that the third tap has been kept open right from he beginning and promptly closes it. What will be the total time required to fill the tank?

a. 8 hours 48 minutes
b. 9 hours 12 minutes
c. 9 hours 36 minutes
d. 8 hours 30 minutes

24. The domain of definition of the function $y = \frac{1}{\{\log_{10}(3-x)\}} + \sqrt{x+7}$ is

a. $[-7, 3) \sim \{0\}$ b. $[-7, 3] \sim \{0\}$ c. $(-7, 3) \sim \{0\}$ d. $(-7, 3] \sim \{0\}$

25. a and b are two vectors and the angle between a and b is θ. If (a + 3b). (7a – 5b) = 0 and (a – 4 b). (7a – 2b) = 0, then the value of tan θ is

a. $\sqrt{3}$ b. 1 c. $\frac{1}{\sqrt{3}}$ d. None of the above

26. Three business entities X Ltd, Y Ltd. and Z Ltd, with 4, 3 and 5 employees respectively, merged into XYZ Ltd in order to jointly raise the capital for setting up a new modern production plant in Jaipur. After two years, on the question of management decisions on the new venture at Jaipur, the employees started adopting differing viewpoints and began to quarrel among themselves. Given the fact that there is not quarrel among the employees of the erstwhile X Ltd, Y Ltd and Z Ltd, what could be the maximum number of quarrels that can take place within XYZ Ltd?

a. 31 b. 53 c. 47 d. 41

27. If $\sin\alpha + \sin\beta = a$, $\cos\alpha + \cos\beta = b$, $\tan\left(\frac{\alpha}{2}\right) * \tan\left(\frac{\beta}{2}\right) = c$, and $a \neq b \neq c \neq 0$, $c \neq 1$, $\frac{1-c}{1+c}$ is equal to

a. $\frac{b}{a^2+b^2}$ b. $\frac{2a}{a^2+b^2}$ c. $\frac{2b}{a^2+b^2}$ d. $\frac{a}{a^2+b^2}$

28. If $a \sin^{-1} x - b \cos^{-1} x = c$, then find the value of $\frac{a}{b}\sin^{-1} x + \frac{b}{a}\cos^{-1} x$ (Assume $-1 \leq x \leq 1$).

a. 0 b. $\frac{\pi}{4}$ c. $\frac{\pi ab + 2c(a-b)}{2ab}$ d. $\frac{\pi ab + 2c(b-a)}{2ab}$

29. If $\frac{2\sin\theta}{1+\sin\theta+\cos\theta} = k$, then $\frac{1-\cos\theta+\sin\theta}{1+\sin\theta}$ is equal to

a. k b. k + 1 c. $\frac{1}{k}$ d. None of the above

30. Amit, Sumit and Pramit go to a seaside town to spend a vacation there and on the first day everybody decides to visit different tourist locations. After breakfast, each of them boards a different tourist vehicle from the nearest bus-depot.After three hours,Sumit who had gone to a famous beach, calls on the mobile of Pramit and claims that he has observed a shark in the waters. Pramit learns from the local guide that at that time of the year, only eight sea-creatures (including a shark) are observable and the probability of observing any creature is equal. However, Amit and Pramit later recall during their discussion that Sumit has a reputation for not telling the truth five out of six times. What is the probability that Sumit actually observed a shark in the waters?

a. $\frac{1}{36}$ b. $\frac{1}{30}$ c. $\frac{5}{36}$ d. $\frac{1}{24}$

IIFT 2006 Set B (GK)

Section II

Directions for questions no 31 to 37: Mark all the options A...d of List 1 that have corresponding matches anywhere (not necessarily in the same row) in each of the other lists (List II, List III and List IV)

31.

List I	List II	List III	List IV
A. Kumar Mamglam Birla	Steel	Sahitya Parishad Award	SUN TV
B. I. G Patel	Voice and radio products	Ernt & Young Enterpreneur Award 2005	Bajaj Auto
C. Pawan Munjal	Aluminium & Copper	NDTV Automobiles Man of theYear 2005	RBI
D. Kalanithi Maran	Policy Formulation	CNBC Business Excellence Award 2005	Grasim

32.

List I	List II	List III	List IV
A. Padmasree Warrior	Integrated Communications Solutions	Sahitya Parishad Award	Maruti
B. Rana Kapoo	IGNIS	Chennai	Motoraola
C. Jagdish Khattar	Integrated Business Solutions	Farady Medal	Wipro
D. Azim Premji	Rabobank	Start – Up Enterpreneur Award 2005	YES Bank

33.

List I	List II	List III	List IV
A. Namibia	Textiles	Copenhagen	Dollar
B. Norway	Diamonds	Abuja	Dinar
C. New Zeland	Oil	Windhoek	Naira
D. Nigeria	Dairy Products	Melbourne	Kroner

34.

List I	List II	List III	List IV
A. Sir Walter Scott	Rip Wan Winkle	The life ofNaolean Bonaparte	Russia
B. Cervantes	Ivanhoe	Noveleas Ejmplares	Scotland
C. Washington Irving	Dr Zhivago	My sister – life	New York
D. Boris Pasternak	Don Quixote	Stratford – on – Avon	Spain

35.

List I	List II	List III	List IV
A. L. N. Mittal	Berkshire Hathway Inc	Slovakia	Steel
B. Warren Buffet	Microsoft	Paris	Bill & Melindia Gates Foundation
C. Bill Gates	ISAT International	Omaha	Har var d University
D. JRD Tata	Air India	Gopalur SEZ	Severstal

36.

List I	List II	List III	List IV
A. Infosys	Hyderabad	Computer software	Nandan Nilekani
B. Tata Steel	Kolkata	Finished Steel	Sanjay. S. Lalbhai
C. Escorts Steel	Faridabad	Tractors	Rajan Nanda
D. Arvind Mills	Pune	Textiles	B. Muthuraman

37.

List I	List II	List III	List IV
A. Dr. Reddy's	Pfizer	Generic drugs	Italy
B. Tata	Eight O'Clock	Razor	Germany
C. Holcim	L & T	Textiles	US
D. Johnson & Johnson	Betapharm	Cement	Indian

38.

List I	List II
a. R. V Ra	i. Automobiles Manufacture
b. C. K. Pr ahalad	ii. Fisheries Economy
c. John Kurien	iii. Information Technolog y and Software
d. Kiran Karnik	iv. Poultry Far ming
	v. Managment Science

A. a i, b v, c ii B. b v, c ii, d iii C. a iv, c ii, d iii d. a i, c iv, d ii

39.

List I	List II
a. My Pr esidential Years	i. S. Radhakrishnan
b. The Hindu View of Life	ii. V. V. Giri
c. Voice of Consience	iii. N. Sanjivan Re ddy
d. Without Fear or Favour	iv. R. Venkatraman
	v. K. R. Narayanan

A. a iv, c ii, d iii B. b v, c ic, d ii C. b i, c ii, d iv D. b i, c ii, d iii

Directions for questions 40 to 56: Mark <u>all</u> the correct statements

40. a. The only Veda to have been rendered musically is the Same Veda.
    b. Port Blair is situated in North Andaman.
    c. The outermost layer of the Sun is called photosphere.
    d. Nhava Sheva, a major Indian port, is in the state of Gujarat.

41. a. The full form of AIDS is Abnormal Immuno Deficiency Syndrome.
    b. Petrology refers to the study of the economy in relation to petroleum products.
    c. A diverging lens can be used as magnifying glass.
    d. Laparoscopy is concerned with gynecological operations.

42. a. The parliamentary term 'crossing the floor' may be best described as leaving a house by a minister in between a session to attend the other house.
    b. It is necessary to be a member of either house of parliament to be appointed as governor of a state.
    c. A cognizable offence is one where arrests can be made without warrants.
    d. The Chief Minister of a State in India is not eligible to vote in the Presidential elections if he is a member of the Upper House of the State Legislature.

43. a. Hanumantha Rao replaced Verghese J. Kurien as the chairman of the National Dairy Development Board.
    b. Dabur is the best known institution of Unani medicine worldwide which ploughs back nearly 90% of its 1200 odd unani products into social welfare.
    c. Pascal Lamy is current the Director General of the World Trade Organization.
    d. Jawahar Lal Nehru had said that it was his ultimate aim to wipe every tear from every eye.

44. a. In an eye donation, it is the lens that is donated.
    b. Dialysis of kidneys involves the process of reverse osmosis.
    c. IC chips used in computers are usually made of chromium.
    d. The age of the tree can be found by counting the annual growth rings in a section of its stem.

45. a. All metals are solids at ordinary temperatures.
    b. Nitric acid is, when pure, a colourful liquid, possessing great oxidising power, turning yellow the skin and other organic bodies.
    c. Ammonia gas may be synthetically prepared from its elements by passing the silent electric discharge through a mixture of nitrogen and hydrogen.
    d. The composition of the air by weight maybe shown by passing a given volume of pure dry air over a weighed quantity of heated metallic copper, the increase in weight showing the weight of oxygen present in the volume of air, the nitrogen also being collected and the weight ascertained.

46. a. Chandragupta, who ruled from 324 to 301 B.C., was the architect of the first Indian imperial power -- the Mauryan Empire (324 - 184 B.C.).
    b. The period from 1707 AD - the year when Aurangzeb died, 1857, the year of the Indian Uprising, saw the gradual increase of the European influence in the India.
    c. Between 1746 - 48, the French and English finally came to blows in the first Carnatic War.
    d. Tilak, who was one of the first nationalist leaders with a following and deep understanding of the grassroots of India, voiced the thought of Home Rule in 1825.

47. a. 198 nations attempted to qualify for the 2006 FIFA World Cup.
    b. South Africa will host the FIFA World Cup 2010.
    c. Special Olympics 2005 took place during 2-9 August 2005 at Glasgow.
    d. New Zealand was the Champion in Sultan Azlan Shah Hockey tournament in 2005.

48. a. Four scientists shared the Nobel Prize in Physics in the year 2005.
    b. International Atomic Energy Agency was the co-recipient of Nobel Peace Prize in the year 2005.
    c. The flow of heat by conduction occurs via collisions between atoms and molecules in the substance and the subsequent transfer of potential energy.
    d. Madam Curie, pioneer in the early field of radiology, was born in France.

49. a. Sand dunes occur only in arid desert regions.
    b. Central Africa is home to the second largest rainforest.
    c. The heat buildup inside the earth reached a high early in the earth's history.
    d. The troposphere is a layer of the earth's atmosphere near its surface which is cooler higher up and warmer farther down.

50. a. Mukhya Mantri Gram Sadak Yojana is one of the major rural development initiatives in India.
    b. Dogri and Gojri are two festivals celebrated in Jammu & Kashmir.
    c. The Surajkund Craft Mela of international fame is held every year in the month of December.
    d. Prasar Bharati is the public service broadcaster in India with All India Radio and Doordarshan as its two constituents.

51. a. The two planets - Mercury and Mars - that move within the Earth's orbit are known as inferior planets.
    b. All planets can be seen at night.
    c. An ion is an atom or molecule that has become electrically charged by the loss or gain of one or more electrons.
    d. Human eyelids open and close about 20 times a minute.

52. a. Chlorine may be collected by downward displacement of air, as it is two and a-half times heavier than air, or it may be collected over warm water.
    b. Chlorine is a greenish yellow gas, easily condensed to a liquid; it does not burn in air, but many substances burn in it, forming chlorides, just as bodies burning in oxygen form oxides.
    c. Because of combining with free hydrogen, chlorine is not able to separate hydrogen from some of its compounds and to combine with it.
    d. Chlorine bleaches mineral colouring matters.

53. a. The Montagu-Chelmsford Reforms were introduced by the British Government in India towards women's participation in active politics.
    b. The first Governor-General of India - Warren Hastings, remained in India until 1874 and was succeeded by Cornwallis, who initiated the Permanent Settlement.
    c. Lord Dalhousie's notorious Doctrine of Lapse, whereby a native state became part of British India if there was no male heir at the death of the ruler, was one of the principal means by which native states were annexed by the British.
    d. In the third Carnatic war, the British East India Company defeated the French forces at the battle of Wandiwash ending almost a century of conflict over supremacy of India.

54. a. The Aravalli is the oldest mountain range in India, running from northeast to southwest across Rajasthan in western India.
    b. The Satpura Range is a range of hills in central India. It begins in eastern Gujarat near the Arabian Sea coast, then runs east through Maharashtra, Madhya Pradesh and ends in the state of Bihar.
    c. The Himalayas extend from the state of Jammu and Kashmir in the west to the state of Assam in the east.
    d. The Cardamom Hills located in Kerala, are named after the cardamom grown in the hill's cool regions.

55. a. Doppler effect refers to the phenomenon whereby the pitch of a sound appears to change as the object moves away.
    b. The equation V = d × d, where V is the volume and d is the diameter of the sphere is dimensionally correct.
    c. Bernoulli's principle states that the pressure of a fluid is inversely proportional to its volume.
    d. Northern lights are caused by energetic particles released from the sun reacting in earth's atmosphere.

56. a. Six Indians have been awarded Nobel Prize till date.
    b. No Indian has ever received Nobel Prize for Medicine.
    c. Two Indians have received Nobel Prize for Literature.
    d. S. Chandrashekar was awarded the Nobel Prize for physics.

IIFT 2006 Set B (English)

Section III (Part i)

Directions for Questions 57 to 59: There are four options (A ... D) in each question. Each of the options has two sentences and each sentence has one word underlined. Mark those options as correct where the underlined words in both the sentences have been used correctly.

57.

A	i.	Frederica must be as much as sixteen, and ought to know better; but from what her mother insinuates, I am afraid she is a **perverse** girl.
	ii.	For ill, to man's nature, as it stands **perverted**, hath a natural motion, strongest in continuance; but good, as a forced motion, strongest at first.
B	i.	A heavy operator overtaken by a reverse of fortune was bewailing his sudden fall from **effluence** to indigence.
	ii.	The child's own nature had something wrong in it which continually betokened that she had been born amiss – the **affluence** of her mother's lawless passion – and often impelled Hester to ask, in bitterness of heart, whether it were for ill or good that the poor little creature had been born at all.
C	i.	This night she hurried to bed **purposely**, every hair up, one eye on the stranger, who had dropped on a mat in a helpless, hopeless sort of way, all four feet spread out, sighing heavily.
	ii.	The Monkey approached carelessly and was caught in the trap; and on his accusing the Fox of **purposefully** leading him into the snare, she replied, "O Monkey, and are you, with such a mind as yours, going to be King over the Beasts?
D	i.	All was still; and instead of surrendering to the reasonable exigencies of life he stepped out, with a **rebelling** heart, into the darkness of the house.
	ii.	The matter and manner of his speech were so **revolting** that instinctively Adam's hand wandered to his revolver, and, with his finger on the trigger, he rested satisfied that he was ready for any emergency.

58.

A	i.	But the populace, seeing in that title an **illusion** damaging to Barbicane's project, broke into the auditorium, smashed the benches, and compelled the unlucky director to alter his playbill.
	ii.	Still, whatever the greatness of my **allusion**, the fact remained that the real commander was there, backing up my self-confidence, though invisible to my eyes behind a maple-wood veneered cabin-door with a white china handle.
B	i.	Then he would talk to Philip of the university, quarrels between rival **corps**, the duels, and the merits of this and that professor.
	ii.	The **corps** was dressed in a uniform that once had been blue, but was now faded to a melancholy shade of green.
C	i.	The blows were given by a person of **grisly** aspect, with a head almost bald, sunken cheeks, apparently of the feminine gender, though hardly to be classed in the gentler sex.
	ii.	Also, when the farther arrived to take him away, the cowmen allowed that they would vastly prefer chumming with howling cannibals, glibbering lunatics, cavorting gorillas, **grizzly** bears, and man-eating tigers than with this particular. Young college product with hair parted in the middle.
D	i.	1, too, have been foully calumniated by our ancient enemy, the **infamous** falsehood, and I wish to point out that I am made of the fur of the Mustela Maculata, which is dirty from birth.
	ii.	Her neglect of her husband, her encouragement of other men, her extravagance and dissipation, were so gross and **notorious** that no one could be ignorant of them at the time, nor can now have forgotten them.

59.

A	i.	Is it not better to fall into the hands of a murderer, than into the dreams of a **lustful** woman?
	ii.	Instead of representing them as a community of **lusty** savages, who are leading a merry, idle, innocent life, he enters into a very circumstantial and learned narrative of certain unaccountable superstitions and practices, about which he knows as little as the islanders themselves.
B	i.	His enticing suggestions I used to **rebel** modestly by the assurance but it was extremely unlikely, as I had not enough experience.
	ii.	His firm step becomes quicker, and the corners of his mouth **repel** against the compression which is meant to forbid a smile.
C	i.	Still, however, he spoke kindly to the lady, and then hastened forth to till his cornfield and set out fruit-trees, or to bargain with the Indians for furs, or perchance to **overlook** the building of a fort.
	ii.	In this way, seeing everything with the utmost vividness, as if he were a spectator of the act ion, he will discover what is in keeping with it, and be most unlikely to **oversee** inconsistencies.
D	i.	Jennings had been **eager** to see Colonel Brandon well married, ever since her connection with Sir John first brought him to her knowledge.
	ii.	With him went the horse-driving Boeotians, breathing above their shields, and the Locrians who fight hand to hand, and the gallant Phocians **anxious** for war and battle.

Direction for questions 60 and 61: Mark the sentences in the options (A ... D) which are grammatically incorrect.

60. a. The hearing, which had been planned for Monday, December 2, was rescheduled for the following Friday so that all witnesses would be able to attend.
    b. In 1952, Japan's GNP was one third that of France. By the late 1970s, it was larger than the combined GNP of France and Britain.
    c. The Huns who were Mongolian invaded Gaul in 461 A.D.
    d. Because Senator Martin is less interested in the environment than in economic development, she sometimes neglects it.

61. a. Because strict constructionists recommend fidelity to the Constitution as written, no one objects more than them to judicial reinterpretation.
    b. When a candidate runs for office, they must expect to have their personal life scrutinized.
    c. Einstein, who was a brilliant mathematician, used his ability with numbers to explain the universe.
    d. Despite the cuts, there are services the hospital has, and will continue to provide to doctors.

Direction for questions 62 and 63: Each question has four analogies from A ... D. Mark all the correct analogies.

62. a. Murrey : Black :: Magenta : Red
    b. Inter : Exhume :: Piebald : Homogeneous
    c. Effete : Fructuous :: Chapfallen : Effervescent
    d. Selenology : Moon :: Epistemology : Knowledge

63. a. Polyglot : Languages :: Polyphagous : Food
    b. Escutcheon : Scutcheon :: Fabulist : Liar
    c. Scurvy : Vitamin C :: Kwashiorkor : Protein
    d. Apothecary : Drugs :: Cruciverbalist : Crosswords

Directions for questions 64 and 65: Each question has four sentences. Mark all the options where the underlined word in the sentence is inappropriately used.

64. a. There is luxuriant vegetation in the tropics.
    b. Her luxuriant black hair is the most beautiful I have ever seen.
    c. He owns a luxurious yacht.
    d. Coral grows luxuriously on that reef.

