

MAT EXAM, 2006

Directions (Questions 1-5) : Study the information given below to answer these questions.

- (i) Six plays A, B, C, D, E and F are to be organized from Monday to Saturday *i.e.* 5th to 10th—one play each day.
- (ii) There are two plays between C and D and one play between A and C.
- (iii) There is one play between F and E and E is to be organized before F.
- (iv) B is to be organized before A, not necessarily immediately.
- (v) The organization does not start with B.

1. The organization would start from which play?
 - (1) A
 - (2) F
 - (3) D
 - (4) Cannot be determined
2. On which date is play E to be organized?
 - (1) 5th
 - (2) 7th
 - (3) 6th
 - (4) Cannot be determined
3. The organization would end with which play?
 - (1) A
 - (2) D
 - (3) B
 - (4) Cannot be determined
4. Which day is play B organized?
 - (1) Tuesday
 - (2) Friday
 - (3) Thursday
 - (4) None of these
5. Which of the following is the correct sequence of organizing plays?
 - (1) AECFBD
 - (2) DFECBA
 - (3) BDFECA
 - (4) None of these

Directions (Questions 6-9) : Read the following information carefully to answer these questions.

A family consists of six members P, Q, R, S, T and U. There are two married couples. Q is a doctor and the father of T. U is grandfather of R and is a contractor. S is grandmother of T and is a housewife. There is one doctor, one contractor, one nurse, one housewife and two students in the family.

6. Who is the sister of T?
 - (1) R
 - (2) T
 - (3) U
 - (4) Information insufficient
7. What is the profession of P?
 - (1) Doctor
 - (2) Doctor or Nurse
 - (3) Nurse
 - (4) Housewife
8. Which of the following are two married couples?
 - (1) US, QT
 - (2) TS, RU
 - (3) US, QP
 - (4) US, RP
9. Which of the following is definitely a group of male members?
 - (1) QU
 - (2) QUP
 - (3) QUT
 - (4) UT

10. In a certain language, TRIANGLE is coded as SQHZMFKD, which word would be coded as DWZLOKD?

- (1) EXAMPLE
- (2) DISMISS
- (3) FIGMENT
- (4) DISJOIN

11. Two buses start from the opposite points of a main road, 150 kms apart. The first bus runs for 25 kms and takes a right turn and then runs for 15 kms. It then turns left and runs for another 25 kms and takes the direction back to reach the main road. In the meantime, due to a minor breakdown, the other bus has run only 35 kms along the main road. What would be the distance between the two buses at this point?

- (1) 65 kms
- (2) 80 kms
- (3) 75 kms
- (4) 85 kms

12. A postman was returning to the post office which was in front of him to the north. When the post office was 100 metres away from him, he turned to the left and moved 50 metres to deliver the last letter at Shantivilla. He then moved in the same direction for 40 metres, turned to his right and moved 100 metres. How many metres was he away from the post office?

- (1) 0
- (2) 150
- (3) 90
- (4) 100

13. Which of the following will *not* be a number of the series 1, 8, 27, 64, 125, ... ?

- (1) 256
- (2) 729
- (3) 512
- (4) 1000

14. Complete the series D-4, F-6, H-8, J-10, ?, ?

- (1) K-12, M-13
- (2) L-12, N-14
- (3) L-12, M-14
- (4) K-12, M-14

15. In a certain code language 'nee muck pic' means 'grave and concern'; 'ill dic so' means 'every body else'; and 'tur muk so' means 'body and soul'. Which of the following would mean 'every concern'?

- (1) dic pic
- (2) pic nee
- (3) ill pic
- (4) Cannot be determined

16. In a certain code, '975' means 'Throw away garbage'; '528' means 'Give away smoking' and '213' means 'Smoking is harmful'. Which digit in that code means 'Give'?

- (1) 5
- (2) 8
- (3) 2
- (4) 3

17. A woman walking with a boy meets another woman and on being asked about her relationship with the boy, she says, "My maternal uncle and his maternal uncle's maternal uncle are brothers." How is the boy related to the woman?

- (1) Nephew
- (2) Son
- (3) Brother-in-Law
- (4) Grandson

Directions (Questions 18-20) : Read the information given below to answer these questions.