65. a. Do you prophecy a return to war-time prosperity?
    b. He prophesied that the end of the world would come within two weeks.
    c. He is an expert at prophesying.
    d. They made many dire prophecies, none of which ever came true.

Directions for questions 66 to 69: Each question has two sentences. Each sentence contains one black. From the first three options (a..c) provided below the sentences, pick the one that best fits both the sentences; otherwise, mark option d.

66. i. As indigenous peoples are denied access to their traditional lands, their cultures are dying. The result is that now over half the world's languages are ____, meaning that only elderly people speak those languages.
ii. The third aim, the big one, is to convince Lockists that their research program ___, and Gauker's contextualist alternative is the way of the future.
a. moribund b. sycophantic c. garrulous d. none of those

67. i. A soft monotonous tone is ___ for the audience.
ii. It was many months since Whitehead had gone to bed sober. He's started to use vodka as a ___ when the night terrors began.
a. maverick b. palladium c. soporific d. none of these

68. i. This seems pretty ___ considering that fair use itself is a grey area rather than a fine line, why superimpose a fine line here?
ii. He was greeted with half a dozen really ___ comments about his grammar and use of capitals at the beginning of sentences. They completely detailed the thread.
a. incriminate b. puerile c. adjure d. none of these

69. i. The target for reducing the use of penal custody for children by 10% by 2008 is ___ and won't happen unless the youth court magistrates get on board.
ii. A ___ Prime Minister Jean Chretien, with a keen political eye for embracing these groups, decided to send token and combat-avoiding units to Afghanistan, reinforcing views across Canada that America's pursuits and actions were ignoble from the start.
a. placative b. egregious c. congenital d. none of these

Direction for questions 70 and 71: List I gives pronounciation hints; List II gives word meanings and List III gives suggested spellings. Mark all the options whose suggested spellings in List C are correct.

70.

List I	List II	List III
Pronounciation hint	**Word Meaning**	**Suggested Spelling**
A. hype-PAL-uh-jee	The interchange in syntactic relationship between two terms	hypallage
B. RAN-tee.pole	characterized by a wild unruly manner or attitude	rantipole
C. in-TAL-yoh	An engraving or incised figured in stone or other hard material	intahlio
D. ICE-uh-goh-jee	A scholarly introduction to a branch of study or research	isagoje

71.

List I	List II	List III
Pronounciation hint	**Word Meaning**	**Suggested Spelling**
A. puh-LIFF-uh-jiz-um	the habit of feeding on a variety of plants or animals	polyphajism
B. see-gwuh-TERR-uh	poisoning caused by eating fish or mollusks with flesh toxic to man	siguatera
C. mak-ETT	a preliminary model of something designed	maquet
D. pan-uh-JEER-ik	an oration or writing expressing praise	panegyric

Section III (Part ii)

Direction for questions 72 to 79: Read the two passages that follow and answer the questions given at the end of each passage.

Passage 1

From our reading we knew that Gartok was the capital of Western Tibet, and the seat of the Viceroy; our geography books had told us that it was the highest town in the world. When, however, we finally set eyes on this famous place we could hardly help laughing. The first thing we saw were a few nomads' tents scattered about the immense plain, then we caught sight of a few mud-brick huts. That was Gartok. Except for a few stray dogs, there was no sign of life.

We pitched our little tent on the bank of the Gartang-Chu, a tributary of the Indus, At last a few curious individuals came up and we learned from then that neither of the two high officials was in the town and only the "Second Viceroy's" agent could receive us. We decided to submit our petition to this personage at once. Going into his office we had to bend low, for there was no door, only a hole in front of which hung a greasy curtain. We came into dimly-lit room with paper gummed over the windows. When our eyes had grown accustomed to the twilight we discerned a man who looked intelligent and distinguished sitting like a Buddha on the floor before us. From his left ear dangled an ear-ring at least six inches long as sign of his rank. There was also a woman present, who turned out to be the wife of the absent official. Behind us, pressed a crowd of children and servants who wished to see these peculiar foreigners from close at hand. We were very politely requested to sit down and were immediately offered dried meat, cheese, butter and tea. The atmosphere was cordial and warmed our hearts, and conversation flowed fairly freely with the aid of an English-Tibetan dictionary and supplementary gestures.

Next day, I brought the agent some medicines as a present. He was much pleased and asked me how to use them, whereupon I wrote out directions. At this point, we ventured to ask him if he would grant us a trave permit. He did not directly refuse, but made us await the coming of his chief who was on a pilgrimage to Mount Kailas, but was expected to return in a few days.

In the interval we made good friends with the agent. I gave him a burning-glass, an object of which one can make good use in Tibet. The customary return gift was not long in coming. One afternoon some bearers carried a present of butter, meat and flour to our tents. And not long after came the agent himself, accompanied by a retinue of servants, to return our visit. When he saw how primitively we were lodged in our tents, he could not get over his astonishment that Europeans led such simple lives.

Our morning, we heard the sound of bells in the distance as a huge mule-drawn caravan approached the village. Soldiers rode ahead followed by a swarm of male and female servants and after them members of the Tibetan nobility, and mounted, whom we now saw for the first time. The senior of the two Viceroys, whom they call Garpons in Tibet, was arriving. He and his wife wore splendid silk robes and carried pistols in their girdles. The whole village assembled to see the spectacle. Immediately after arriving, the Garpon moved in solemn procession into the monastery to give thanks to the gods for his safe return from the pilgrimage.

Aufschnaiter composed a short letter begging for our audience. As no answer came we set out in the late afternoon to visit the Garpon. His house was not essentially different from that of his agent, but inside it

was cleaner and of better quality. The Garpon, a high official, is invested for the duration of his mission with the fourth rank in the hierarchy of the nobles. He is in charge of five districts which are administered by nobles of the fifth, sixth and seventh rank. At last we came into the presence of this potentate. We explained our case to him in all its details and he listened to us with friendly patience. Often he could not refrain from smiling to our defective Tibetan, while his retainers laughed out loud. This merriment added a spice to the conversation and created a friendly atmosphere. The Garpon promised to consider our case carefully to talk it over with the representative of his colleague. At the end of the audience we were hospitably entertained and received tea made in the European fashion. Afterwards, the Garpon sent presents to our tents and we began to hope for a happy issue.

Out next audience was rather more formal but still cordia. It was a regular official meeting. The Garpon sat on the sort of throne and near him on a lower seat was the agent of his colleague. On a low table, lay a file of letters written on Tibetan paper. The Garpon informed us hat he could only give us passes and transport for the province of Ngari. We would in no circumstances be allowed to enter the inner provinces of Tibet. We quickly took counsel together and suggested that he should give us a travel permit to the frontier of Nepal. After some hesitation he promised to communicate our request to the Government in Lhasa, but he explained to us that the answer might not arrive for some months. We were not anxious to wait all that time Gartok. We had not given up the idea of pushing on the east and were anxious to continue our journey at all costs. As Nepal was a neutral country situated in the direction which we wished to go, we felt that we could be satisfied with the result of the negotiations.

The Garpon then kindly asked us to remain for a few days longer as his guests, as pack-animals and a guide had to be found. After three days, our travel pass was delivered to us. It stipulated that our route should pass through the following places - Ngakhyu, Sersok, Montse, Barkha, Tokchen, Lholung, Shamtsang, Truksum and Gyabnak. It was also laid down that we had the right to requisition two yaks. A very important clause required the inhabitants to sell us provisions at the local prices, and to give us free fuel and servants for the evenings.

We were very glad to have obtained so much in the way of facilities. The Garpon invited us to a farewell dinner. Afterwards, he made us give him or word of honour not to go to Lhasa from his territory. At last, on July 13th, we bade farewell to Gartok and started on our way. Our little caravan, now of decent proportions, consisted of our two yaks with their driver and my small donkey, which was now in good shape and carried no more than a tea-kettle. Then came our guide, a young Tibetan named Norbu, on horseback, while we three Europeans modestly brought up the rear on foot.

The country through which we had been traveling for days had an original beauty. The wide plains were diversified by stretches of hilly country with low passes. We often had to wad through swift-running ice-cold burns. While in Gartok, we had had occasional showers of hail, but now the weather was mainly fine and warm. By this time we all had thick beards, which helped to protect us against the sun. It was long since we had seen a glacier, but as we were approaching the tasam at Barkha, a chain of glaciers gleaming in the sunshine came into view. The landscape was dominated by the 25,000-foot peak of the Gula Mandhata; less striking, but far more famous, was the sacred Mount Kailas, 3000 feet lower, which stands in majestic isolation apart from the Himalaya range. When we first caught sight of it, the Tibetans prostrated themselves and prayed. At the places from which the first sight of the mountain can be obtained are set up heaps of stones, grown through the centuries to giant proportions, expressing the piety of the pilgrims, each of whom, following ancient observance, adds fresh stones to the heaps. We, too, would have liked to travel round the mountain as the pilgrims do, but the unfriendly master of the caravanserai at Barkha

prevented us by threatening to stop our future transport facilities unless we continued on our way.

We mountaineers were most strongly attracted to the majestic Gurla Mandhata, mirrored in the waters of Lake Manasarovar, than by the Sacred Mountain. We pitched our tents on the shore of the lake and feasted our eyes on the indescribably beautiful picture of this tremendous mountain, which seemed to grow out of the lake. This is certainly one of the loveliest spots on earth. The lake is held to be sacred and round it one finds many small monasteries in which the pilgrims lodge and perform their devotions. Most of the people we met were traders. The biggest market in the region is that of Gyanyima. Here hundreds of tents from a huge camp given over to buying and selling.

72. Mark all the options from those given below the Lists that correctly match List I items with List II items.

List I		List II	
i	Agent	a	Guide
ii	Garpon	b	Market
iii	Gyanyima	c	Bruning-glass
iv	Norbu	d	Caravan

a. i a, ii d, iv c b. i c, ii d, iii b c. ii a, iii c, iv d d. ii d, iii b, iv a

73. Mark all the correct statements
   a. The author and his friends were not very interested in travelling westwards from the city of Gartok.
   b. The travel pass for the author was issued immediately after meeting the Garpon.
   c. The climate of Gartok was moderately warm.
   d. When the party of the author left Gartok, it consisted of less than seven persons.

74. Mark all the incorrectly statements.
   a. The author and his friends enjoyed the European style tea they had in the agent's office in Gartok.
   b. When the author and his friends met the Garpon for the second time, he offered the visitors a travel pass up to the town of Gyabnak.
   c. The viceroy the Gartok was astonished to witness the simplicity in the lifestyle that the author and his friends were following.
   d. The author and his friends liked the mountain Gurla Mandhata, reflected in the waters of Gartang-Chu, more than Mount Kailas, sacred mountain.

75. Mark all the correct statement.
   a. The biggest market that the author and his friends witnessed in the region they visited was not located in Ngari.
   b. While the gifts given by the author and his friends to the Tibetan officials included medicines and burning-glass, the gifts received in return consisted of butter, meat, cheese etc.
   c. The travel passes received by the author and his friends allowed them to purchase clothes, fuels and foods at local prices.
   d. The author and his friends came to know that the Garpon, a high official in Gartok, does not administratively control more than four districts.

Passage 2

As the Mongol empire of conquest expanded into an even larger empire of commerce, it became increasingly important for the Mongols to have a smoothly functioning calender that operated according to the same principles throughout the empire. With the need to coordinate activities and regulate social life in places with such varied ways of marking time, Mongols, almost as soon as they conquered an area, created observatories to accurately measure the movement of planets and starts for both practical and religious reasons. They built one immediately near Tabriz, but China needed a series of observatories erected across the land because it was so large. Mongol authorities had specific instructions from the central government to seek out astronomers and astronomical instruments and charts in each newly conquered land. Hulegu sent many of the astronomers captured in the Persian and Arab cities back to his homeland in Mongolia. These included Jamal-ad-Din, who was one of the most brilliant astronomers of the era; he brought with him the blueprints for major astronomical devices and new means of scientific measurement unknown in China.

On a scale that surpassed prior civilizations, the Mongols needed to process and record massive amounts of numerical information in the censuses of people, animals, and buildings. Each year they had to settle the accounts for all the goods sent back and forth, as well as for the movement of herds, soldiers, and merchants. The new forms of agriculture, the demands of astronomy, the system of censuses, and myriad other issues of administration taxed the numerical knowledge and ability of the era. They necessitated new approaches to the handling of numbers. To make the needed calculations quickly and efficiently, the clerks working for the Mongols relied on the abacus, which, with the movement of a few beads, allowed them to calculate large sums mechanically with less mental effort than making the calculations mentally or through writing.

Always fastidious about numerical information and with hundreds of millions of people across the vast Mongol Empire, the Mongols searched for simpler methods, shortcuts, and ways of calculating ever-larger quantities and processing them in every more complex sequences. The larger numbers of calculations required new ways of preserving information through the compilation of complex charts and the coordination of the number systems used in different countries. Mongol administrators found both European and Chinese mathematics too simple and impractical, but they adopted many useful innovations from Arabic and Indian mathematics. The cities of the Khwarizm empire had been a particularly important center for mathematics scholarship; the word algorithm was derived from al Khwarizm. The Mongols transported knowledge of these innovations throughout their empire. They quickly discerned the advantages of utilizing columns of numbers or place numbers in the style of Arabic numerals, and they introduced the use of zero, negative numbers, and algebra in China.

Not just in numbers and calenders, but on many levels, life itself in various parts of the empire had to be coordinated in a way that prior history had not required. The writing of history proved too important to allow each civilization to proceed in its own manner and according to the conventions developed in their literary traditions. To control the way that they themselves were presented to their subjects, the Mongols had to make the local standards on writing history correlate and articulate with the Mongol story. Written history was much more than a means of recording information; it served as a tool to legitimize the ruling dynasty and spread propaganda about its great conquests and achievements. For the Mongols, written history also became an important tool in learning about other nations in order to conquer and rule them more efficiently. Khubilai Khan established the National History Office in the 1260s. In keeping with Chinese practices, he

commissioned the compilation of complete histories of the Jurched and Khitan kingdoms, as well as the Sung dynasty. The project was probably the most massive history project ever commissioned and took nearly eighty years, until the 1340s, to complete. In Mongol Persia, the Ilkhan Gazan commissioned the first history of the world from Rashid-al-Din, a successor of Juvaini. Rashid-al-Din orchestrated a massive undertaking that employed many different scholars and translators in order to create histories of the Chinese, Turks, and Franks, as the Mongols called the Europeans.

The volume of information produced in the Mongol Empire required new forms of dissemination. Scribes could no longer handle the flow by laboriously hand copying everything that needed to be written. They compiled the records, wrote letters, and sent information to those who needed it, but they did not have time to copy agricultural manuals, medical treatises, atlases, and astronomical tables. Information had to be mass produced for mass dissemination, and for this task, the Mongols turned again to technology, to printing.

The Mongols adopted printing technology very early. Printing with movable letters probably began in China in the middle of the twelfth century, but it was the Mongols who employed it on massive scale and harnessed its potential power to the needs of state administration. Instead of the printing with thousands of characters, as the Chinese did, the Mongols used an alphabet in which the same letters were used repeatedly. Under the Mongols, printers carved out many copies of each letter that could then be arranged into whatever word was needed. Each time the printer wanted a new page of print, instead of carving the whole text, he needed to merely place the right sequence of already carved letters into position, use them, and then wait until the next printing job, when they would be rearranged and the used again.

General literacy increased during the Mongol dynasty, and the volume of literary material grew proportionately. In 1269, Khubili Khan established a printing office to make government decisions more widely disseminated throughout the population, and he encouraged widespread printing in general by nongovernmental groups as well. This included religious books and novels in addition to government publications. The number of books in print increased so dramatically that their price fell constantly throughout the era of Mongol rule. Presses throughout the Mongol Empire were soon printing agriculture pamplets, almanacs, scriptures, laws, histories, medical treatises, new mathematical, theories, songs and poetry in many different languages.

In conquering their empire, not only had the Mongols revolutionized warfare, they also created the nucleus of a universal culture and world system. Although never ruled by the Mongols, in many ways Europe gained the most from their world system. The Europeans received all the benefits of trade, technology transfer, and the Global Awakening without paying the cost of Mongol conquest. The Mongols had killed off the knights in Hungary and Germany, but they had not destroyed or occupied the cities.

One technological innovation after another arrived in Europe. The most labor-intensive professions such as mining, milling, and metalwork had depended almost entirely on human and animal labor, but they quickly became more mechanized with the harnessing of water and wind power. The transmission of the technology for improving the blast furnace also arrived in Europe from Asia via the Mongol trade routes, and it allowed metal workers to achieve higher temperatures and thereby improve the quality of metal, an increasingly important material in this new high-technology era. In Europe, as a result of the Mongol Global Awakening, carpenters used the general adze less and adapted more specialized tools for specific functions to make their work faster and more efficient; builders used new types of cranes and hoists. There was quick spread of new crops that required less work to produce or less processing after production; carrots,

turnips, cress, buckwheat, and parsnips became common parts of the diet. Labour-intensive cooking was improved by mechanizing the meat spit to be turned more easily. The new tools, machines, and mechanical devices helped to build everything, from ships and docks to warehouses and canals, faster and better, just as previously the improved Mongol technology of war helped to tear down and destroy quicker with improved cannons and firepower.

76. Mark all the correct statements
   a. Religious and real world compulsions motivated the Mongols not to delay the construction of observatories in their occupied territories after winning the battle.
   b. While the Mongols were very impressed with Arabic and Indian mathematical tools and incorporated them in their calculating methods, they adopted Chinese technique for printing purpose.
   c. Mongol conquest of entire Europe resulted in transmission of knowledge on mining, milling and metalwork.
   d. In the aftermath of introducing mass production of published materials, the volume of books, both from government and non-government sources, increased with a consequent decline in their price.

77. Mark all the incorrect statements.
   a. The technique of printing with movable letters was introduced by the Mongols during the twelfth century.
   b. Numerical knowledge and ability were the main concerns of Mongols.
   c. According to the article, presses in Mongol days were printing almanacs, scriptures, histories, medical treatises, new astronomical theories, songs, and poetry in many different languages.
   d. The study of astrology and history during the Mongol period flourished because the Emperors wanted them to serve practical objectives of the ruling regime.

78. Mark all the correct statements.
   a. Khubilai Khan commissioned compilation of complete histories of Sung period.
   b. While the available Mongol inventions in Europe aided the advancement of several manufacturing sectors, the agriculture sector also benefited owing to cultivation of new crops.
   c. The works of Jamal-ad-Din and Rashid-al-Din did not contribute much in the creation of new knowledge during the Mongol regime.
   d. One of the major inspirations for the Mongols to start looking for advanced yet simpler methods of calculation was the need to effectively document and handle the available figures of military importance as well as those on trade and population.

79. Mark all the options given below the Lists that correctly match List I items with List II items

List I		List II	
i	Astronomy	a	Clerk
ii	Abacus	b	Propaganda
iii	Literacy	c	Tabriz
iv	History	d	Almanc

a. i c, ii a b. i c, iii d c. iii d, iv d d. i d, ii a

IIFT 2006 Set B (DI)

Section IV (Part i)

Directions for questions 80 to 85: Study the 10 statements given below and answer the questions.

1. Six businessmen from six different nations are staying in different rooms in succession in the same row in a hotel.
2. Each of them owns a different number of cars and has donated to different number of institutions during the last year.
3. The businessman in Room no. 102 owns twice as many as the number of cars owned by the businessmen who has donated to 8 institutions in the last year.
4. The businessman from Uruguay and the businessman in Room no. 106 together own 40 cars in total.
5. The businessman from Argentina owns 8 cars less than the businessman from England but donated to 10 more instillations in the last year.
6. Four times the number of cars owned by the businessman in Room no. 104 is lesser than the number of institutions to which he has donated in the last year.
7. The businessman in Room No. 103 owns 12 cars and donated to 8 institutions in the last year.
8. The businessman who owns 16 cars donated to 24 institutions in the last year.
9. The businessman in Room no. 105 owns 8 cars and donated to 2 institutions less than those donated by the businessman from Canada in the last year.
10. The Brazilian businessman is staying two rooms ahead of the English businessman who is staying two rooms ahead of the Canadian businessman.

80. In which room is Brazilians businessman staying?
a. Room no. 102 b. Room no. 103 c. Room no. 104 d. Room no. 105

81. What is the number of institutions to which the Argentinean businessman donated in the last year?
a. 8 b. 3 c. 18 d. 24

82. The businessman of which country is staying in Room no. 106?
a. Argentina b. Canada c. Uruguay d. Germany

83. The businessman of which country has donated to 24 institutions in the last year?
a. Argentina b. Uruguay c. Canada d. Germany

84. The businessman of which country owns the highest number of cars?
a. Argentina b. Uruguay c. Germany d. Brazil

85. How many cars are owned by the English businessman?
a. 8 b. 12 c. 4 d. 20

Direction for questions 86 to 89: Study the information given below and answer the questions.
A word arrangement machine, when given a particular input, rearranges it using a particular rule. The following is the illustration and the steps of the arrangement.

INPUT :	lemon	apple	choco	college	girl	dreams	rooms	book	calf
STEP 1:	choco	apple	lemon	college	girl	dream	calf	book	room
STEP 2 :	lemon	apple	choco	dream	girl	college	room	book	calf
STEP 3 :	calf	lemon	apple	book	choco	college	room	girl	dream
STEP 4 :	apple	calf	lemon	book	choco	college	dream	room	girl
STEP 5 :	lemon	calf	apple	college	choco	book	girl	room	dream
STEP 6 :	dream	lemon	calf	room	apple	book	girl	choco	college

86. Which will not be Step 10 for the given input

a. Calf lemon dream room apple book college choco girl
b. apple calf lemon book choco college dream room girl
c. lemon college dream choco calf room book girl apple
d. dream college lemon room calf choco apple girl book

87. Indicate all the step numbers for which the following will not be an output

dream lemon calf book apple room girl choco college

a. Step 7 b. Step 8 c. Step 9 d. Step 12

88. Mark all the arrangements that do not fall between step numbers 11 and 15

a. choco book dream calf college lemon apple girl room
b. book dream college girl lemon calf apple room choco
c. book dream college room lemon girl apple calf choco
d. college dream book girl lemon calf choco room apple

89. Mark two arrangement which will fall as consecutive steps at any time.

a. calf lemon dream room apple book college choco girl
b. choco book dream calf college lemon apple girl room
c. book dream college girl lemon room apple calf choco
d. college dream book girl lemon room choco calf apple

Direction for Question 90: Read the information given below and answer the question.
A school in Bhopal decided to stage a historical drama, involving a battle between two ancient kingdoms. As a part of the battle, four students, namely - Aslam, Bimal, Chris and Dilip dressed as soldiers, marched through the stage at one point. When the make-up man dressed these four students, he put a helmet on each one's head, without any one realizing the colour of their respective helmets. The make-up man selected the helmets for these four students from 3 gold-plated helmets, 2 silverplated helmets and one copper-plated helmet at the make-up room. Now, when Aslam, Bimal, Chris and Dilip marched in that order, Aslam being the first person in the queue could not see the helmet on the heads of the other three. Bimal saw the colour of helmet on Aslam's head; Chris saw the same on Aslam's head and Bimal's head and Dilip saw the helmets on the heads of all others. After the drama, a classmate of them asked whether they were aware of the colour of the helmet on their own head, starting from Dilip. No one could answer the question.

90. Mark all the incorrect statements
    a. Dilip did not observe the helmets on the heads of the other three actors, two of which were silver-plated and one copper-plated.
    b. Bimal did not observe Aslam wearing either silver-plated or copper-plated helmet.
    c. Chris did not observe the helmets worn by Aslam and Bimal, one of which could be silver-plated and the other copper-plated or both could be silverplated helmets.
    d. None of the above.

Direction for Question 91: Read the information given below and answer the question.
My father had given Rs. 50 lakh worth of property to me in his will but with a strange condition. To own the property, I need to spend Rs. 2,000 on a commodity bundle which consists of 5 products. Every unit of product 1 costs Rs. 115, of product 2 costs Rs. 90, of product 3 costs Rs. 70, of product 4 costs Rs. 40 and product 5 cost Rs. 45. For every unit of product 4 that I purchase, I must also buy only two units of product 2. For every unit of product 1, I must buy one unit of product 3. For every unit of product 5, I must also buy two units of product 4 and one unit of product 2. For every unit of any product purchased, I earn 1000 points and for every rupee not spent, I face a penalty of 500 points. I will get the property only if my points are positive, otherwise the money in the will goes to charity.

91. Mark all the correct statements.
    a. I can claim the property with current conditions.
    b. I can claim the property if every unit of product 3 costs Rs. 60, other prices remaining unchanged.
    c. I can claim the property if unit price of product 4 increases by Rs. 5, other prices remaining unchanged.
    d. I can claim the property if unit price of product 4 decreases by Rs. 5, other prices remaining unchanged.

Section IV (Part ii)

Direction for Questions 92 - 96: Questions are based on the table below. Unless otherwise stated, all changes (increases, decreases) indicated in the questions must be calculated over the immediately preceding year.

Sector / Companies	Sales			Salaries & wages			R & D			Profit / Loss		
	2001	2002	2003	2001	2002	2003	2001	2002	2003	2001	2002	2003
Textile (Total)	**53145**	**50184**	**52616**	**4296**	**4360**	**4315**	**26**	**36**	**39**	– 3770	– 3437	– 2441
Indo Rama Synthetics Ltd.	2000	1953	2224	48	50	33	0	0	0	19	41	138
Arvind Mills Ltd.	1970	740	1552	136	46	102	0	0	0	– 499	20	129
Raymond Ltd.	1477	992	1035	160	167	168	0	0	1	332	88	90
Century Enka Ltd.	960	892	946	32	34	35	0	0	1	70	35	58
Pharmaceuticals (Total)	**25245**	**30273**	**34731**	**2009**	**2291**	**2716**	**538**	**820**	**993**	**1758**	**2586**	**3069**
Ranbaxy Laboratories Ltd.	2363	3461	4243	167	197	255	77	192	276	262	478	795
Dr. Reddy's Laboratories Ltd	991	1712	1705	83	121	137	42	102	163	144	460	392
Cipla Ltd.	1064	1401	1573	50	63	73	41	47	0	179	208	248
Glaxosmithkline Ltd.	1143	1197	1242	139	139	139	4	4	4	49	98	172
Electronics (Total)	**26944**	**29323**	**30022**	**2164**	**2218**	**2323**	**200**	**263**	**247**	**830**	**692**	**– 287**
Wipro Ltd.	3137	3487	4048	422	508	642	0	15	28	657	866	813
Infosys Technologies Ltd.	1901	2604	3623	718	1119	1678	17	15	14	629	808	958
Videocon International Ltd.	3244	4974	3602	43	63	53	0	0	0	155	156	– 100
Bharat Electronics Ltd.	1722	1947	2517	394	364	368	89	90	109	155	200	261
Iron and Steel (Total)	**54396**	**55582**	**70341**	**5367**	**5643**	**6377**	**73**	**64**	**74**	**– 2983**	**– 4604**	**310**
Steel Authority of India Ltd.	17320	16624	20665	3135	3255	3728	52	50	55	– 729	– 1707	– 304
Tata Steel Ltd.	8491	8277	10517	922	1098	1218	10	8	16	553	205	1012
Rashtriya Ispat Nigam Ltd.	3585	4200	5185	408	375	406	0	3	0	– 291	– 75	521
Ispat Industries Ltd.	3217	2812	4658	45	40	55	9	0	0	– 312	– 443	83

92. Mark all the correct statements

a. Wipro's share in total sales of the electronics sector was lower than the share of Tata Steel in total sales of the iron & steel sector in each given year.

b. From the group consisting of the textiles and the iron & steel sector, there were 5 companies whose salaries & wages as percent of total salaries & wages as percent of total salaries and wages of their respective sectors increased in 2003 as compared to 2001.

c. Tata Steel's R & D expenditure in each given year as percent of sales was lower than that of the iron and steel sector as a whole.

d. From the group consisting of the pharmaceuticals and the electronics sectors, there were 5 companies which experienced a decline in the growth rate of sales in 2003.

93. Mark all the correct statements
   a. Total salaries & wages over 2001-2003 as percent of total sales of the same period had been the highest for the iron & steel sector.
   b. In the year 2003, if all the companies were ranked in descending order in terms of salaries & wages as percent of sales, Videocon International would have been ranked the lowest.
   c. In the year 2002, if all companies were ranked in descending order in terms of R & D as percent of sales, Bharat Electronics Limited would have been ranked third.
   d. Of all companies that made profits in each year during 2001-2003, wipro registered the highest growth in profits for the period.

94. Mark all the incorrect statements
   a. Salaries & wages of each company in the iron & steel sector were up to 13 times its losses reported in each of the loss-marking years.
   b. Total salaries & wages over 2001-2003 as percent of total sales of the same period for the pharmaceuticals sector had been the minimum.
   c. Total salaries & wages over 2001-2003 as percent of total sales of the same period for only two companies exceeded 20 percent.
   d. Total profits / Total Sales for all the four sectors taken together was higher in 2002 than in 2001.

95. Mark all the correct statements
   a. Tata Steel experienced the highest percent decline in R & D expenditure in any single year during the given period.
   b. Of all companies which incurred R & D expenditure every year during 2001-2003, total R & D expenditure / total sales was the highest for Dr. Reddy's Laboratories Ltd.
   c. During 2001-2003, in terms of sales growth, the best performer in the pharmaceuticals sector fared better than the best performer in the iron & steel sector.
   d. Videocon International Ltd experienced the second largest percent decline in salaries & wages in any single year during the given period.

96. Mark all the situations described in the options below, which when plotted, closely resemble the figure

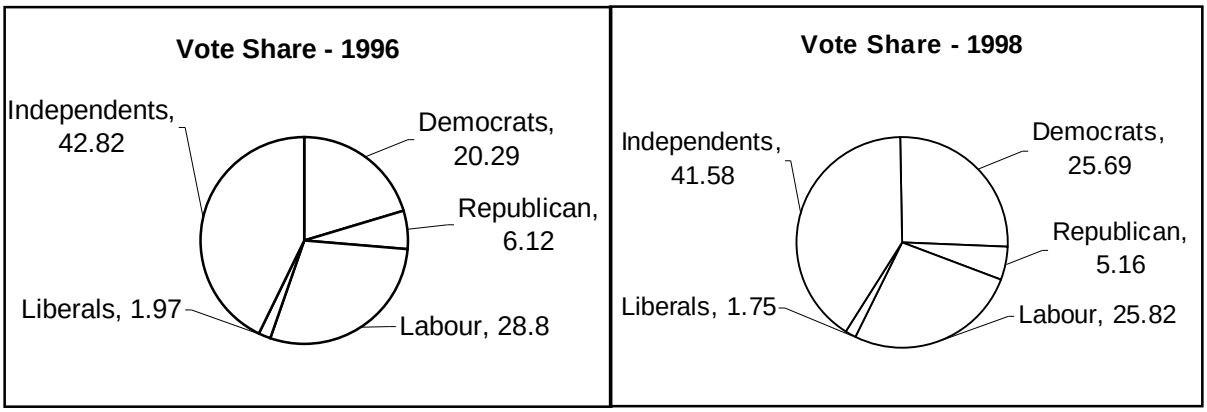
   a. Raymond Limited's share in the total sales of the textiles sector.
   b. Tata Steel's share in the total sales of the iron & steel sector.
   c. Glaxosmithkline Ltd's salaries & wages as percent of sales.
   d. Rymond Limited's profit as percent of sales.

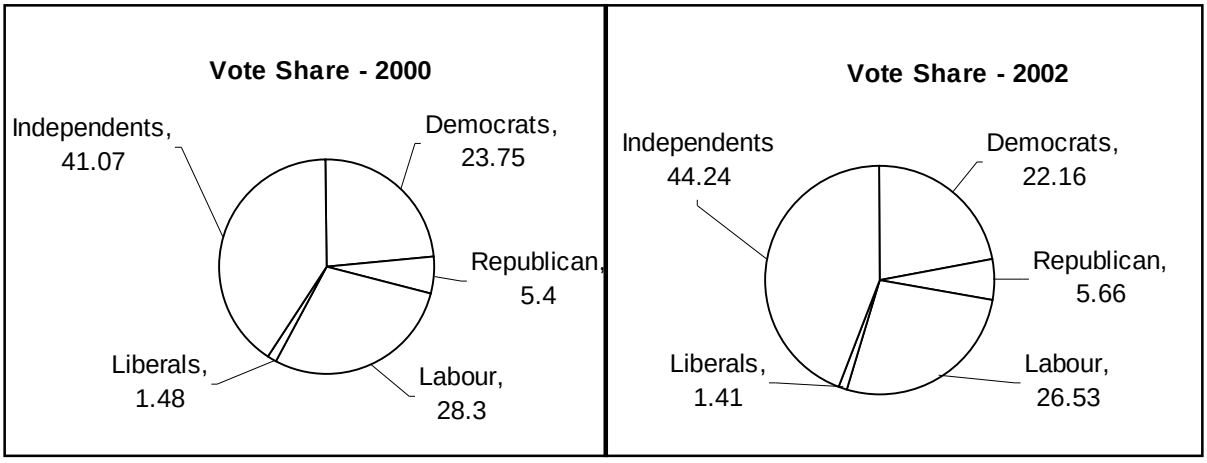
Direction for Question 97 - 100: The graphs below give vote share and distribution of seats of different parties in election years during the period 1996-2002. Study the graphs and answer the questions, taking into account the following:

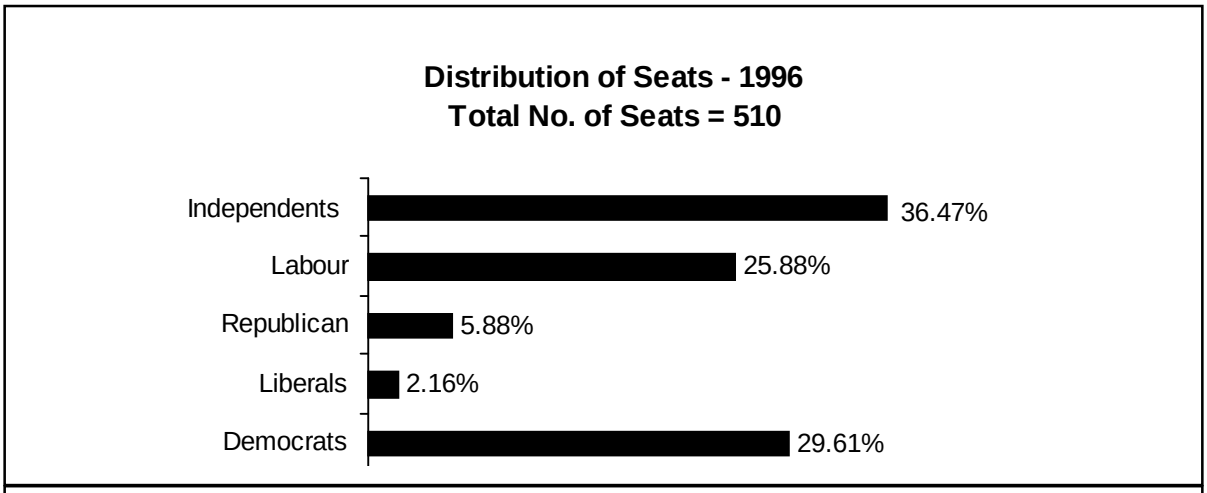
i. Independents may be considered as a separate party

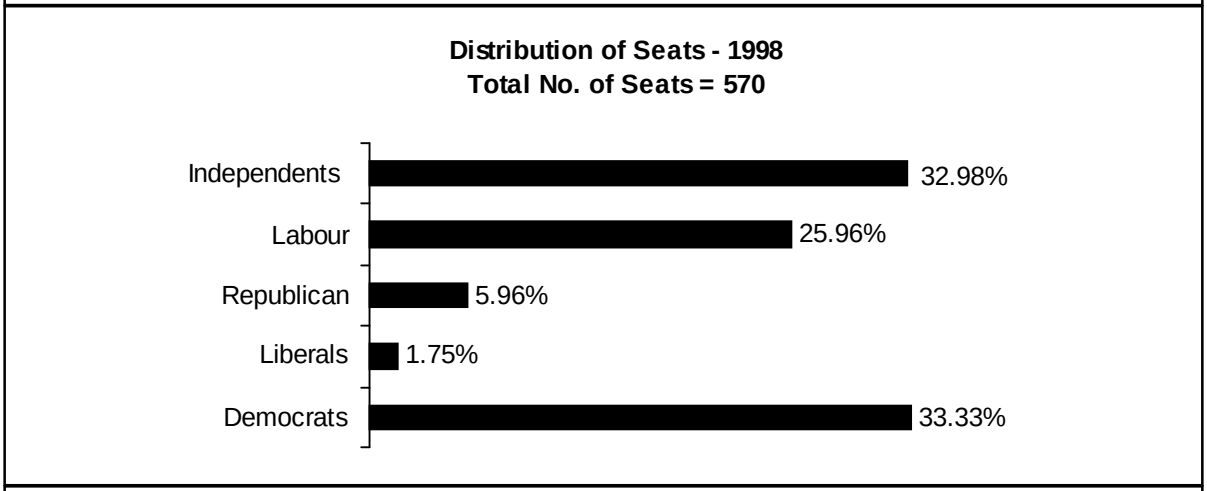
ii. Unless otherwise stated, all changes, jumps, gains or losses should be calculated over the immediately preceding election year