- (i) There is a group of five girls.
- (ii) Kamini is second in height but younger than Rupa.

- (iii) Pooja is taller than Monika but younger in age.
 (iv) Rupa and Monika are of the same age but Rupa is tallest between them.
 (v) Neelam is taller than Pooja and elder to Rupa.
- 18.** If they are arranged in the ascending order of height, who will be in third position?
 (1) Monika (2) Monika or Rupa
 (3) Rupa (4) None of these
- 19.** If they are arranged in the descending order of their ages, who will be in fourth position?
 (1) Monika or Rupa (2) Monika
 (3) Kamini (4) None of these
- 20.** To answer the question "who is the youngest person in the group", which of the given statements is superfluous?
 (1) Only (i) (2) Only (v)
 (3) Only (ii) (4) Either (i) or (iv)
- 21.** What are the headquarters of Asian Development Bank?
 (1) Manila (2) Singapore
 (3) London (4) None of these
- 22.** India's Wage Policy is based on:
 (1) productivity (2) standard of living
 (3) cost of living (4) minimum needs
- 23.** With which game is 'Bully' associated?
 (1) Cricket (2) Football
 (3) Golf (4) Hockey
- 24.** Black soil is best suited for:
 (1) Tea (2) Rice
 (3) Cotton (4) Coffee
- 25.** Which of the following yields the largest revenue in the Central Budget?
 (1) Excise Duty (2) Sales Tax
 (3) Income Tax (4) None of these
- 26.** Which is the smallest State of India in terms of area?
 (1) Sikkim (2) Goa
 (3) Tripura (4) Nagaland
- 27.** Which State of India has the highest population density?
 (1) UP (2) Kerala
 (3) West Bengal (4) Bihar
- 28.** 'Aeroflot' Airlines belongs to which country?
 (1) Australia (2) France
 (3) Russia (4) Germany
- 29.** Thomas Cup is associated with:
 (1) Table Tennis (2) Golf
 (3) Football (4) Badminton
- 30.** Tagline 'Empowering People' is linked with which brand?
 (1) HCL (2) Compaq
 (3) Acer (4) Wipro
- 31.** Which is the newest Indian Institute of Management (IIM)?
 (1) Lucknow (2) Bangalore
 (3) Kozhikode (4) Indore
- 32.** Who is the second person with Indian roots to be awarded the Nobel Prize for Literature after Tagore?
 (1) Arundhati Roy (2) Vikram Seth
 (3) VS Naipaul (4) None of these
- 33.** Which bank advertises itself as 'The World's local bank'?
 (1) Citibank (2) HSBC
 (3) ICICI Bank (4) ABN-AMRO

- 34.** Olympics in the year 2008 will be held in:
 (1) London (2) Beijing
 (3) Sydney (4) New York
- 35.** Which is *not* a product from the company Indian Oil?
 (1) Servo Lubricants (2) Xtra Premium Petrol
 (3) Xtra Mile Diesel (4) Hi-speed Diesel
- 36.** According to the annual Forbes magazine's billionaires rankings released recently, Indian Steel magnate, Lakshmi N. Mittal has been placed at which place?
 (1) Second (2) Fourth
 (3) Fifth (4) Third
- 37.** IAEA stands for:
 (1) Indian Atomic Energy Agency
 (2) Indian and Afro Asian Energy Agency
 (3) International Atomic Energy Association
 (4) International Atomic Energy Agency
- 38.** How many countries took part in the recently held 18th Commonwealth Games in Melbourne?
 (1) 61 (2) 81
 (3) 71 (4) 91
- 39.** Global brand 'Marlboro' deals in:
 (1) Beverages (2) Tobacco
 (3) Retail Food (4) Automobiles
- 40.** Famous book 'The Argumentative Indian' has been written by?
 (1) Anurag Mathur (2) Rajdeep Sardesai
 (3) Amartya Sen (4) Vir Sanghvi

Directions (Questions 41-45) : Each question has an inference drawn out of the passage below. Mark your answer as:

- (1) if the inference is 'definitely true'
 (2) if the 'data provided is inadequate'
 (3) if the inference is 'probably true'
 (4) if the inference is 'definitely false'
- Ministry of Environment and Forest has granted environmental clearance to the Karkatla open-cast expansion project of the Central Coal Fields Ltd. In Bihar that envisages exploitation of non-coking coal reserves. The present production level of 0.8 million tonnes is proposed to be expanded to 1.5 million tonnes per annum at an estimated cost of Rs 67.82 crores under the project. The total land area requirement for the proposed mining activities is about 651 hectares which includes about one-sixth of it as forest land.
- 41.** The expansion plan would require about 100 hectares of forest land.
42. Karkatla open-cast mine is the only one of non-coking coal in the country.
43. There is no demand for non-coking coal.
44. The production cost of one tonne of non-coking coal from Karkatla mine will be about Rs 450.
45. Environmental concern gets less priority over the need of the coal.

Directions (Questions 46-50) : Each question has a statement followed by three suggested courses of action numbered I, II and III. Assume everything in the statement to be true, and decide which of the courses of action logically follows for pursuing.

Statement:

- 46.** Drinking water supply to New Bombay has been suspended

till further orders from Maharashtra pollution Control Board following pollution of Patalganga river, caused by discharge of effluents from some chemical industries.

Courses of Action:

- I. The industries responsible for discharging effluents into the river should be asked to close down immediately.
- II. The river water should immediately be treated chemically before resuming supply.
- III. The Pollution Control Board should check the nature of effluents being discharged into the river by industries at regular intervals.

- (1) All follow (2) Only II and III follow
(3) Only I follows (4) Only III follows

Statement:

47. The Department of Education has recommended that the primary level admission to Government and Government aided schools should be done purely by random selection and not by admission tests. This is necessitated as the number of admission seekers are much more than the available seats.

Courses of Action:

- I. The Government should instruct the private schools also to follow the same practice.
- II. The Government should set up an independent body to regulate the primary level admissions.
- III. The schools should be asked to select students only from those who stay in the neighbouring area of the school.

- (1) None follows (2) Only II and III follow
(3) Only I follows (4) Only III follows

Statement:

48. The vehicular traffic has increased so much in the recent past that it takes at least two hours to travel between the city and the airport during peak hours.

Courses of Action:

- I. Non-airport bound vehicles should not be allowed to ply on the road connecting the city and the airport.
- II. The load of vehicular traffic should be diverted through various link roads during peak hours.
- III. The departure and arrival of flights should be regulated so as to avoid congestion during peak hours.

- (1) Only I follows (2) Only I and II follow
(3) Only II follows (4) All follow

Statement:

49. Due to cancellation of a huge export order for not adhering to the time frame, the company is likely to get into incurring losses in the current financial year.

Courses of Action:

- I. The officer in charge of the production should be immediately suspended.
- II. The goods manufactured for the export order should be sold to other party.
- III. The company should change its machinery to maintain the time frame.

- (1) None follows (2) Only I and II follow
(3) Only II follows (4) All follow

Statement:

50. A devastating earthquake has ravaged the city killing hundreds of people and rendering many more homeless.

Courses of Action:

- I. The entry of outsiders into the city should be stopped immediately.
- II. The civic administration should immediately make alternate temporary housing arrangement for the victims.
- III. The affected people should immediately be shifted to a safer place.

- (1) Only I follows (2) Only III follows
(3) Only II and III follow (4) Either II or III follows

Directions (Questions 51-55) : Each question has a statement followed by three assumptions numbered I, II and III. Consider the statement and the assumptions to decide which of the assumptions is implicit in the statement.

Statement:

51. The residents of the locality wrote a letter to the Corporation requesting to restore normalcy in the supply of drinking water immediately as the supply at present is just not adequate.

Assumptions:

- I. The Corporation may not take any action on the letter.
- II. The municipality has enough water to meet the demand.
- III. The water supply to the area was adequate in the past.

- (1) Only I and III are implicit (2) Only II and III are implicit
(3) Only II is implicit (4) Only III is implicit

Statement:

52. We must be prepared to face any eventuality and all the assignments must be completed as per their schedule—Director tells the Faculty members.

Assumptions:

- I. There is possibility of a serious eventuality.
- II. Dates are fixed for all the assignments.
- III. Faculty members are supposed to complete all the assignments.