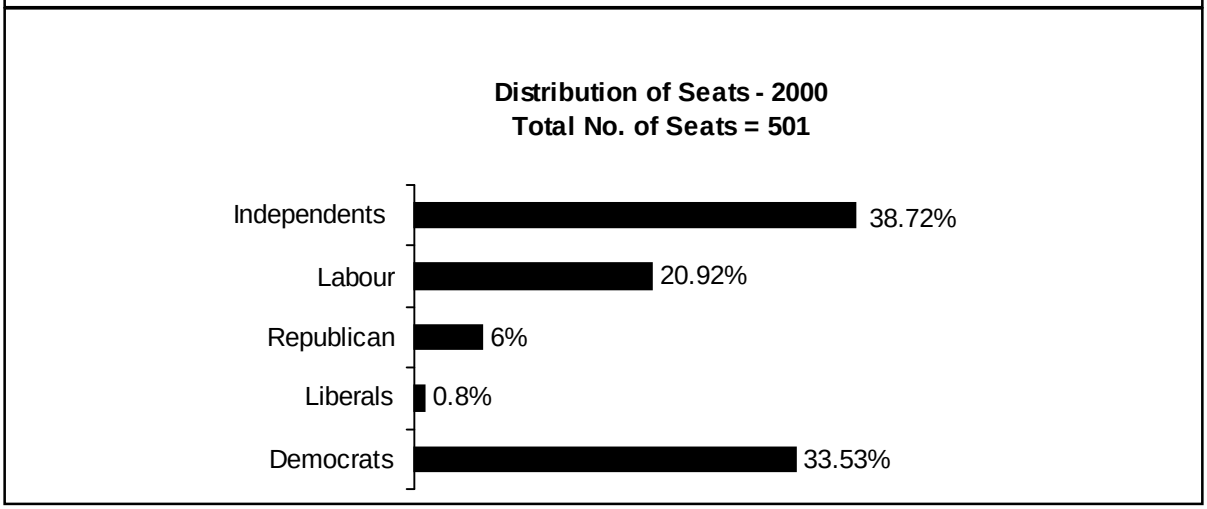
iii. For forming government, the party / alliance should obtain majority seats (more than 50%)

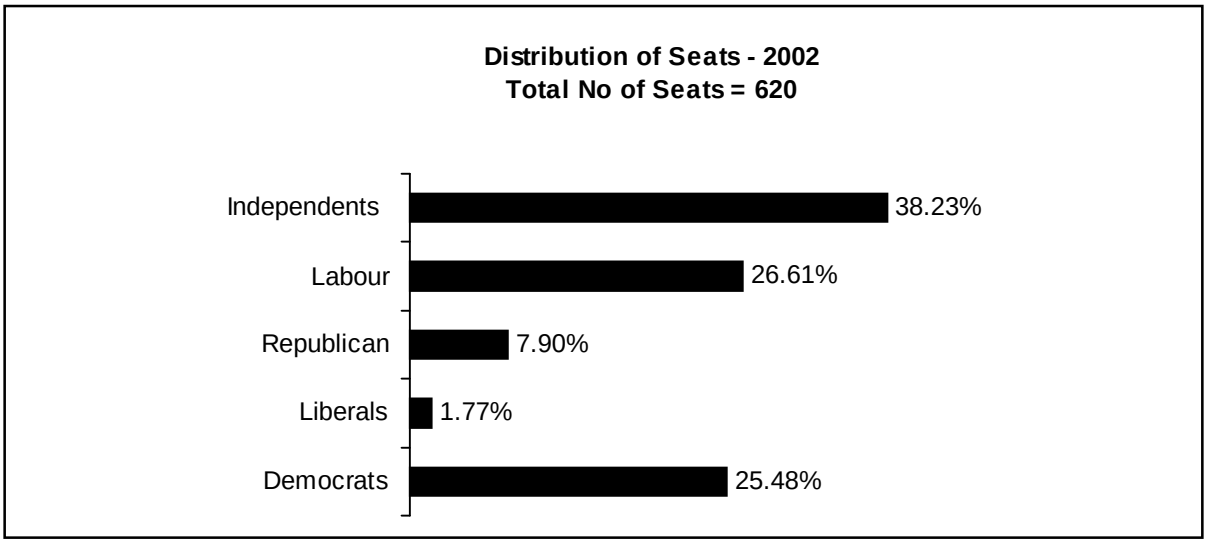





Distribution of Seats - 1996
Total No. of Seats = 510
Independents
36.47%
Labour
25.88%
Republican
5.88%
Liberals
2.16%
Democrats
29.61%


Distribution of Seats - 1998
Total No. of Seats = 570
Independents
32.98%
Labour
25.96%
Republican
5.96%
Liberals
1.75%
Democrats
33.33%


Distribution of Seats - 2000
Total No. of Seats = 501
Independents
38.72%
Labour
20.92%
Republican
6%
Liberals
0.8%
Democrats
33.53%



97. Mark all the correct statements

A. Democrats and Labour together improved their vote share by a larger margin in 1998 over 1996 as compared to the one in 2002 over 1996.

B. The number of seats lost by Democrats in 2002 elections was less than the number of seats gained by Republicans in the same year.

C. In 2002, the Independents gained the most both in terms of vote share and number of seats obtained.

D. If 70% of Independents had joined Labour, they could have formed government in 2002 but not in 1996.

98. Mark all the incorrect statements

A. In 2002, the percent increase in the number of seats of Liberals and Labour together over 1998 was more than 5 time increase in the vote share obtained by these parties during the same period.

B. In the 2000 elections, in terms of vote share, Labour was the major beneficiary of Democrat's loss.

C. In terms of vote share, it was in the 2000 elections that most number of parties faced a decline in their individual vote shares.

D. The highest jump in the percentage of seats obtained by any party in any election year over the immediately preceding election year has been smaller than the highest jump in the vote share of any party in any election year.

99. Mark all the correct statements

A. In terms of vote share, Labour and Liberal parties taken together lost 3.2 percent in 1998 but gained a total of 16 seats in the same period.

B. Democrats, Republicans and 35% of the Independents could have formed the government in two election years.

C. No. party increased its vote share in every succeeding election.

D. In the 2000 elections, as compared to the 1996 elections, Republicans and Democrats taken together, gained more in terms of vote share than in terms of percentage of seats.

100. Mark all the incorrect statements

A. In the year 2002, in terms of percentage of seats obtained, Democrats and Labour together lost the maximum.

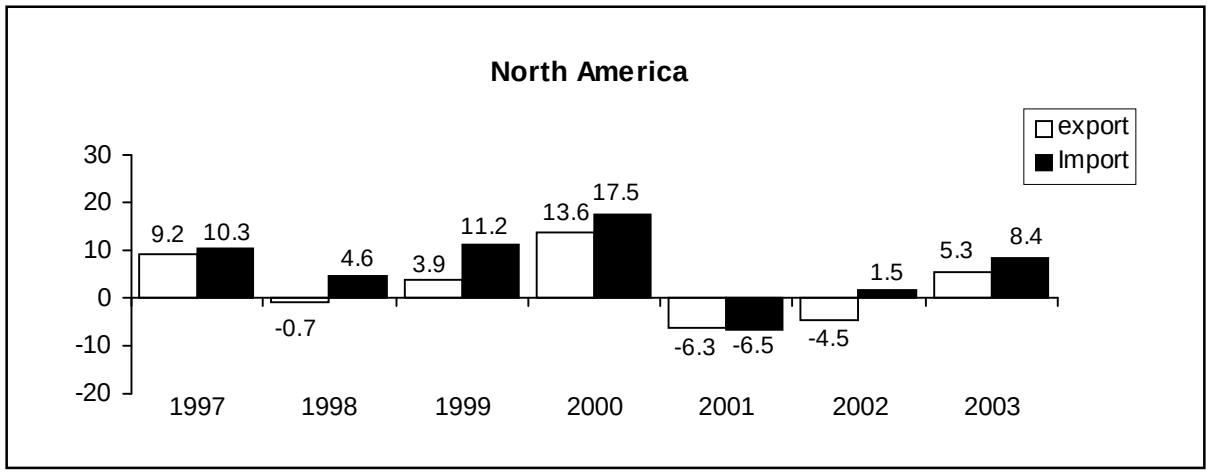
B. Liberals and Republicans taken together lost both in terms of vote share and the number of seats obtained in the year 2000.

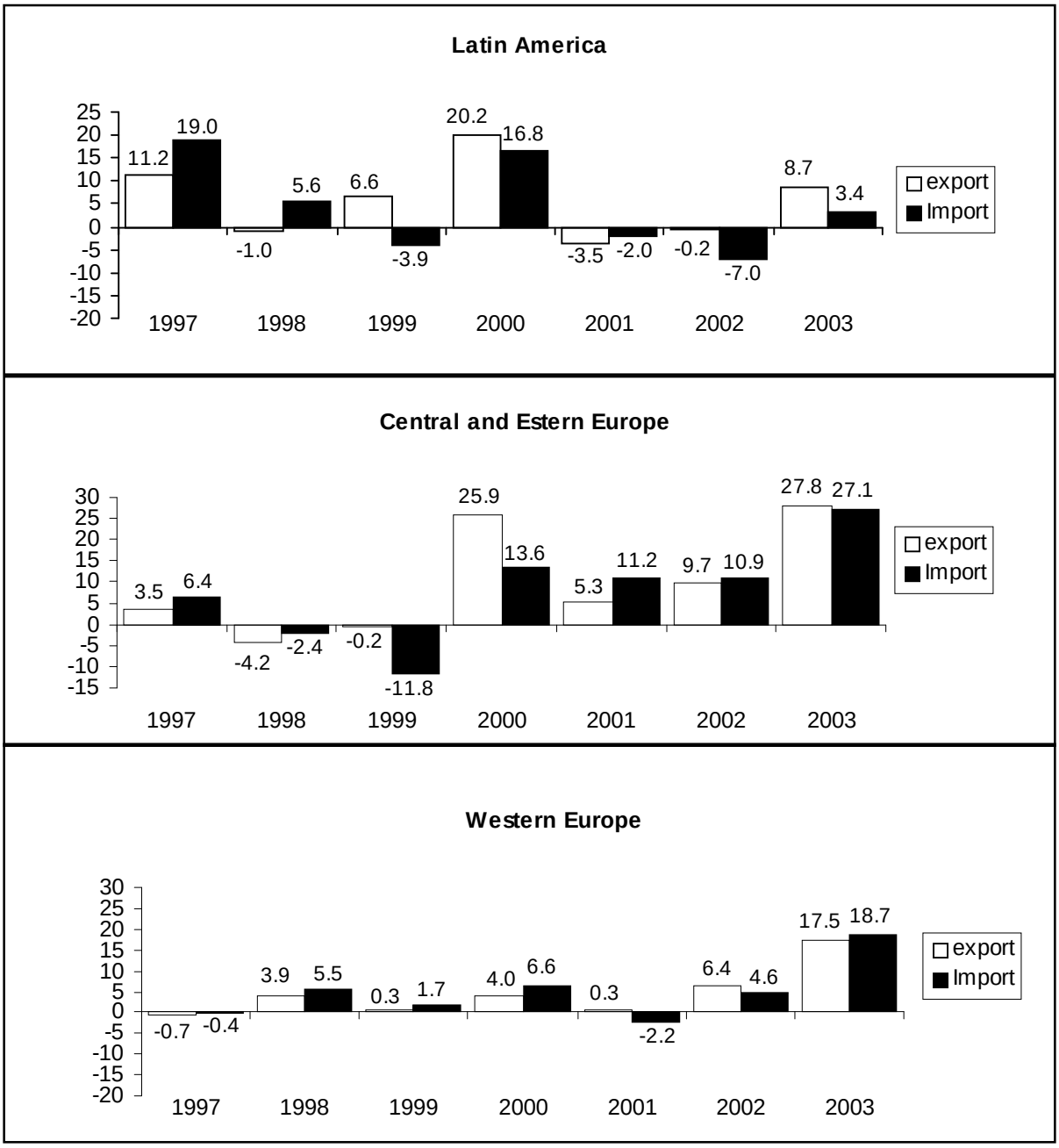
C. In the 2000 elections, all parties lost in terms of number of seats.

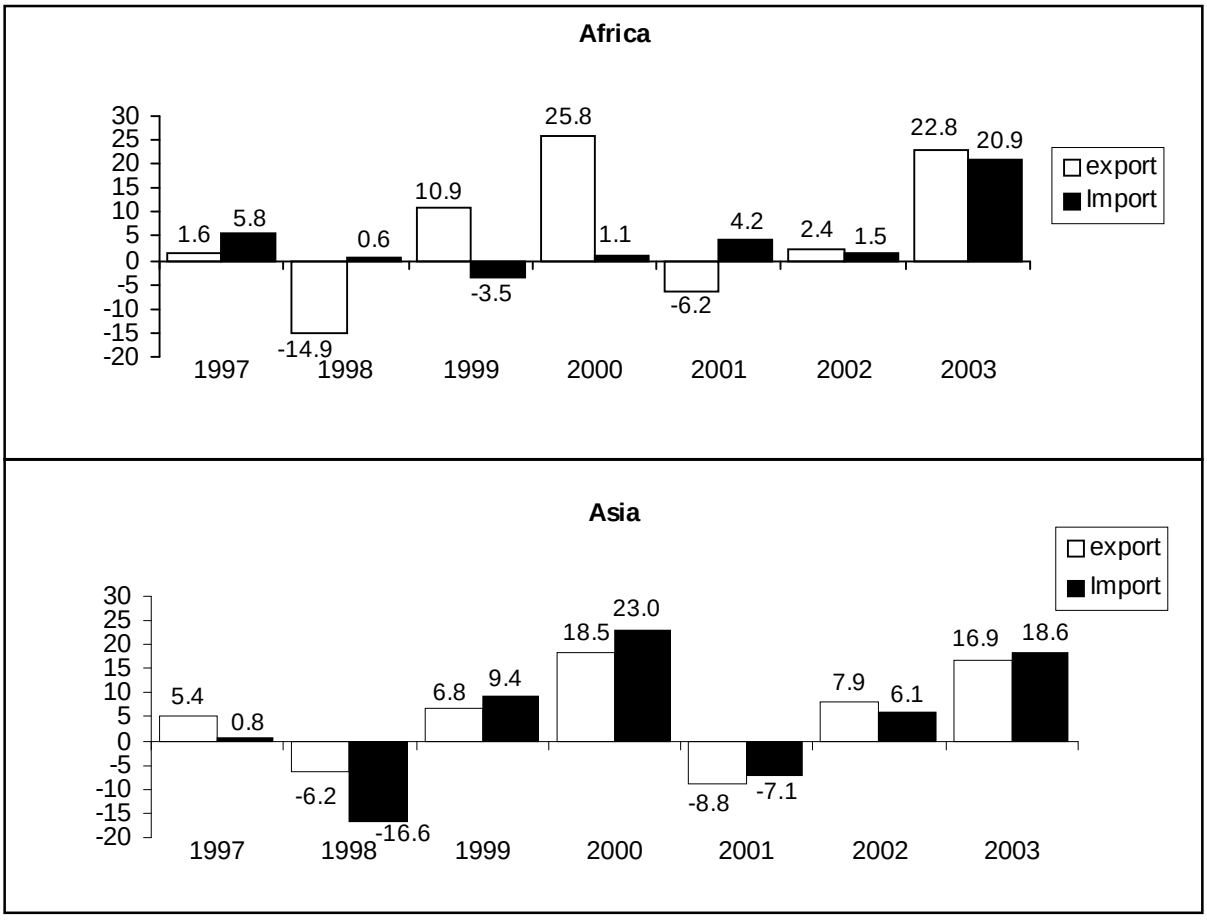
D. The highest gain in the number of seats for Labour was in the year 2002.

Directions for questions no. 101 and 102: The graphs below relate to export and import rates for dix regions for the peirod 1997-2003. Study the graphs and answer the questions.

Annual percentage change in world merchandisc trade by region, 1996-03 Exports and Imports.




Latin America
25
20
15
10
5
0
-5
-10
-15
-20
11.2
19.0
-1.0
5.6
6.6
-3.9
20.2
16.8
-3.5
-2.0
-0.2
-7.0
8.7
3.4
1997
1998
1999
2000
2001
2002
2003
export
Import
Central and Estern Europe
30
25
20
15
10
5
0
-5
-10
-15
3.5
6.4
-4.2
-2.4
-0.2
-11.8
25.9
13.6
5.3
11.2
9.7
10.9
27.8
27.1
1997
1998
1999
2000
2001
2002
2003
export
Import
Western Europe
30
25
20
15
10
5
0
-5
-10
-15
-20
-0.7
-0.4
3.9
5.5
0.3
1.7
4.0
6.6
0.3
-2.2
6.4
4.6
17.5
18.7
1997
1998
1999
2000
2001
2002
2003
export
Import



101. Mark all the correct statements

a. In 1999, if the regions were ranked in descending order based on the gap between the annual percentage change in exports and imports, Central and Eastern Europe would be ranked second.

b. The unweighted average annual percentage change in exports of the six regions was the highest during 2003.

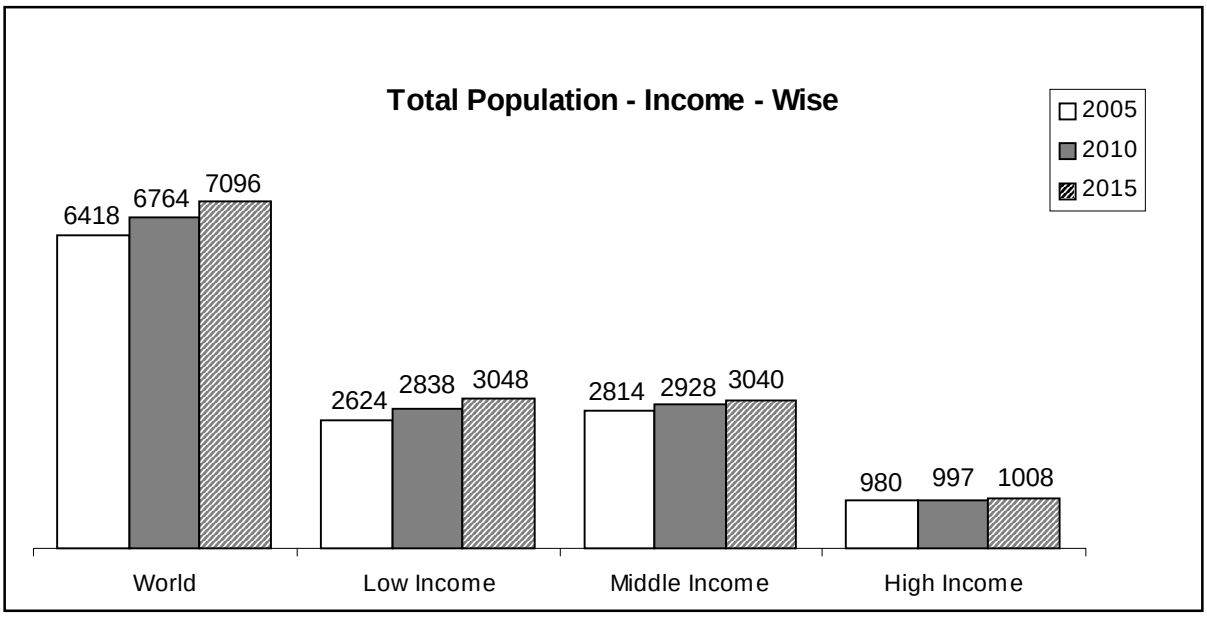
c. In 2001, if the regions were ranked in ascending order based on the gap between the annual percentage change in exports and imports, Asia would be ranked second.