- (1) Only I is implicit (2) Only III is implicit
(3) None is implicit (4) All are implicit

Statement:

53. The telephone company informed the subscribers through a notification that those who do not pay their bills by the due date will be charged penalty for every defaulting day.

Assumptions:

- I. Majority of the people may pay their bills by the due date to avoid penalty.
- II. The money collected as penalty may set off the losses due to delayed payment.
- III. People generally pay heed to such notices.

- (1) All are implicit (2) Only I and II are implicit
(3) Only II and III are implicit (4) None of these

Statement:

54. In view of the recent spurt in sugar prices in the open market, the government has asked the dealers to release a vast quantity of imported sugar in the open market.

Assumptions:

- I. The dealers will follow the government directive.
- II. The sugar prices will come down.
- III. The price of indigenous sugar will remain unchanged.

- (1) Only I and II are implicit (2) Only I and III are implicit
(3) Only II and III are implicit (4) None is implicit

Statement:

55. In the recently held All Indian Commerce Conference the session on 'Management of Service Sector in India' surprisingly attracted large number of participants and also received a very good media coverage in the leading newspapers.

Assumptions:

- I. People were not expecting such an encouraging response for service sector.
 - II. Service sector is not managed properly in India.
 - III. Media is always very positive towards service sector.
- (1) Only I is implicit (2) Only I and III are implicit
(3) Only II and III are implicit (4) All are implicit

Directions (Questions 56-60) : Each question has a set of Assertion (A) and Reason (R). Mark the answer as:

- (1) if both A and R are true and R is the correct explanation of A.
- (2) A is true but R is false.
- (3) if both A and R are true but R is not the correct explanation of A.
- (4) A is false but R is true.

56. Assertion (A) : India has a tropical monsoon type climate.

Reason (R) : India is located exactly between the tropical latitudes.

57. Assertion (A) : For the production of aluminium, cheap electricity is essential.

Reason (R) : Extraction of aluminium from its ore requires abundant supply of electricity.

58. Assertion (A) : Winds are deflected to their right in Northern Hemisphere and to the left in the Southern Hemisphere.

Reason (R) : Rotation of earth causes the changes in wind direction.

59. Assertion (A) : Noise pollution is an unwanted accumulation of noise in the atmosphere.

Reason (R) : It interferes with communication.

60. Assertion (A) : Forest cutting is undesirable from the point of view of soil erosion.

Reason (R) : Cutting of forests reduces the percolation of rain water.

61. During the year 2004-2005, which commodity of the following earned the maximum amount in terms of value of exports in India?

- (1) Chemicals (2) Engineering Goods
(3) Textiles (4) None of these

62. Of the total value of India's foreign trade in 2004-05, the value of imports was nearly:

- (1) 45% (2) 65%
(3) 55% (4) 35%

63. Agriculture contributes approximately _____ of total GDP.

- (1) one-quarter (2) one-half
(3) one-third (4) two-thirds

64. Balance of trade is known to be favourable when:

- (1) value of exported goods exceeds value of imported goods
- (2) value of imported goods matches value of exported goods
- (3) value of imported goods exceeds value of exported goods
- (4) None of the above is correct

65. Sensex (Sensitive Index) points towards state of shares of top _____ blue chip companies.

- (1) 50 (2) 20 (3) 100 (4) 30

66. Who finally approves the draft Five-Year Plans?

- (1) Prime Minister (2) Planning Commission
(3) President (4) National Development Council

67. Which is India's largest Private Sector Bank?

- (1) HDFC (2) ICICI
(3) UTI (4) IDBI

68. Telecom company Nokia belongs to which country?

- (1) USA (2) Sweden
(3) Denmark (4) Finland

69. Slogan 'What you dream' is associated with which company?

- (1) Honda (2) Phillips
(3) Sony (4) Suzuki

70. In which city are the headquarters of International Monetary Fund (IMF) located?

- (1) New York (2) Berlin
(3) Washington (4) Geneva

71. Which company is the world's biggest automaker?

- (1) Toyota (2) General Motors
(3) Ford (4) Suzuki

72. Which plant has caught the fancy of many automobile manufacturers and oil companies to be developed as a source of 'Bio-diesel'?

- (1) Neem (2) Jatropa
(3) Palm (4) Eucalyptus

73. 'Data one' broadband services have been launched by which organization?