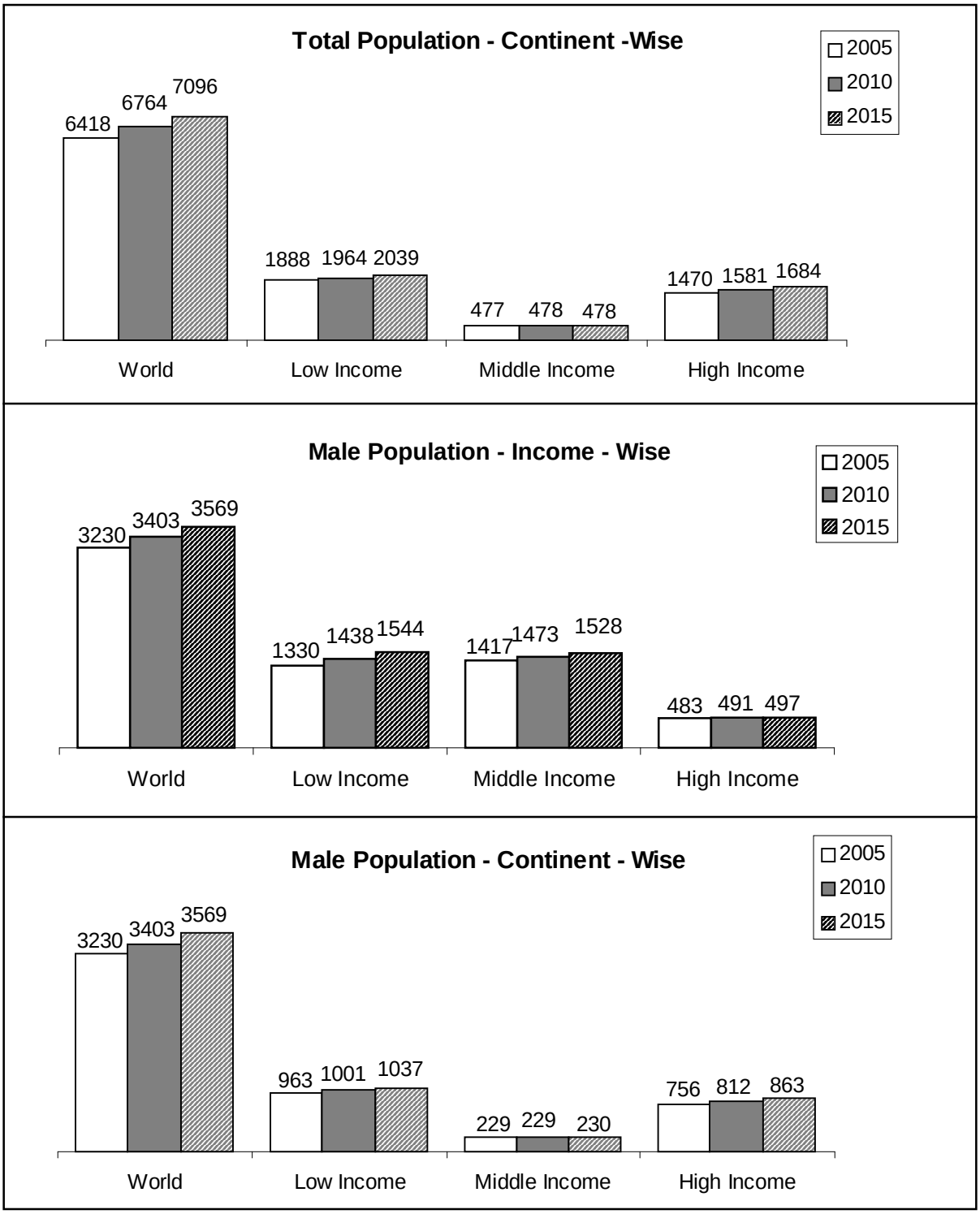
d. The unweighted average annual percentage change in imports of the six regions was the lowest during 1998.

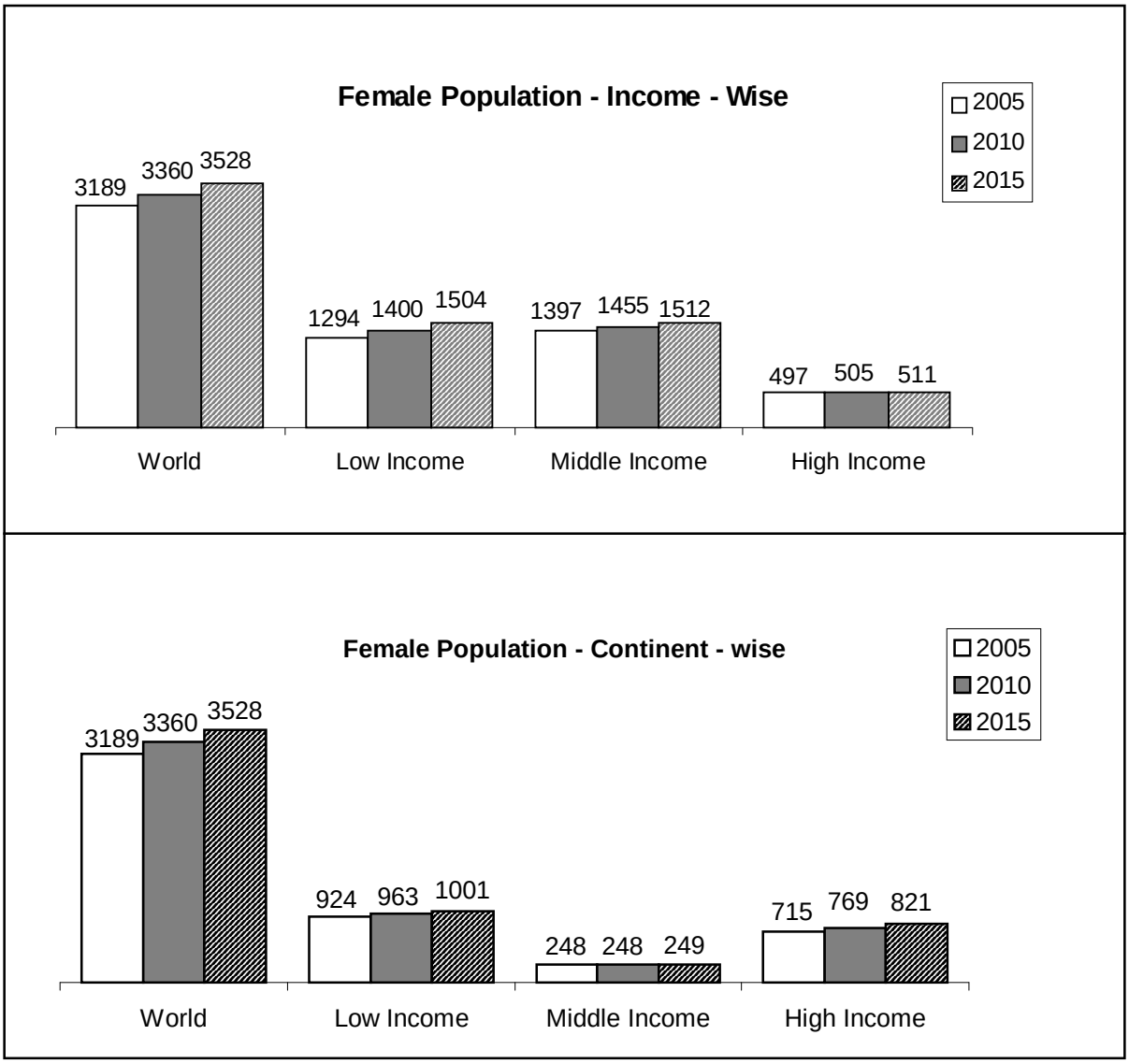
102. Mark all the correct statements

a. During 2000-2003, North American region experienced the highest average annual percentage change in exports as compared to other regions.
b. During 1997-2000, Western European region experienced the lowest average annual percentage change in imports as compared to other regions.
c. Central and Eastern European region experienced the highest jump in percentage change in exports in any year during the sample period.
d. Asian region experienced the largest slump in imports in any single year during the sample period.

Directions for Questions no. 103 to 106: Study the graph below and answer the questions.




Total Population - Continent -Wise
2005
2010
2015
6418
6764
7096
1888
1964
2039
477
478
478
1470
1581
1684
World
Low Income
Middle Income
High Income
Male Population - Income - Wise
2005
2010
2015
3230
3403
3569
1330
1438
1544
1417
1473
1528
483
491
497
World
Low Income
Middle Income
High Income
Male Population - Continent - Wise
2005
2010
2015
3230
3403
3569
963
1001
1037
229
229
230
756
812
863
World
Low Income
Middle Income
High Income



103. Mark <u>all</u> correct statements

a. The growth rate of female population in the world during the period 2005-2010 is expected to be greater than the growth rate in male population in the world during 2010-2015.
b. The growth rate of total population in high income countries during 2005-2010 is expected to be greater than the growth rate of male population in East Asia and Pacafic during 2010-2015.
c. During 2005-2010, the growth rate of male population in low income countries is expected to be lower than the growth rate of female population in low income countries.
d. The growth rate of total world population during 2005-2010 and 2010-2015 is expected to greater than 5 percent.

104. Mark all incorrect statements

a. The share of high income countries in total world population in 2005 is expected to be not lower than the share of high income countries in total female population during 2005.
b. The share of Europe and Central Asia in the total male population in all three periods given is likely to be greater than seven percent.
c. The share of middle income countries in total female population in 2015 is not expected to be lower than the share of low income countries in total world population in 2010.
d. The share of South Asia in total female population in 2015 is not expected to be lower than the share of South Asia in total world population in 2010.

105. Mark all the correct statements

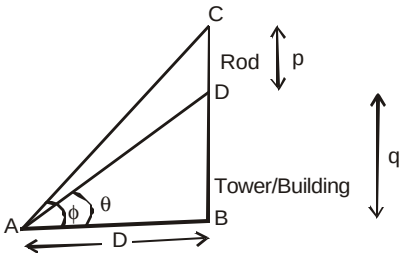
a. The share of high income countries in total female population is expected to be larger than the share of these countries in total male population in each year.
b. Population in high income countries is expected to grow at a faster rate than total world population between 2010- and 2015.
c. The share of South Asia's female population in total world population is expected to grow at a higher rate at which the region's female population in total female population will between 2005 and 2015.
d. The growth rate in population of middle income countries is expected to be higher during 2010-2015 as compared to that during 2005-2010, while that of the high income countries is expected to be lower taking the periods into account.

106. Mark all the incorrect statements

a. The share of South Asia in total world population is expected to rise by a larger margin than the share of low income countries in total world population between 2005 and 2015.
b. The share of high income countries in total population is expected to be larger than the share of high income countries in total world population in both 2010 and 2015.
c. The average annual growth rate of female population in the East Asia & Pacafic region between 2010 and 2015 is expected to be higher than the average annual growth rate of female population in South Asia during the same period.
d. As compared to female population, male population in Europe & Central Asia in expected to grow at a higher rate at a higher between 2005 and 2015.

IIFT-2006 (Quant solutions)

1. (A,D)



$\frac{p+q}{D}=\tan\phi$ and $\frac{q}{D}=\tan\theta$

$\Rightarrow \frac{p}{q}+1=\frac{\tan\phi}{\tan\theta}$

$\Rightarrow \frac{p}{q}=\frac{\tan\phi-\tan\theta}{\tan\theta}$

Height of tower is $q=\frac{p\tan\theta}{\tan\phi-\tan\theta}$ and

height of rod is $p=q\frac{(\tan\phi-\tan\theta)}{\tan\theta}$

So, (A) and (D) are the only correct options.

2. (A,C) Let roots are α and β ,then

$\alpha+\beta=\frac{-q}{p}$ and $\alpha\times\beta=\frac{r}{p}$

$\frac{1}{\alpha^2}+\frac{1}{\beta^2}=\frac{\alpha^2+\beta^2}{(\alpha\beta)^2}=\frac{(\alpha+\beta)^2-2(\alpha\beta)}{(\alpha\beta)^2}$

$=\frac{\left(\frac{-q}{p}\right)^2-2\left(\frac{r}{p}\right)}{\left(\frac{r}{p}\right)^2}$ Aspergiven,

$\frac{-q}{p}=\frac{\left(\frac{-q}{p}\right)^2-2\left(\frac{r}{p}\right)}{\left(\frac{r}{p}\right)^2}$

or $2p^2r=pq^2+qr^2$

$\frac{2p^2r}{pqr}=\frac{p.q^2}{pqr}+\frac{qr^2}{pqr}$ (divide by pqr)

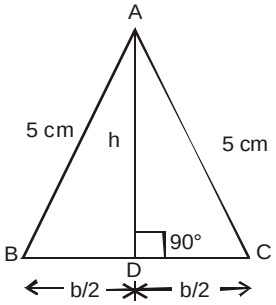
$\Rightarrow \frac{2p}{q}=\frac{q}{r}+\frac{r}{p}$

(A) clearly $\frac{r}{p},\frac{p}{q}$ and $\frac{q}{r}$ are in A.P. (A) is correct

(B) As $\frac{q^2}{p^2}\neq\left(\frac{p}{r}\right)\times\left(\frac{r}{q}\right)=\frac{p}{q}$. (B) is incorrect.

(C) As $\frac{r}{p},\frac{p}{q}$ and $\frac{q}{r}$ are in A.P., their reciprocals are in H.P.
(D) is wrong as these terms as in H.P., not in A.P.
Hence A and C are correct.

3. (B,C)



$\text{Area}(\Delta ABC)=\frac{1}{2}\times b\times h=12\,\text{sq.cm}$

$\Rightarrow b\times h=24$ …(1)
Also, in right triangle ΔABD,

$\Rightarrow (5)^2=\left(\frac{b}{2}\right)^2+h^2$

or $b^2+4h^2=100$ …(2)

$\Rightarrow b^2+\left(\frac{48}{b}\right)^2=100$ …(3)

b = 6 and 8 are the roots of the above equation.
Hence, B and C are correct.

4.(B, D) Initial mixture = 40 kg
Sand (S): Cement (C) ratio is 1 : 4

$\Rightarrow$ S by weight $=\frac{1}{5}\times 40=8\text{kg}$

and C by weight $=\frac{4}{5}\times 40=32\text{kg}$

Let he mixes x kg of sand to the 40 kg mixture,

$\frac{8+x}{40+x}=\frac{3}{7}\Rightarrow x=16\text{kg}$

$\Rightarrow$ he mixed 16 kg of sand to the 40 kg mixture.
Option (A): Weight of second mixture = 40 + 16

= 56 kg which is $\frac{56}{40}=1.4$ times heavier and not 1.5 times. Hence (A) is incorrect.
Option (B): Correct. x = 16 kg, as solved above.
Option (C): If the original mixture was in 8 : 3 ratio, the weight of sand would have been

$$\frac{3}{8+3}\times 40 = 10.9\,kg \neq 12kg$$

Hence, (C) is incorrect.

Option (D): The mixture weighs 56 kg. After selling 7 kg of it, he is left with 49 kg of the mixture. In 11 kg of new mixture (7 : 4 ratio)

Sand is $\frac{4}{7+4}\times 11 = 4kg$

and Cement is $\frac{7}{7+4}\times 11 = 7kg$

In the final mixture

Cement = $\frac{4}{7}\times(49)+7$

= 28 + 7 = 35 kg

Sand $\frac{3}{7}\times(49)+4 = 25kg$

Cement : Sand ratio = $\frac{35}{25}=\frac{7}{5}$

Hence (D) is correct.
In all B and D options are correct.

5.(A,C,D) The correct option will have exactly one country assigned (or matched) to a single year of the four given.Total no. of ways of randomly answering (randomly matching) the question is given by:-
= 4 × 3 × 2 × 1 = 24 ways.
Option (D):
P (X = 4) = P(All four matches are correct)

= P(Answer is marked correctly) $=\frac{1}{24}$

Hence, (D) is correct)
Option (C): P(X = 3) = P(Exactly three matches are correct & fourth is not correct)
If 3 countries are matched, correctly, fourth must be correct as well.
So P(X = 3) event will never occur.
Hence P(X = 3) = 0 is also correct.
Option (B): P(X = 1)
Let's assume, the match given in the question is the correct match. We have to count, all the possible ways of matches where exactly one is correct and the rest three are wrong.

Lets say, Italy $\rightarrow$ 82 is a correct match.For a wrong match,WG can be 90 or 98& F $\rightarrow$ 98or66 and E $\rightarrow$ 90or66
Case 1:- When F is 98; only one way of assignment is (E $\rightarrow$ 6 6 & W G $\rightarrow$ 90) .
Case 2:- When F is assigned 66; only one way of assignment is (E $\rightarrow$ 9 0 & W G $\rightarrow$ 98)
So; if the only correct match is that of Italy, there are exactly two ways of marking the other countries, wrongly.

$$\Rightarrow P(X=1)=\frac{4\times(2)}{24}=\frac{8}{24}=\frac{1}{3}.$$

$\Rightarrow$ $P(X = 1)=\frac{1}{3}$. Hence option (B) is wrong.

Option (A): $P(X \geq 1)$
= P(X = 1) + P(X = 2) + P(X = 3) + P(X = 4)
P(X = 2) going as in option (B)

$$P(X=2)=\frac{({}^4C_2\times 1)}{24}=\frac{6}{24}=\frac{1}{4}$$

$$\Rightarrow P(X\geq 1)=\frac{1}{3}+\frac{1}{4}+0+\frac{1}{24}=\frac{15}{24}.$$

$P(X \geq 1) = \frac{5}{8} \Rightarrow$ Option(A) is correct.

In all options (A), (C) & (D) are correct.

6. (A,B,C,D) Joshi's Total cost price = 20,000 + 8,000 + 2,000
= Rs. 30,000/-
Joshi's selling price = Wadhwa's cost price

$$=30,000\left(1+\frac{20}{100}\right)=\text{Rs. } 36,000/-$$

And then Wadhwa sells it back to Joshi.
Option A:-Wadhwa lost Rs. 7200/- when selling the shop, back to Joshi
$\Rightarrow$ Wadhwa's selling price = 36000 – 7200
= Rs. 28800/-

$\Rightarrow$ Wadhwa's loss $=\frac{28800-36000}{36000}$

= 20% exactly

$\Rightarrow$ Option (A) is correct.
Option B:- Joshi's new total cost price
= 14000 + 8000 + 4000 = Rs. 24000/-
Joshis selling price is still the same = 36000

$\Rightarrow$ Joshi's profit $=\frac{36}{24}=1.5 \Rightarrow$ Profit is 50%

Option (B) is correct.
Option C:- At a profit of 40% on his total cost price of Rs. 36000, Joshi's monetary gain is:-

$= 30000 \times \frac{40}{100}$ = Rs. 12000/-

Hence, Option (C) is correct.

Option D:- If Joshi sold to Wadhwa at 40% profit then Wadhwa's cost price = 42,000/-

Wadhwa sells it back to Joshi at a loss of 40%

i.e. at a price of $= 42000 \times \left(1 - \frac{40}{100}\right)$ = 25,200.

As, Joshi had made a monetary gain of Rs. 12,000 in selling the same shop to Wadhwa earlier, his net investment in taking the shop back is:-

(Rs. 25200 – Rs.12,000) = Rs. 13,200/-

$\Rightarrow$ Option (D) is correct.

$\Rightarrow$ All the 4 options are correct.

7. (A,B,C,) $\frac{\log x}{b-c} = \frac{\log y}{c-a} = \frac{\log z}{a-b} = K$, say. Let B is base.

Then $\log_B x = K(b-c) \Rightarrow x = B^{K(b-c)}$ and

$y = B^{K(c-a)}$ and $z = C^{K(a-b)}$.

Adding, we get

$\log_B x + \log_B y + \log_B z$

$= \{K(b-c) + K(c-a) + K(a-b)\} = 0$

or $\log_B(xyz) = 0 \Rightarrow (xyz) = B^{(0)} = 1$

$\Rightarrow$ xyz = 1

Option (A): xyz = 1, is correct.

Option (B): $x^a.y^b.z^c$

$= \left[B^{K(b-c)}\right]^a \times \left[B^{K(c-a)}\right]^b \times \left[B^{K(a-b)}\right]^c$

$= B^{K[a(b-c)+b(c-a)+c(a-b)]}$

$= B^{K(0)} = B^0 = 1$

Option (B) is correct.

Option (C): $x^{b+c}.y^{c+a}.z^{a+b}$

$\left[B^{k(b+c)(b-c)}\right] \times \left[B^{k(c+a)(c-a)}\right] \times \left[B^{k(a+b)(a-b)}\right]$

$= B^{K\left[(b^2-c^2)+(c^2-a^2)+(a^2-b^2)\right]}$

$= B^0 = 1$

Option (C) is correct.

Option (D): is wrong as the expression evaluates to 1 as in (C) and not zero.

In all, options (A), (B) and (C) are correct.

8.(A,B,C) In the pot there are x tickets of Knife Throwing game and y tickets of Talking Dolls game. Starting from Ajay, one ticket out of a total of (x + y) is drawn. If the ticket is one of the x tickets for the Knife Throwing game, the drawing of tickets is stopped. If a Talking Dolls ticket is drawn, it is put back in the pot.

Probability of Ajay, first drawing the Knife Throwing ticket is

P_A = (Ajay gets it in first draw)

+ (Ajay gets it in third draw)

+ (Ajay gets it in fifth draw)+ …… ∞

$$P_A = \frac{x}{x+y} + \left(\frac{y}{x+y}\right)^2 \times \left(\frac{x}{x+y}\right) + \left(\frac{y}{x+y}\right)^4 \times \left(\frac{x}{x+y}\right) \ldots \infty$$

$$P_A = \frac{\frac{x}{x+y}}{1-\left(\frac{y}{x+y}\right)^2} = \frac{x+y}{x+2y} \text{ or } P_A = \frac{x+y}{x+2y}$$

For Mohan to get the first Knife throwing ticket, let the probability is P_M

P_M = (Mohan gets it in second draw)

+ (Mohan gets it in fourth draw)

+ (Mohan gets it in sixth draw)

+ …… ∞

$$P_A = \left(\frac{y}{x+y}\right) \times \left(\frac{x}{x+y}\right) + \left(\frac{y}{x+y}\right)^3 \left(\frac{x}{x+y}\right) + \left(\frac{y}{x+y}\right)^5 \times \left(\frac{x}{x+y}\right) + \ldots \infty$$

$$= \frac{\frac{xy}{(x+y)^2}}{1-\left(\frac{y}{x+y}\right)^2}$$

$$P_M = \frac{y}{x+2y}$$

Option A: Given $P_A = 4\ P_M$

i.e. $\frac{x+y}{x+2y} = \frac{4y}{x+2y}$

$\Rightarrow \frac{x}{y} = \frac{3}{1}$

Hence, (A) is correct.

Option (B): Given $P_A = 5\ P_M$

$\Rightarrow \frac{x}{y} = \frac{4}{1}$

Hence (B) is correct.

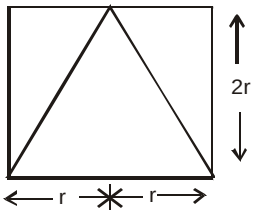
Option C: $P_A = 2\ P_M$

$\Rightarrow \frac{x}{y} = \frac{1}{1}$

Hence (C) is correct.

Option D: $P_M < P_A$ always. $\{\because y < (x+y)\}$
Here (D) cannot be a valid statement.
In all options. (A), (B) and (C) are correct.

9.(A,C) $\Rightarrow$ height of the cone = diameter of the cone = side of the cube.



Volume of the memento = $718\frac{2}{3}$ cc

or $\frac{1}{3}\times\pi\times r^2(2r) = 718\frac{2}{3}$

$\Rightarrow r = 7$ cm and side of cube = 14 cm.

$\Rightarrow$ surface area of box = $6 \times (14)^2 = 1176$ cm^2

$\Rightarrow$ expense in packing $= 1176 \times 1.5 = 1764$ Rs.

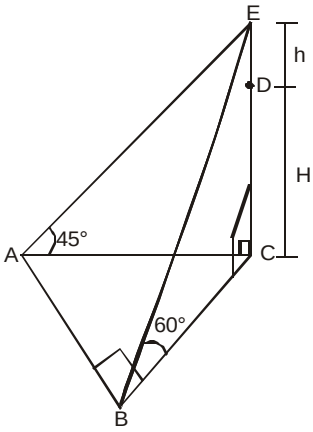
Option (A) Madan's total expenditure on the box
= (cost of the box) + (expenditure in the covering)
= 500 + 1764 = Rs. 2264.
Hence, option (A) is correct.

Option (B):wrong,as expenditure was Rs. 1764 .

Option (C):correct, as area= $(14)^2 = 196$ cm^2

Option (D): Volume of box=$(14)^3 = 2744$ cc
Hence option (D) is incorrect.
In all, option (A) and (C) are correct.

10.(A,B,D)



(h + H) = combined height

ED = tower
CD = hill
AB = width of the river

Water does not move in the lake.
In the right triangle ACE;

$\angle A = 45^\circ \Rightarrow EC = AC = (h+H)$
$= 300$ m ...(1)
In the right triangle BCE;

$\angle B = 60^\circ \Rightarrow \frac{EC}{BC} = \tan 60^\circ = \sqrt{3}$ ...(2)

and in right triangle ABC, $AC^2 = AB^2 + BC^2$ ...(3)
speed of boat = 2 km / hr.
Option (A):- AC = 300 m

$\frac{EC}{BC} = \sqrt{3} \Rightarrow BC = \frac{300\times\sqrt{3}}{3} = 100\sqrt{3}$m

$\Rightarrow AB = \sqrt{AC^2 - BC^2}$

$AB = 100\sqrt{6}$ m is the breadth of the river.

$\Rightarrow$ time taken by boat to move from A to B.

$\text{time}_{A\to B} = \frac{100\sqrt{6}\times 60}{2\times 1000} = 3\sqrt{6}$ minutes.

Option (A) is correct.

Option (B):- The breadth of the river is $100\sqrt{6}$m,

Option (C):- incorrect,asRajan took $3\sqrt{6}$ minutes.
Option (D):- h + H = 450 m
speed of boat = 1 km / hr.
As all the angles remain the same, we will get 3 new right triangles which are correspondingly similar to the earlier ones.

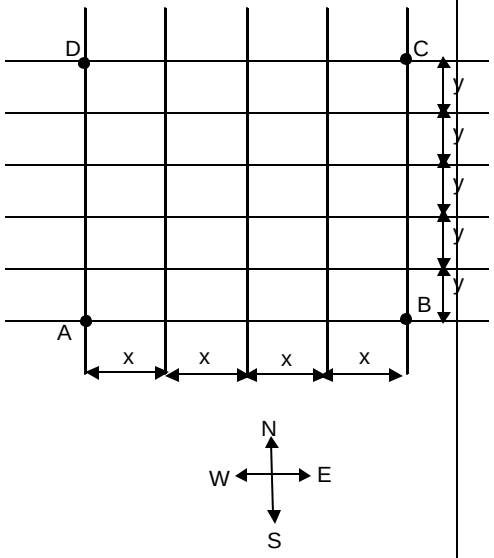
Breadth of the river $= \frac{450}{300}\times(100\sqrt{6})$ m

$= 150\sqrt{6}$ m

$\Rightarrow \text{timetaken} = \frac{150\sqrt{6}\text{m}}{1\text{km/hr}} = 9\sqrt{6}$ minutes

$\Rightarrow$ Option (D) is correct.
In all; options; (A), (B) & (D) are correct.

11.(ACD)



Option (A) Sunil has to go from A to C. There are 4 x's and 5 y's which have to be arranged in order to reach C, from A. The total number of routes :

$\frac{9!}{4!\ 5!}$ = 126 routes.

Option (B) The total number of ways includes the shortest possible routes as well. There can be infinitely possible routes as retracing of the paths will not be restricted. Hence (B) is wrong.
Option (C) A square is a special case of rectangle. To form a rectangle, we have to choose 2 N-S lines from the given 5 and 2 W-E lines, out of 6 hence, the total number of rectangles = ${}^6C_2 \times {}^5C_2 = 150$. Option (C) is correct.

Option (D): As in option (A) we have 11 objects now, out of which 5 are similar, of one kind and 6 are similar of another kind. Total number of

routes $= \frac{11!}{5! \times 6!}$ = 336. Option (D) is correct.

$\Rightarrow$ In all options (A), (C) and (D) are correct.

12.(A,C,D) Laxman takes the first train which is the slower one. Bharat takes the faster train. Let the trains be A and B respectively. Speed of the faster train, train B = $\frac{180\text{km}}{3\text{hr}} = 60\text{km/hr}$

Train A takes twice time, so $V_A = 30\text{km/hr}$.

Speed of train B, w.r.t. Laxman (when he is sitting in the train A) is (60 – 30) = 30 km/hr
Laxman observes the train B, pass by him in 12 seconds. If L_B were the length of the faster train then,

$30\text{km/hr} = \frac{L_B}{12\text{seconds}}$

$\Rightarrow L_B = \frac{30 \times 1000}{3600} \times 12$ m = 100 m.

Option A: $30\text{km/hr} = \frac{L_A + L_B}{30\text{seconds}}$

{L_A = Length of the slower train}

$\Rightarrow L_A + L_B = \frac{30 \times 1050}{3600} \times 30 = 250$ m

$\Rightarrow L_A = (250 - 100)\text{m}$ OR L_A = 150 m

So, $L_A - L_B$ = 50 m. Option (A) is correct.
Option (B) If V_B = 60 × 2 = 120 km/hr
V_A = 30 km/hr, as before.
To overtake, train A; train B has to cover its length, L_A. As we cannot determine the length of the slower train, we cannot find the time taken in overtake. Hence, (B) is not correct.
Option (C): V_A = 30 km/hr
V_B = 60 km/hr

$30\text{km/hr} = \frac{L_A + L_B}{24}$

$\Rightarrow L_A + (100) = 30 \times \frac{1000}{3600} \times 24$

L_A = 200 – 100 = 100 m.
Option (C) is correct. Option (D):

$V_A = 30 \times \frac{3}{2} = 45\text{km/hr}$ and $V_B = 60\text{km/hr}$

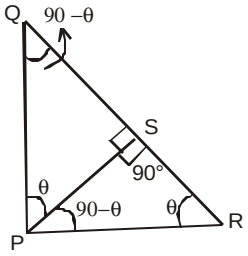
$\Rightarrow 15\text{km/hr} = \frac{L_B}{t} = \frac{100}{t}$ m

$\Rightarrow$ t = 24 seconds. Hence (D) is correct.

13.(A,B,D) Let M and W denote Men and Women.
$\Rightarrow$ 20 × 10 M = 15 × 20 W
$\Rightarrow$ 2M = 3W …(i)
Hence 10 Men and 10 Women together can finish the work in N days such that
{N = Number of Days taken working together.}
$\Rightarrow$ 20 × 15 = 25 × N
$\Rightarrow$ N = 12
Option (A) Total wage for Men = 12 × 50 × 10
= Rs. 6000

Total wage for Women = 12 × 10 × 45
= Rs. 5400
∴ Total wage bill = Rs. 11400
Hence, option (A) is correct.
Option (B) Total wage for Men = 12 × 10 × 45
= Rs. 5400
Total wage for Women = 12 × 10 × 40
= Rs. 4800
∴ Total wage bill = Rs. 10200
Hence, option (B) is correct.
Option (C) Total wage for Men = 12 × 10 × 40
= Rs. 800
Total wage for Women = 12 × 10 × 40
= Rs. 4800
∴ Total wage bill = Rs. 9600
Hence, option (C) is correct.
Option (D) If 20 Men and 30 Women are employed. Then, together they way finish the work in N days such that
$\Rightarrow$ 20 × 15 = 60 × N {$\because$ 20 M = 30 W}
$\Rightarrow$ N = 5
Total wage for Men = 5 × 20 × 40 = Rs. 4000
Total wage for Women = 5 × 30 × 35 = Rs. 5250
∴ Total wage bill = Rs. 9250
Hence, option (D) is correct.

14.



Statement I: ΔPQS has angles
$\angle P = \theta$, $\angle Q = 90 - \theta$, $\angle S = 90°$
ΔRPS has angles
$\angle R = \theta$ $\angle P = 90 - \theta$ and $\angle S = 90°$
As all the corresponding angles are equal,
$\Delta PQS \sim \Delta RPS$
Hence, statement I is correct.

Statement II:
ΔPSQ, angles $\angle P = \theta$, $\angle S = 90°$ and $\angle Q = 90 - \theta$
ΔRSP, angles $\angle R = \theta$, $\angle S = 90°$, $\angle P = 90 - \theta$
$\Rightarrow \Delta PSQ \sim \Delta RSP$
but $\Delta PSQ \not\equiv \Delta RSP$ similar but not congruent.
Hence, II is incorrect.

Statement III:
ΔPSQ, angles $\angle P = \theta$, $\angle S = 90°$ and $\angle Q = 90 - \theta$
and
ΔRPQ, angles $\angle R = \theta$, $\angle P = 90°$ and $\angle Q = 90 - \theta$
Hence, statement III is correct.
Hence, statement (I) and (III) are correct.
option (B) is correct.

15.(D) $S = \frac{3}{4} + \frac{5}{36} + \frac{7}{144} + ...$

$$S = \left(\frac{1}{1^2} - \frac{1}{2^2}\right) + \left(\frac{1}{2^2} - \frac{1}{3^2}\right) + \left(\frac{1}{3^2} - \frac{1}{4^2}\right) + ...\left(\frac{1}{(n)^2} - \frac{1}{n+1)^2}\right)$$

$$\text{or } S = \left(1 - \frac{1}{2^2} + \frac{1}{2^2} - \frac{1}{3^2} + \frac{1}{3^2} + ... + \left(\frac{1}{n^2} - \frac{1}{(n+1)^2}\right)\right)$$

$$= 1 - \frac{1}{(n+1)^2}$$

$$= \frac{(n+1)^2 - 1}{(n+1)^2}$$

$$\text{or } S = \frac{n^2 + 2n}{(n+1)^2}$$

$$\Rightarrow \frac{1}{S} = \frac{(n+1)^2}{n^2 + 2n}$$

Hence, option (d) is the correct answer.

16.(D) $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + (8 + 2\sqrt{5}) = 0$
Let roots be α, β and H be their harmonic mean

$$\Rightarrow \frac{2}{H} = \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{\frac{4 + \sqrt{5}}{5 + \sqrt{2}}}{\frac{8 + 2\sqrt{5}}{5 + \sqrt{2}}} = \frac{4 + \sqrt{5}}{8 + 2\sqrt{5}}$$

$$\text{or } \frac{2}{H} = \frac{1}{2} \Rightarrow H = 4 \Rightarrow \sqrt{H} = \pm 2$$

Hence, option (D) is correct.

17.(A) Given, $\tan\alpha$ is the G.M. of $\sin\alpha$ and $\cos\alpha$

$$\Rightarrow (\tan\alpha)^2 = (\sin\alpha)(\cos\alpha)$$

$$\text{or } (\sin\alpha) = (\cos\alpha)^3 \qquad (\sin\alpha)^2 = \left[(\cos\alpha)^3\right]^2$$

$$\sin^2\alpha = (1)^3 + (-\sin^2\alpha)^3 + 3(1)^2 (-\sin^2\alpha) + 3(1)(-\sin^2\alpha)^2$$

$$\text{or } \sin^2\alpha = 1 - \sin^6\alpha - 3\sin^2\alpha + 3\sin^4\alpha$$

or $1-4\sin^2\alpha+3\sin^4\alpha-\sin^6\alpha=0$

Adding 1, on both sides,

$2-4\sin^2\alpha+3\sin^4\alpha-\sin^6\alpha=1$

Hence, option (A) is correct.

18.(A) $\dfrac{1}{\sqrt{5}+\sqrt{6}+\sqrt{11}}$

$=\dfrac{1}{\left(\sqrt{5}+\sqrt{6}\right)+\sqrt{11}}\times\dfrac{\left(\sqrt{5}+\sqrt{6}\right)-\sqrt{11}}{\left(\sqrt{5}+\sqrt{6}\right)-\sqrt{11}}$

$=\dfrac{\sqrt{5}+\sqrt{6}-\sqrt{11}}{2\sqrt{30}}$

$=\dfrac{\left(\sqrt{5}+\sqrt{6}-\sqrt{11}\right)\times\sqrt{30}}{2\left(\sqrt{30}\right)^2}$

$=\dfrac{5\sqrt{6}+6\sqrt{5}-\sqrt{330}}{60}$

Option (A) is correct

19.(B) Let roots be α and α^2. Given, $\alpha+\alpha^2=-p$ and $(\alpha)\times\left(\alpha^2\right)=q$

or $\alpha+\alpha^2=-p$ and $\alpha^3=q$

$\Rightarrow\left(\alpha+\alpha^2\right)^3=(-p)^3$

or $(\alpha)^3+(\alpha^2)^3+3(\alpha)^2\times(\alpha^2)+3(\alpha)(\alpha^2)^2=-p^3$

or $p^3-q(3p-1)+q^2=0$

Option, (B) is correct.

20.(A) For $x^2+mx+1=0$, roots are α and β

$\Rightarrow\alpha+\beta=-m$ and $\alpha.\beta=1$

For $x^2+nx+1=0$, roots are γ and δ

$\Rightarrow\gamma+\delta=-n$ and $\gamma.\delta=1$

Expression:

$(\alpha-\gamma)(\beta-\gamma)(\alpha+\delta)(\beta+\delta)$

$=(\alpha-\gamma)(\beta+\delta)(\beta-\gamma)(\alpha+\delta)$

$=[\alpha\beta+\alpha\delta-\gamma\beta-\gamma\delta][\alpha\beta+\beta\delta-\gamma\alpha-\gamma\delta]$

$=[1+\alpha\delta-\gamma\beta-1][1+\beta\delta-\gamma\alpha-1]$

$=(\alpha\delta-\gamma\beta)(\beta\delta-\gamma\alpha)$

$=1.\delta^2-\alpha^2.1-\beta^2.1+\gamma^2.1$

$=\left(\delta^2+\gamma^2\right)-\left(\alpha^2+\beta^2\right)$

$=\left[(\delta+\gamma)^2-2\delta.\gamma\right]-\left[(\alpha+\beta)^2-2\alpha\beta\right]$

$=\left[(-n)^2-2.1\right]-\left[(-m)^2-2.1\right]=n^2-m^2$

Hence, option (A) is correct.