- (1) MTNL (2) Tata Walky
(3) BSNL (4) None of these

74. Inflation leads to:

- (1) no change in price level
- (2) abnormal increase in price level
- (3) abnormal decrease in price level
- (4) None of the above is correct

75. Percentage export growth rate of India during 2005 was:

- (1) 10% (2) 26%
(3) 8% (4) 21%

76. Indian Railways tied up with which of the following to launch a co-branded credit card and traveller loyalty card to tap the huge railway passengers market?

- (1) BOB Card (2) Citibank Card
(3) SBI Card (4) None of these

77. Indian Railways has been organized into how many zones?

- (1) 14 (2) 16
(3) 15 (4) 17

78. Tenth Five-Year Plan targets a growth rate of _____ of GDP per annum.

- (1) 8% (2) 9%
(3) 7% (4) None of these

79. When will the next population census be held in India?

- (1) 2010 (2) 2011
(3) 2015 (4) 2008

80. Of which US university is the Kellogg School of Management a part?

- (1) New York (2) Columbia
(3) North-Western (4) None of these

Directions (Questions 81-84) : Fill in the blanks with the most appropriate alternatives.

81. It is _____ that those who expect _____ from others are seldom merciful themselves.

- (1) strange; sincerity
- (2) unpardonable; kindness
- (3) stupid; sympathy
- (4) paradoxical; clemency

82. Some people have the _____ for learning foreign languages but they have no _____ to speak any.

- (1) aptitude; interest
- (2) stamina; fondness
- (3) capacity; ability
- (4) compulsion; inclination

83. In Buddhism, it is impossible to keep ethics and psychology _____ from one another, because they _____ at so many points.

- (1) aloof; merge
- (2) disjoin; converge
- (3) alien; meet
- (4) separate; overlap

84. Cholesterol has long been identified as a silent killer because the patient has no _____ of the danger freely _____ his system.

- (1) information; invading
- (2) thought; attacking
- (3) idea; infecting
- (4) inkling; traversing

Directions (Questions 85-88) : In each of these questions one sentence has been split into four parts. There is an error in one part. Identify the part having the error.

- 85.** (1) A skilful advertiser may be able to create
(2) not because his product is superior to,
(3) practically a monopoly for himself
(4) but because he has succeeded in inducing people to believe that it is.
- 86.** (1) Whatever may be the origin of speech
(2) to feel the need to speak
(3) we can be certain that man did not begin
(4) until he began to live in communities.
- 87.** (1) I regret to bring to your kind notice
(2) of your school, has been found to be much distressed
(3) that my son Sachin Dubey of Vth Standard
(4) and out of sorts for the last few days.
- 88.** (1) Our teeming masses, nevertheless illiterate they may be,
(2) and they are fully capable
(3) have a very high sense of consciousness
(4) of exercising their franchise.

Directions (Questions 89-92) : In each of these questions four words are given marked A, B, C and D. Two of these words are most nearly the same or opposite in meaning. Identify those two words.

- 89.** A. enthralling
B. respecting
C. projecting
D. alluring
(1) A-B (2) C-D (3) B-C (4) A-D
- 90.** A. swoop
B. perturb
C. plump
D. boil

- (1) A-D (2) A-C (3) B-C (4) B-D

- 91.** A. fallacy
B. adage
C. dictum
D. endorse

- (1) B-D (2) B-C (3) C-D (4) A-D

- 92.** A. elevate
B. frugal
C. exult
D. lament

- (1) C-D (2) B-C (3) A-B (4) B-D

Directions (Questions 93-96) : Each of these questions has a set of 3 or 4 sentences to logically convey an idea. The possible filler(s) in the middle is/are given separately as A and B. Mark the answer as:

- (1) if A and B are to be filled in that order.
- (2) if only A is to be filled.
- (3) if B and A are to be filled in that order.
- (4) if only B is to be filled.

93. As far as aircraft maintenance procedures are concerned, they are rigorous. (______). Such cases may end-up in disastrous results, though exceptionally.

- A. All problems are immediately corrected on almost every occasion.
- B. Only due to urgency or want of aircraft for substitution, certain ones are overlooked.

94. Auto-riding is a very fascinating hobby. (______). It is obvious that they consider the hobby more important than anything else.