21.(C) Side of the square $=\sqrt{484}\,\text{cm}=22\text{cm}$

$\Rightarrow$ length of the wire = 4 × (22) = 88cm.

After cutting, longer part $=\dfrac{3}{4}\times88=66\text{cm}$

shorter part = 88 – 66 = 22 cm.

Radius of the circle, formed $=\dfrac{66}{2\pi}=\dfrac{21}{2}\text{ cm}$.

Side of the square formed $=\dfrac{22}{4}=\dfrac{11}{2}\text{ cm}$

Area of the circle $=\pi\left(\dfrac{21}{2}\right)^2=\dfrac{693}{2}\text{ cm}^2$

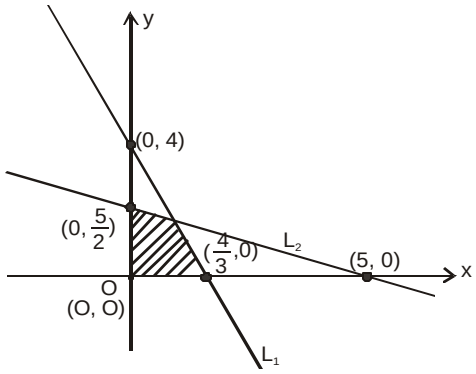
Area of the square $=\left(\dfrac{11}{2}\right)^2=\dfrac{121}{4}\text{ sq.cm}$

Total area enclosed by both

$=\left(\dfrac{693}{2}+\dfrac{121}{4}\right)\text{sqcm}=376.75\text{cm}^2$

Hence (c) is correct.

22.(C)



Line L_1 passes through (0, 4) and $\left(\dfrac{4}{3},0\right)$.

It's equation is $\dfrac{y-4}{x-0}=\dfrac{0-4}{\frac{4}{3}-0}=-3$

or $y + 3x - 4 = 0$ …(1)

and the equation of line L_2 is

$x + 2y - 5 = 0$ …(2)

The shaded region includes x-axis (y = 0) and y-axis (i.e. x = 0) as its boundaries and bounds only the positive quadrant of the x-y plane.

$\Rightarrow x \geq 0 \text{ and } y \geq 0$ …(3)

For the shaded region,

$y + 3x - 4 \leq 0$ …(4)

and $x + 2y - 5 \leq 0$ …(5)

$3x + y \leq 4,\ x + 2y \leq 5,\ x \geq 0,\ y \geq 0$

The region bounded is given by

Hence, option (C) is correct.

23.(B) Here we can find after 6 hours, how much part was filled by the three pipes.

$$= \frac{16}{12} + \frac{4}{18} - \frac{6}{36} = \frac{1}{2} + \frac{2}{9} - \frac{1}{6}$$

$$= \frac{9 + 4 - 3}{18} = \frac{10}{18} = \frac{5}{9}$$

Remaining part = $\frac{1-5}{9} = \frac{4}{9}$

Since, this part is to be filled by A and B together. Further, A and B together can fill in one hour $= \frac{1}{12} + \frac{1}{10}$ part $= \frac{5}{36}$ part.

$\therefore \frac{4}{9}$ part will be filled by A and B together in time $= 3\frac{1}{5}$ h.

$\therefore$ Total time required = 6h + 3h + 12 min
= 9 hrs and 12 min.
Hence, option (B) is correct.

24.(A) $$y = \frac{1}{\{\log_{10}(3-x)\}} + \sqrt{x+7}$$

(i) $\log_{10}(3 - x) \neq 0 \Rightarrow 3 - x \neq 1$

or $x \neq 2$ …(1)

(ii) $3 - x > 0 \Rightarrow x < 3$ …(2)

(iii) $x + 7 \geq 0 \Rightarrow x \geq -7$ … (3)

The domain is

$-7 \leq x < 3,\ x \neq 2$

or $[-7,3) \sim \{2\}$

The correct answer is $[-7,3) \sim \{2\}$.

Apparently, option (A) should have had this answer, if there was no misprint.

Hence, (A) is correct.

25.(A) The angle between $\vec{a}$ and $\vec{b}$ is θ.

$(\vec{a} + 3\vec{b}).(7\vec{a} - 5\vec{b}) = 0$ … (1)

and $(\vec{a} - 4\vec{b}).(7\vec{a} - 2\vec{b}) = 0$ … (2)

From (1)

$(\vec{a}).(7\vec{a}) + (\vec{a}).(-5\vec{b}) + (3\vec{b}).(7\vec{a}) + (3\vec{b})(-5\vec{b}) = 0$

or

$$7|\vec{a}|^2 \cos 0° - 5|\vec{a}||\vec{b}|\cos\theta + 21|\vec{a}||\vec{b}|\cos\theta - 15|\vec{b}|^2 \cos 0° = 0$$

or $7a^2 - 5ab\cos\theta + 21ab\cos\theta - 15b^2 = 0$

or $7a^2 - 15b^2 + 16ab\cos\theta = 0$ …(3)

Similarly, solving the dot product in (2), we get

$7a^2 + 8b^2 - 30ab\cos\theta = 0$ …(4)

Subtracting (3) from (4)

$23b^2 = 46ab\cos\theta$

$$\Rightarrow \frac{b}{a} = 2\cos\theta \Rightarrow \cos^2\theta = \frac{b^2}{4a^2}$$

or

$$\Rightarrow \sin^2\theta = 1 - \frac{b^2}{4a^2} \Rightarrow \tan^2\theta = 4\left(\frac{a^2}{b^2}\right) - 1$$

From equation (3) and (4)

$7a^2 - 15b^2 = -16ab\cos\theta$

$$7a^2 + 8b^2 = 30ab\cos\theta \Rightarrow \frac{7a^2 - 15b^2}{7a^2 + 8b^2} = \frac{-16}{30} \text{ or}$$

$$\frac{7\left(\frac{a^2}{b^2}\right) - 15}{7\left(\frac{a^2}{b^2}\right) + 8} = \frac{-8}{15} \Rightarrow \frac{a^2}{b^2} = 1 \text{ or } \tan^2\theta = 3$$

$\Rightarrow \tan\theta = \pm\sqrt{3}$

Option (A) has one of the two possible values i.e. $\sqrt{3}$. Hence, (A) is correct.

26. (C) Before the merger
X Ltd. had no. of employees = 4
Y Ltd. had no. of employees = 3
Z Ltd. had no. of employees = 5
After the merger, there are quarrels amongst the employees of the erstwhile X ltd, Y ltd, & Z ltd. An employee does not quarrel with any of the employees from his parent company.

Company	X	Y	Z
Employees	4	3	5

Any employees in X can have a maximum possible no. of quarrels with the employees of Y ltd. & Z ltd. as given by:-

$1 \times 3 + 1 \times 5$

As there are 4 employees in the merged company, who came from X; So; the total number of quarrels involving employees of X company is

$4 \times [1 \times 3 + 1 \times 5]$

$= 4 \times 8$

= 32 quarrels. ...(1)

Further employees of Y & Z ltd. will be involved with quarrels within each other. The total number of such quarrels.

$= 3 \times [1 \times 5]$

$= 5 \times [1 \times 3]$

= 15 quarrels ...(2)

From (1) and (2)

The total number of quarrels between the employees of three erstwhile companies is

= 32 + 15 = 47 quarrels.

Hence (C) option is correct.

27. (C)

$$\frac{1-c}{1+c} = \frac{1-\tan\left(\frac{\alpha}{2}\right)\times\tan\left(\frac{\beta}{2}\right)}{1+\tan\left(\frac{\alpha}{2}\right)\times\tan\left(\frac{\beta}{2}\right)}$$

$$= \frac{\cos\left(\frac{\alpha}{2}\right)\cos\left(\frac{\beta}{2}\right)-\sin\left(\frac{\alpha}{2}\right)\times\sin\left(\frac{\beta}{2}\right)}{\cos\left(\frac{\alpha}{2}\right)\cos\left(\frac{\beta}{2}\right)+\sin\left(\frac{\alpha}{2}\right)\times\sin\left(\frac{\beta}{2}\right)}$$

$$= \frac{\cos\left(\frac{\alpha+\beta}{2}\right)}{\cos\left(\frac{\alpha-\beta}{2}\right)} \quad ...(i)$$

$\because \sin\alpha + \sin\beta = a \ \ \& \cos\alpha + \cos\beta = b$

Squaring and adding up both equations

$$\Rightarrow \sin^2\alpha + \sin^2\beta + 2\sin\alpha\sin\beta = a^2$$

$$\cos^2\alpha + \cos^2\beta + 2\cos\alpha\cos\beta = b^2$$

$$\Rightarrow 1 + 1 + 2(\cos\alpha\cos\beta + \sin\alpha\sin\beta) = a^2 + b^2$$

$$2 + 2\{\cos(\alpha-\beta)\} = a^2 + b^2$$

$$\Rightarrow 1 + \cos(\alpha - \beta) = \frac{a^2+b^2}{2} \quad ...(ii)$$

$\because \cos\alpha + \cos\beta = b$ ...(iii)

Dividing equation (iii) by (ii)

$$\Rightarrow \frac{\cos\alpha + \cos\beta}{1+\cos(\alpha-\beta)} = \frac{2b}{a^2+b^2}$$

$$\Rightarrow \frac{2\cos\frac{(\alpha+\beta)}{2}\times\cos\frac{(\alpha-\beta)}{2}}{2\cos^2\frac{(\alpha-\beta)}{2}} = \frac{2b}{a^2+b^2}$$

$$\Rightarrow \frac{\cos\frac{(\alpha+\beta)}{2}}{\cos\frac{(\alpha-\beta)}{2}} = \frac{2b}{a^2+b^2}$$

From equation (i) we get

$$\Rightarrow \frac{1-c}{1+c} = \frac{2b}{a^2+b^2}$$

Option C is correct.

28.(C) $\sin^{-1}x + \cos^{-1}x = \frac{\pi}{2}$

$\because a\sin^{-1}x = c + b\cos^{-1}x$

$$\Rightarrow \frac{a}{b}\sin^{-1}x = \frac{c}{b} + \cos^{-1}x \quad ...(I)$$

or $b\cos^{-1}x = a\sin^{-1}x - c$

$$\Rightarrow \frac{b}{a}\cos^{-1}x = \sin^{-1}x - \frac{c}{a} \quad ...(II)$$

Adding equation (I) and (II)

$$\Rightarrow \frac{a}{b}\sin^{-1}x + \frac{b}{a}\cos^{-1}x = (\sin^{-1}x + \cos^{-1}x) + \frac{c}{b} - \frac{c}{a}$$

$$= \left(\frac{\pi}{2}\right) + c\left\{\frac{1}{a} - \frac{1}{b}\right\}$$

$$= \left(\frac{\pi}{2}\right) + \frac{c(b-a)}{ab}$$

$$\frac{\pi ab + 2c(b-a)}{2ab}$$

Hence, option (c) is the correct answer.

29. (A)

$$\frac{2\sin\theta}{1+\sin\theta+\cos\theta} = \frac{4\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{1+2\sin\frac{\theta}{2}\cos\frac{\theta}{2}+2\cos^2\frac{\theta}{2}-1}$$

$$= \frac{4\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{2\cos\frac{\theta}{2}\left\{\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right\}}$$

$$\Rightarrow K = \frac{2\sin\frac{\theta}{2}}{\left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)} \quad \ldots(I)$$

Now

$$\frac{1-\cos\theta+\sin\theta}{1+\sin\theta}$$

$$= \frac{1-1+2\sin^2\frac{\theta}{2}+2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}{\left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)^2}$$

$$= \frac{2\sin\frac{\theta}{2}\left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)}{\left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)^2}$$

$$= \frac{2\sin\frac{\theta}{2}}{\left(\sin\frac{\theta}{2}+\cos\frac{\theta}{2}\right)} \quad \ldots(II)$$

$\because$ Equation (I) and (II) are same.
Hence, the value is equal to K and option (A) is correct.

30. (A) The probability that Sumit actually sees a Shark, given that he claimed to have seen one.

$$= \frac{\text{P(He actually sees the shark \& reports truth)}}{\text{P(He claims of seeing a shark)}}$$

$$= \frac{\text{P(Sees the shark)} \times \text{P(Reports Truth)}}{\left(\begin{array}{l}\text{P(sees the shark)} \times \text{P(reports truth)} \\ + \text{P(Doesn't see)} \times \text{P(reports false)}\end{array}\right)}$$

$$= \frac{\frac{1}{8}\times\frac{1}{6}}{\frac{1}{8}\times\frac{1}{6}+\frac{7}{8}\times\frac{5}{6}}$$

$$= \frac{\frac{1}{48}}{\frac{36}{48}} = \frac{1}{36}$$

$\Rightarrow$ Option (A) is the correct answer.

IIFT-2006 (GK solutions)

31.(A,D)

32.(B,C,D)

33.(A,D)

34.(A,B,D)

35.(A,B)

36.(C)

37.(A)

38.(B,C)

39.(A,D)

40.(A,D)

41.(D)

42.(C)

43.(C,D)

44.(B,D)

45.(B,C,D)

46.(B,C)

47.(A,B)

48.(B)

49.(B,C,D)

50.(A,D)

51.(C,D)

52.(A,B,D)

53.(C,D)

54.(A,D)

55.(D)

56.(D)

IIFT-2006 (English Solutions)

57.(A,D) The words 'perverse' and 'perverted' are correctly used in A. The words 'rebelling' and 'revolting' have also been used correctly in D. This meaning fits in the context of both the sentences.B is incorrect because 'effluence' has been used incorrectly with 'indigence'.C is incorrect because 'purposely' has been misplaced in the sentence.

58.(B,C,D) Options B,C& D are correct .Corps & corpse, 'grisly & grizzly & infamous & notorious have been used correctly. Illusion & allusion have been used incorrectly, fit in accurately when interchanged between options i & ii .

59.(A,D) Options A & D are correct. In B, the usage of the word 'rebel' makes the sentence inconsistent and unclear. In option C 'overlook' and'oversee' make sense only if they are interchanged between options i & ii.

60.(C,D) Sentences C and D are incorrect. In sentence C it should have been "The Huns,who were Mongolian, invaded Gaul in 461 A. D." In D, there is an unclear pronoun reference. The sentence should be "Because of her interest in economic development, Senator Martin sometimes neglects the environment."

61.(A,B,D) Sentence A – "more than they do"; sentence B – "he must … his personal life"; sentence D – modifier error.

62.(B,C,D) Murrey means dark purplish - red colour. Thus a similar relationship cannot be established between murrey and black, like the one between magenta (purplish red) and red. So, A is incorrect. Inter (to bury) and Exhume (to dig out) are opposite actions of each other. Piebald (varied) and Homogeneous (uniform) also share a relationship of being opposites. Effete (barren) and Fructuous (productive) share the same relationship as that of Chapfallen (dejected) and Effervescent (excited) i.e. that of being opposites. Selenology is the study of moon, whereas Epistemology is the study of (human) knowledge. Thus B, C and D are valid analogies.

63.(A,B,C,D) A Polyglot is able in several Languages. A Polyphagous craves for Food. Hence, some kind of a correspondence has been established between the given choices. Escutcheon and Scutcheon are synonyms (both meaning a shield) and so are Fabulist and Liar (both meaning a person concealing the truth). Scurvy is a disease caused by the lack of Vitamin C whereas Kwashiorkor is a disease caused by lack of Protein (caused primarily due to a high carbohydrate diet).Apothecary is an institution manufacturing and/or selling Drugs whereas a Cruciverbalist is a person who is an expert at solving crosswords. Hence all are valid analogies.

64.(D) Growth cannot be described as luxurious. Hence sentence D contains inappropriate usage of the word 'luxuriously'.

65.(A) Prophecy is a noun and not a verb. Hence sentence A contains inappropriate usage of the word.

66.(A) Moribund means dying and is the only word that fits in the context of both the sentences.

67.(C) Soporific is a word that can be used both as a noun and as an adverb. In the first sentence it is used as an adverb to qualify the nature of the tone. In the second sentence it is used as a noun to mean a sleep inducing medication.

68. (B) 'Puerile' means 'childishly foolish; immature or trivial. The first meaning fits in sentence (ii). The second meaning fits in sentence (i).

69. (D) None of the options fit in both the sentences

70.(A,B) Hypallage and rantipole have been spelt correctly

71.(D) Only panegyric has been spelt correctly.

72.(B,D) The correct combinations are

Agent	Burning-Glass
Garpon	Caravan
Gyanyima	Market
Norbu	Guide

Hence the correct choices are B and D

73.(A,D) From the passage only statements A and D are correct.

74. (A,B,C,D) Satement A is not mentioned in the passage. It only states that the visitors received tea made in European fashion. Statement B is incorrect because the passage mentions that during the second visit 'the Garpon' insisted the visitors to stay put for a few more days. C is an incorrect statement because it was the agent who was astonished to witness the simplicity in the lifestyle of the author and his friends. (paragraph 4). The last paragraph reveals that mountain Gurla Mandhata was reflected in the waters of Lake Mansarovar. Hence, all four statements are incorrect.

75. (A) This is the only correct statement. The last lines of the passage reveal that "the biggest market .....Gyanyima." Statement B, C and D are not mentioned correctly even though some reference has been made in the passage. Hence, only A is correct.

76.(A,B,D) There is no mention of Statement C in the passage. The rest however are correct.

77. (A,B,C,D) Paragraph 7 reveals that "Printing with movable letters began in China in the middle of the 12th century" So, A is incorrect. It cannot be inferred that 'numerical knowledge and ability' , were the main concerns. There were other concerns like co-ordiantion, history, printing, war, technology etc. So, B is incorrect. C is incorrect because paragraph 7 mentions "new mathematical theories". D is not mentioned in the passage. So, all the statements are incorrect.

78. (A,B,D) A and B are clearly mentioned in the passage. D can be inferred from paragraph 2.

79.(A,B,C) The combinations are

Astronomy	Tabriz
Abacus	Clerk
Literacy	Almanac
History	Propaganda

Thus the correct answers are A, B, C.

IIFT-2006 (DI Solutions)

For questions 80 to 85:

From Information 7, the occupant of room number 103 owns 12 cars and he donated to 8 institutions. Then from Information 3, occupant of room number 102 must be having 24 cars. From information 6, occupant of room number 104 must be having 4z number of cars and donated to y number of institutions where $4z < y$. From information 9, occupant of room number 105 owns 8 cars and if the businessman from Canada donated to 'x' number of institutions, then the occupant of room number 105 must have donated to (x–2) number of institutions.

From information 10, residents of Canada, England and Brazil are staying in alternate rooms in that order starting from left. Though room numbers of residents of Canada, England and Brazil can also be 102, 104 and 106 respectively. But from question 80 we can conclude that room numbers are 101, 103, and 105 respectively as room number 106 is not given for Brazilian Businessman.

Although the nationality of the occupant of room number 106 is not known from the information given, it can be found out to be Germany from the options of the 3rd question in the set.
We can compile the following table now and answer all questions.

Room No	**101**	**102**	**103**	**104**	**105**	**106**
Nationality	**Canada**	**Uruguay**	**England**	**Argentina**	**Brazil**	**(Germany)**
Number of Cars		24	12	4	8	16
Number of Institutions in which they have donated	x		8	18	x-2	24

80.(D) Room No. 105

81.(C) 18

82.(D) Germany

83.(D) Germany

84.(B) Uruguay

85.(B) 12

For questions 86 to 89:

The following table can be made after observing the rules:

INPUT	lemon	apple	choco	college	girl	dream	room	book	calf	
	1	2	3	4	5	6	7	8	9	
STEP-1	3	1	2	4	5	6	9	8	7	**Rule-1**
STEP-2	1	2	3	6	5	4	7	8	9	**Rule-2**
STEP-3	9	1	2	8	3	4	7	5	6	**Rule-3**
STEP-4	2	9	1	8	3	4	6	7	5	**Rule-4**
STEP-5	1	9	2	4	3	8	5	7	6	**Rule-2**
STEP-6	6	1	9	7	2	8	5	3	4	**Rule-3**
STEP-7	9	1	6	7	2	8	4	3	5	**Rule-1**
STEP-8	6	1	9	8	2	7	5	3	4	**Rule-2**
STEP-9	4	6	1	3	9	7	5	2	8	**Rule-3**
STEP-10	1	4	6	3	9	7	8	5	2	**Rule-4**
STEP-11	6	4	1	7	9	3	2	5	8	**Rule-2**
STEP-12	8	6	4	5	1	3	2	9	7	**Rule-3**
STEP-13	4	6	8	5	1	3	7	9	2	**Rule-1**
STEP-14	8	6	4	3	1	5	2	9	7	**Rule-2**
STEP-15	7	8	6	9	4	5	2	1	3	**Rule-3**

86.(A,B,D) From the table STEP 10 is:

STEP-10	1	4	6	3	9	7	8	5	2
	lemon	**college**	**dream**	**choco**	**calf**	**room**	**book**	**girl**	**apple**

So STEP 10 is option (C).
Hence the right options are A, B and D.

87.(A,C,D) From the table STEP 8 is:

STEP-8	6	1	9	8	2	7	5	3	4
	dream	**lemon**	**calf**	**book**	**apple**	**room**	**girl**	**choco**	**college**

So option (B) can be output. Hence the right options are A, C and D.

88.(A,B,C,D) By observing the table, we get none of the arrangement in the options will fall between STEP 11 to 15.

89.(C, D) By check the options. Rule-1 is applied in options (C) and (D).

90. (D) By checking the options.
Option(A): If Dilip observed the other three actors helmets colour like 2 silver and 1 copper. Then he could tell his helmet colour i.e. Gold . But he did not give right answer. So option (1) is the correct statement.
Option (B): Bimal knows that Chris and Dilip cannot tell their helmets colour. If Bimil observed the helmet colour of Aslam. Then he could tell his helmet colour i.e. Gold. But he did not give the right answer
Option (C): Chris knows that Dilip cannot tell his helmet colour. If Chris observed the other two actors helmets colour like one silver and one copper or both silver. Then he can identify his helmet colour i.e. Gold. But he did not give right answer. So it is the right statement.
Option (D): None of the statement is wrong. So option D is answer.

91.(A,B,C,D) By checking the options. The following table can be made.

	Option -A	Option -B	Option -C	Option -D
No of Units of Product-1	2	2	2	2
No of Units of Product-2	14	14	10	14
No of Units of Product-3	2	4	8	4
No of Units of Product-4	6	4	4	4
No of Units of Product-5	2	2	2	2
Cost	1960	1980	1960	1980
No of points	26000	26000	26000	26000
No of Panalty points	20000	10000	20000	10000

Hence A, B, C and D are the right options.

For questions 92 to 96:

92.(A,B,D) Statement A: correct

	2001	2002	2003
Wipro	0.1164	0.1189	0.1348
Tata Steel	0.156	0.1489	0.1495

Statement B: correct

	2001	2003
Indo Rama	0.0111	0.0076
Arvind Mills	0.0316	0.0236
Raymond	0.0372	0.0389
Century Enka	0.00744	0.00811
Steel Authority	0.5631	0.584
Tata Steel	0.1717	0.1909
Rashtriya Ispat	0.076	0.0636
Ispat Industries	0.0083	0.0086

Statement C: incorrect

	2001	2002	2003
R & D expenditure of Tata Steel as a percentage of sales	0.117	0.096	0.152
Percentage of R & D expenditure to sales as iron and steel sector as a whole	0.134	0.113	0.105

Statement D: Correct as 5 companies show decline.

	2002	2003
Ranbaxy	0.4646	0.225
Dr.Reddy Lab	0.727	-0.004
Cipla Ltd.	0.3167	0.1206
Glaxosmithkline	0.0472	0.0375
Wipro	0.1115	0.1608
Infosys	0.3698	0.3913
Videocon	0.5332	-0.275
Bharat Electronics	0.1257	0.291

93.(A,C) **Statement A: Correct**

Sectors	Required Percentage
Textiles	8.31%
Pharmaceuticals	7.77405%
Electronics	7.7704%
Iron and Steel	9.64%

Statement B: Incorrect (Ispat Industries will be ranked lowest)

Companies	Required Percentage
Indo Rama	1.4%
Arvind Mills	6.57216%
Raymond Ltd.	16.23188%
Century Enka Ltd.	3.69979%
Ranbaxy	6.0099%
Dr. reddy's	8.03519%
Cipla	4.64081%
GlaxoSmithkline	11.19163%
Wipro	15.85%
Infosys	46.31%
Videocon	1.4714%
Bharat electronics	14.62058%
Steel Authority	18.04016%
Tata Steel	11.58125%
Rashtriya Ispat Nigam	7.83028%
Ispat Industries limited	1.18076%

Statement C: Correct

Companies	Required Percentage
Indo Rama	0
Arvind Mills	0
Raymond Ltd.	0
Century Enka Ltd.	0
Ranbaxy	5.54753%
Dr. reddy's	5.95794%
Cipla	3.35%
GlaxoSmithkline	0.33417%
Wipro	0.43017%
Infosys	0.57604%
Videocon	0
Bharat electronics	4.6225%
Steel Authority	0.30077%
Tata Steel	0.09665%
Rashtriya Ispat Nigam	0.0714286%
Ispat Industries limited	0

Statement D: Incorrect
It did not make the highest profit as Indo Rama Synthetic ltd. has made a higher growth than Wipro in the year 2001-2003.

94.(B,C,D) **Statement A: Correct**
By observation.
Statement B: (Incorrect as the percentage is minimum for Electronics sector)

Sectors	Required Percentage
Textiles	8.31%
Pharmaceuticals	7.77405%
Electronics	7.7704%
Iron and Steel	9.64%

Statement C: Incorrect.
It is Incorrect as for no company the required percentage is greater than 20%.

Statement D: Incorrect
In the year 2002 the ratio of total profits to total sales is –0.02880 and in the year 2001 the given ratio is –0.0260.

95.(B,C) **Statement A: Incorrect**
Because in the year 2002-2003 Cipla Ltd. had a 100% decline in the R & D expenditure.

Statement B: Correct.

Company	Ratio
Ranbaxy	0.0541
Dr. Reddy's	0.0696
GlaxoSmithKline	0.0033501
Infosys	0.00565
Bharat Electrical	0.04655
Steel Authority of India Limited	0.0028
Tata Steel	0.00124

The ratio was highest for Dr.Reddy's.

Statement C: Correct
During the year 2001-2003, in terms of sales growth, the best performer in the pharmaceutical sector was that of Ranbaxy which had a 79.55% growth and no company had a growth rate greater than any company in the Iron and Steel sector.

Statement D: Incorrect

Arvind Mills in the year 2001-2002 and Indo Rama Synthetic Ltd in the year 2002-2003 have greater percentage decline than Videocon in any of the given years.

96.(A,B,D)

Statement	2001	2002	2003
A	0.02779	0.01976	0.0196
B	0.156096	0.14891	0.1495
C	0.12160	0.11612	0.1119
D	0.2247	0.0883	0.0869

The values in the statements A, B and D in the given three years when plotted will closely resemble in the figure.

For questions 97 to 100:

97.(A,B) **Statement A: Correct**

From graphs we can conclude that the vote share of Democrats and Labour party in 2002 is greater than their combined vote share in 1998.

Statement B: Correct

Number of seats lost by Democrats in 2002 elections = (33.53 x 5.01 – 25.48 x 6.20)
= 168 – 158 = 10
Number of seats gained by the Republicans in 2002 = (7.9 x 6.2 – 6 x 5.01) = 49 – 30 = 19.

Statement C: Incorrect

Independents gained the most in terms of vote share but in terms of the number of seats, labour gained the most over the 2000 election as they increased their seats from 104 in 2000 election to 165 in 2002 election.

Statement D: Incorrect.

In the year 2002 as well as in the year 1996 70% of Independants and Labour are eligible to form the government as their share in the seats won is greater than 50% in each of the years.

98.(C,D) **Statement A: Correct**

The percent increase in seats obtained by the Liberals and Labour together in 2002 over the year 1998 is 11.39% and the percent increase in the vote share obtained by these parties during the same period is 1.34%.

Statement B: Correct

By observation Labour party showed the greatest percentage increase in the vote share obtained in the year 2000 over the year 1998 across all the parties.

Statement C: Correct

Because in 2000 elections three parties namely Independents, Democrats and Liberal faced a decline in the vote share, whereas in 1998 four parties (excluding democrats) faced decline.

Statement D: Incorrect

Highest jump in the percentage of seats obtained by any party (Independents in 2000 over the year 1998) = (38.72 – 32.98) = 5.74%

Highest jump in the percentage of vote share obtained by any party (Democrats in 1998 over the year 1996) = (25.69 – 20.29) = 5.4%

99.(B,C) **Statement A: Incorrect**

Vote share of Labour and Liberal party taken together in the year 1996
= 28.8 + 1.97 = 30.77
Vote share of Labour and Liberal party taken together in the year 1998
= 25.82 + 1.75 = 27.57.

Number of seats won by Labour and Liberal in the year 1996 = 143
Number of seats won by Labour and Liberal in the year 1998 = 158.
Gain is 15 sweets.

Statement B: Correct

Democrats, Republicans and 35% of the Independents could have formed the government in two elections 1998 and 2000.

Statement C: Correct

By observation we find that no party increased its vote share in every succeeding elections.

Statement D: Incorrect

In 1996 vote share of the republicans and Democrats = (20.29 + 6.12) = 26.41%
In 2000 vote share of the republicans and Democrats = (23.75 + 5.4) = 29.15%.
In 1996 percentage of seats of the republicans and Democrats = (29.61 + 5.88) = 35.49%
In 2000 percentage of seats of the republicans and Democrats = (33.53 + 6.00) = 39.53%.

Difference in the vote share = 2.74%
Difference in the percentage of the seats = 4.04%

100.(A,C) **Statement A: Incorrect**
Percentage of seats obtained by Democrats and labour together in years 1996, 1998, 2000 & in 2002 were 55.49%, 59.29%, 54.45% and 52.09% respectively. In 2002, they lost only, 4.4% but in 2000 elections, they lost 8.2%. Hence A is incorrect.

Statement B: Correct
Vote share of the Liberals and Republicans together in the year 1998 = 6.91%
Vote share of the Liberals and Republicans together in the year 2000 = 6.88%
Number of seats obtained by the Liberals and Republicans together in the year 1998 = 44.
Number of seats obtained by the Liberals and Republicans together in the year 2000 = 34.

Statement C: Incorrect
Difference in the number of seats won by Independents in 2000 and 1998 = +6
Difference in the number of seats won by Labour in 2000 and 1998 = –43
Difference in the number of seats won by Republican in 2000 and 1998 = –4

Difference in the number of seats won by Liberals in 2000 and 1998 = –6

Difference in the number of seats won by Democrats in 2000 and 1998 = –21

Statement D: Correct
Number of seats won by Labour party in the year 1996 = 132
Number of seats won by Labour party in the year 1998 = 148
Number of seats won by Labour party in the year 2000 = 105
Number of seats won by Labour party in the year 2002 = 165

For questions 101 and 102:

101. (A, D) **Statement A: Correct.**

	Gap	Rank
North America	-7.3	6
Latin America	9.9	3
Central and Eastern Europe	11.6	2
Western Europe	-1.4	5
Africa	14.4	1
Asia	2.6	4

Rank of Central and Eastern Europe is second.

Statement B: Incorrect (The highest percentage change in exports was highest in the year 2000)

Year	Average Annual Percentage Change
1997	5.03333333
1998	- 3.85
1999	4.716
2000	18
2001	-3.61666
2002	3.5666
2003	16.5

Statement C: Incorrect (Rank of Asia is third)

	Gap	Rank
North America	0.2	5
Latin America	-1.5	4
Central and Eastern Europe	-5.9	2
Western Europe	2.5	6
Africa	-10.6	1
Asia	-1.7	3

Statement D: Correct
The lowest change, whether (increase or decrease) is observed in year 1998 at –0.45.

Year	Average Annual Percentage Change
1997	6.98333
1998	-0.45
1999	0.51666
2000	13.1
2001	-3.4
2002	-2.9333
2003	16.1833

102.(C,D) **Statement A: Incorrect**
North American region average annual percentage change in exports is 2.25 is less than the average annual percentage change in exports of Latin America which is 6.3.

Statement B: Incorrect

Regions	Average Annual Percentage Change
North America	10.9
Latin America	9.375
Central and Eastern Europe	1.7
Western Europe	3.45
Africa	1
Asia	4.15

Africa region experienced the lowest average annual percentage change in imports as compared to other regions.

Statement C: Correct

In the year 1999-2000 Central and Eastern European region experienced a jump of 26.1 which is the highest across all companies in any of the given years.

Statement D: Correct

In the year 2000-2001 Asian region suffered the maximum slump which is 30.1 and it is the highest across all companies in any of the given years.

For questions 103 to 106:

103.(A,C) **A. Correct**
Growth rate of female population during 2005-2010
= (3360 – 3189) / 3189 × 100 = 5.3%
Growth rate of male population during 2010-2015 = (3559 – 3403) / 3403 × 100 = 4.5%

B. Incorrect
Growth rate of population of high income countries during 2005-2010 = 17 / 980 × 100 = 1.73%
Growth rate of male population in East asia and Pacific during 2010-2015 = 36 / 1001 × 100 = 3.59%

C. Correct
Growth rate of male population in low income countries during 2005-2010 = (1438 – 1330) / 1330 × 100 = 8.12%
Growth rate of female population in low income countries during 2005-2010 = (1400 – 1294) / 1294 × 100 = 8.19%
D. Incorrect
Growth rate of world population during 2005-2010 = (6764 – 6418) / 6418 × 100 = 5.39%
Growth rate of world population during 2010-2015 = (7096 – 6764) / 6764 × 100 = 4.90%

104.(A,B,D) **A. Incorrect**
Share of high income countries in total world population in 2005 = 980 / 6418 × 100 = 15.26%
Share of high income countries in total female population in 2005 = 497 / 3189 × 100 = 15.58%

B. Incorrect
Share of Europe and central Asia in total male population in 2005 = 229 / 3230 × 100 = 7.08%
Share of Europe and central Asia in total male population in 2010 = 229 / 3403 × 100 = 6.73%
Share of Europe and central Asia in total male population in 2015 = 230 / 3569 × 100 = 6.44%

C. Correct
Share of middle income countries in total female population in 2015 = 1512 /3528 × 100 = 42.85%
Share of low income countries in total world population in 2010 = 2838 /6764 × 100 = 41.95%

D. Incorrect
Share of south Asia in total Female population in 2015 = 821/3528 × 100 = 23.27%
Share of south Asia in total world population in 2010 = 1581/6764 × 100 = 23.37%

105.(A) **A. Correct**
Share of high income countries in total female population in 2005 = 497/3189 × 100 = 15.58%
Share of high income countries in total female population in 2010 = 505/3360 × 100 = 15.02%
Share of high income countries in total female population in 2015 = 511/3528 × 100 = 14.48%

Share of high income countries in total male population in 2005 = 483/3230 × 100 = 14.95%
Share of high income countries in total male population in 2010 = 491/3403 × 100 = 14.42%
Share of high income countries in total male population in 2015 = 497/3569 × 100 = 13.92%

B. Incorrect
Growth rate of population of high income countries during 2010-2015 = (1008 – 997) / 997 × 100 = 1.10%
Growth rate of world population during 2010-2015 = (7096 – 6764) / 6764 × 100 = 4.90%

C.Incorrect
Share of Share of South Asia's females in total world population in 2005 = 715 / 6418 × 100 = 11.14%
Share of South Asia's females in total world population in 2015 = 821 / 7096 × 100 = 11.56%
Share of South Asia's females in total female population in 2005 = 715 / 3189 × 100 = 22.42%
Share of South Asia's females in total female population in 2015 = 821 / 3528 × 100 = 23.27%

Growth rate of Share of South Asia's females in total world population during 2005-2015 = (11.56–11.14)/11.14 × 100 = 3.77%
Growth rate of Share of South Asia's females in total female population during 2005-2015 = (23.27–22.42)/22.42 × 100 = 3.79%

D.Incorrect
Growth rate in population of middle income countries during 2010-2015 = (3040 – 2928) / 2928 × 100 = 3.82%
Growth rate in population of middle income countries during 2005-2010 = (2928 – 2814) / 2814 × 100 = 4.05%
Growth rate in population of high income countries during 2010-2015 = (997 – 980) / 980 × 100 = 1.73%
Growth rate in population of high income countries during 2005-2010 = (1008 – 997)/ 997 × 100 = 1.10%

106.(A,C) **A Incorrect**
Share of south Asia in total world population in 2005 = 1470/6418 × 100 = 22.90%
Share of south Asia in total world population in 2015 = 1684/7096 × 100 = 23.73%
Share of low income countries in total world population in 2005 = 2624/6418 × 100 = 40.88%
Share of low income countries in total world population in 2015 = 3048/7096 × 100 = 42.95%
(23.73–22.90) < (42.95 – 40.88)

B.Correct
Share of high income countries in total female population in 2010 = 505/3360 × 100 = 15.02%
Share of high income countries in total female population in 2015 = 511/3528 × 100 = 14.48%
Share of high income countries in total world population in 2010 = 997/6764 × 100 = 14.73%
Share of high income countries in total world population in 2015 = 1008/7096 × 100 = 14.20%

C. Incorrect
Growth rate of female population in East Asia and Pacific region during 2010–2015 = (1001–963)/963 × 100 = 3.94%
Average annual growth rate = 3.94/5 = 0.79%
Growth rate of female population in South Asia region during 2010-2015 = (821–769)/ 769 × 100 = 6.76%
Average annual Growth rate = 1.35%

D. Correct
Growth rate of female population in Europe and Central Asia during 2005-2015 = 1/248 × 100 = 0.40%
Growth rate of male population in Europe and Central Asia during 2005–2015 = 1/229 × 100 = 0.43%