- A. Low or even middle income group people cannot afford it.
- B. I know many people who had missed many important cases or opportunities for participation in auto-riding.

95. There is no doubt that we must be fair and honest in all our dealings. (______). What you really are is less important than what you are perceived by people around you.

- A. It means that perception assumes greater importance than reality.
- B. But even more important is how you are perceived by others.

96. The admiration for those who fight against corruption in high places has always been very spontaneous amongst the common people in India. (______). They unhesitantly appreciate such acts but are afraid of openly doing so for fear of the higher ups.

- A. They hold such people in high esteem who make sacrifices on principles and moral issues.
- B. They make verbose speeches of admiration and appreciation of such acts.

Directions (Questions 97-100) : Each of these questions has a sentence scrambled and marked A, B, C, D and E. Find the correct order as one of the four alternatives.

- 97.** A. in different regions of that federation.
B. that was Yugoslavia.
C. the fundamental cause has been the very large difference in the quality of life.
D. although the dismemberment of the federation.
E. is seen more as the result of an ethnic conflict.
(1) D, B, E, C, A (2) B, C, E, D, A
(2) C, E, B, D, A (4) A, B, D, E, C

- 98.** A. but there is some merit in it
 B. as distinct from consumption
 C. the bifurcation of plan and non-plan funds
 D. insofar as it focuses attention on development expenses
 E. in the budget is artificial

- (1) D, C, A, B, E (2) C, E, A, B, D
 (3) C, D, B, E, A (4) D, E, A, C, B

- 99.** A. like the Industrialized countries
 B. as if they are to be suffered as relics of a backward past
 C. we have specially drawn attention to the non-motorized transport modes
 D. because they are completely overlooked in transport planning
 E. till replaced by faster petroleum fuelled transport

- (1) D, E, A, C, B (2) C, B, A, D, E
 (3) C, D, E, B, A (4) C, D, B, E, A

- 100.** A. he was highly sensitive and resentful
 B. towards the country or to those
 C. when there was even implied discourtesy
 D. while he was extremely gentle and tolerant
 E. he held in honour

- (1) A, C, D, B, E (2) E, A, D, C, B
 (3) D, A, C, B, E (4) D, C, B, E, A

101. A sum of Rs 25 was paid for a work which A can do in 32 days, B in 20 days, B and C in 12 days and D in 24 days. How much did C receive if all the four work together?

- (1) $\frac{14}{3}$ (2) $\frac{16}{3}$ (3) $\frac{15}{3}$ (4) $\frac{17}{3}$

102. A can build up a wall in 8 days while B can break it in 3 days. A has worked for 4 days and then B joined to work with A for another 2 days only. In how many days will A alone build up the remaining part of the wall?

- (1) $13\frac{1}{3}$ days (2) $6\frac{1}{3}$ days
 (3) $7\frac{1}{3}$ days (4) 7 days

103. A cistern can be filled by two pipes filling separately in 12 and 16 min respectively. Both pipes are opened together for a certain time but being clogged, only $\frac{7}{8}$ of full quantity water flows through the former and only $\frac{5}{6}$ through the latter pipe. The obstructions, however, being suddenly removed, the cistern is filled in 3 min from that moment. How long was it before the full flow began?

- (1) 2.5 min (2) 4.5 min
 (3) 3.5 min (4) 5.5 min

104. A man sold two steel chairs for Rs 500 each. On one, he gains 20% and on other, he loses 12%. How much does he gain or lose in the whole transaction?

- (1) 1.5% gain (2) 2% gain
 (3) 1.5% loss (4) 2% loss

105. A sum of money lent out at simple interest amounts to Rs 720 after 2 years and to Rs 1,020 after a further period of 5 years. The sum and the rate % are:

- (1) Rs 500, 5% (2) Rs 400, 15%
 (3) Rs 600, 10% (4) Rs 700, 20%

106. A man takes 6 hours 30 min in going by a cycle and coming back by scooter. He would have lost 2 hours 10 min by going on cycle both ways. How long would it take him to go by scooter both ways.

- (1) $2\frac{1}{6}$ hrs (2) $4\frac{1}{3}$ hrs
 (3) $3\frac{1}{3}$ hrs (4) $5\frac{1}{3}$ hrs

107. A train with 90 km/h crosses a bridge in 36 seconds. Another train 100 metres shorter crosses the same bridge at 45 km/h. What is the time taken by the second train to cross the bridge?

- (1) 61 seconds (2) 63 seconds
 (3) 62 seconds (4) 64 seconds

108. Two pipes A and B can fill a tank in 20 and 30 hours respectively. Both the pipes are opened to fill the tank but when the tank is $\frac{1}{3}$ rd full, a leak develops in the tank through which one-third water supplied by both pipes goes out. The total time taken to fill the tank is:

- (1) 12 hours (2) 16 hours
 (3) 14 hours (4) 18 hours

109. Ramesh travels 760 km to his home, partly by train and partly by car. He takes 8 hours, if he travels 160 km by train and the rest by car. He takes 12 minutes more, if he travels 240 km by train and the rest by car. What are the speeds of the train and of the car?

- (1) Speed of car = 90 km/h, speed of train = 60 km/h
 (2) Speed of car = 100 km/h, speed of train = 80 km/h
 (3) Speed of car = 80 km/h, speed of train = 70 km/h
 (4) Speed of car = 100 km/h, speed of train = 90 km/h

110. Some students planned a picnic. The budget for food was Rs 500. But, 5 of them failed to go and thus the cost of food for each member increased by Rs 5. How many students attended the picnic?

- (1) 15 (2) 25 (3) 20 (4) 30

111. In a flight of 6000 km, an aircraft was slowed down due to bad weather. The average speed for the trip was reduced by 400 kmph and the time of flight increased by 30 minutes. The original planned duration of the flight was:

- (1) $1\frac{1}{2}$ h (2) $3\frac{1}{2}$ h (3) 3 h (4) 4 h

112. After being set up, a company manufactured 6000 scooters in the third year and 7000 scooters in the seventh year. Assuming that the production increases uniformly by a fixed number every year, what is the production in the tenth year?

- (1) 7850 (2) 7650
 (3) 7750 (4) 7950

113. Soma purchases National Savings Certificates every year whose value exceeds the previous year's purchase by Rs 400. After 8 years, she finds that she has purchased certificates whose total face value is Rs 48,000. What is the face value of the certificates purchased by her in the first year?

- (1) Rs 4,300 (2) Rs 4,500
 (3) Rs 4,400 (4) Rs 4,600

114. A computer is available for Rs 39,000 cash or Rs 17,000 as cash down payment followed by five monthly instalments of Rs 4,800 each. What is the rate of interest under the instalment plan?

- (1) 35.71% p.a. (2) 37.71% p.a.
 (3) 36.71% p.a. (4) 38.71% p.a.

115. Under the Rural Housing Scheme, the Delhi Development Authority (DDA) allotted a house to Kamal Raj for Rs 1,26,100. This payment is to be made in three equal annual instalments. If the money is reckoned at 5% per annum compound interest, how much is to be paid by Kamal Raj in each instalment?

- (1) Rs 45,205 (2) Rs 47,405
 (3) Rs 46,305 (4) Rs 48,505

116. A pole 5 metres high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point A on the ground is 60° and the angle of depression of the point A from the top of the tower is 45°. The height of the tower is:

- (1) 5.83 m (2) 7.83 m
 (3) 6.83 m (4) 4.83 m

117. A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of the cylinder is 24 m. The height of the cylindrical portion is 11 m while the vertex of the cone is 16 m above the ground. The area of the canvas required for the tent is:

- (1) 1300 m² (2) 1320 m²
 (3) 1310 m² (4) 1330 m²

118. The average score of boys in an examination in a school is 71 and that of the girls is 73. The average score of the school is 71.8. The ratio of the number of boys to that of the girls that appeared in the examination is:

- (1) 1 : 2 (2) 3 : 2
 (3) 2 : 2 (4) 4 : 2

119. The mean monthly salary paid to 75 workers in a factory is Rs 5,680. The mean salary of 25 of them is Rs 5,400 and that of 30 others is Rs 5,700. The mean salary of the remaining workers is:

- (1) Rs 5,000 (2) Rs 7,000
 (3) Rs 6,000 (4) Rs 8,000

120. It is known that a box of 200 electric bulbs contains 16 defective bulbs. One bulb is taken out at random from the box. What is the probability that the bulb drawn is (i) defective? (ii) non-defective?

- (1) (i) $\frac{2}{25}$ (ii) $\frac{23}{25}$ (2) (i) $\frac{4}{25}$ (ii) $\frac{21}{25}$
 (3) (i) $\frac{3}{25}$ (ii) $\frac{22}{25}$ (4) (i) $\frac{1}{25}$ (ii) $\frac{20}{25}$

Directions (Questions 121-124) : Study the following table to answer these questions.

Availability and Demand for Various Categories of Steel in Indian Railways

(in '000 tonnes)

S.No.	Category	1999-2000		2003-2004	
		Demand	Availability	Demand	Availability
1.	Shapes	6960	5725	9745	9360
2.	Flats	4360	5020	6300	6600
3.	Railway material	400	550	450	560

121. If the demand for each category of steel is to be met in 2003-04, the additional quantity of steel that is to be produced is:

- I. 110 thousand tonnes of railway material
 II. 300 thousand tonnes of flats
 III. 385 thousand tonnes of shapes
 (1) I only (2) III only

- (3) II only (4) Both II and III only

122. The expected percentage growth in the demand for railway material over the five-year period from 1999-2000 to 2003-04 is:

- (1) 11 (2) 1/8 (3) 37.5 (4) 12.5

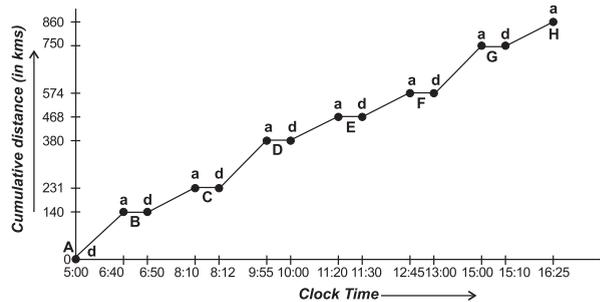
123. The percentage change in the shortfall of shapes over the five-year period from 1999-2000 to 2003-04 is expected to be:

- (1) + 40 (2) + 221 (3) - 68 (4) - 221

124. Which one of the following statements is necessarily true?

- (1) The demand for shapes as a percentage of the total demand for steel was almost the same for 1999-2000 and 2003-04.
 (2) The shortage of shapes is only due to excess availability of flats and railway material.
 (3) The demand for railway materials as a percentage of the total demand for steel was less in 1999-2000 than in 2003-04.
 (4) The rate of growth in demand for shapes is greater than the rate of growth in supply of shapes.

Directions (Questions 125-128) : Study the following line graph to answer these questions.



Railway Time Schedule of an Express Train X Running Between City A and City H.

a → Arrival of train d → Departure of train
 A, B, C, D, E, F, G, H → Cities through which the train runs.
 a-d → Indicates stoppage/halting of the train at the city station.

125. The average speed of the train maintained between two successive stations was maximum between:

- (1) E-F (2) F-G
 (3) G-H (4) Both G-H and F-G

126. Between how many pairs of consecutive stations does the speed run below the overall average speed of the entire trip?

- (1) 4 (2) 1
 (3) 3 (4) 2

127. If the train stops at each city for 30% more time than what it is at the moment, then at what time will it reach the city H after departing from City A as per schedule?

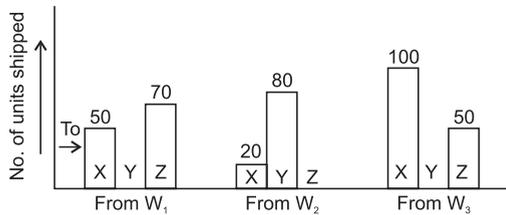
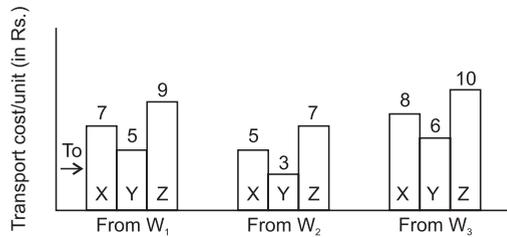
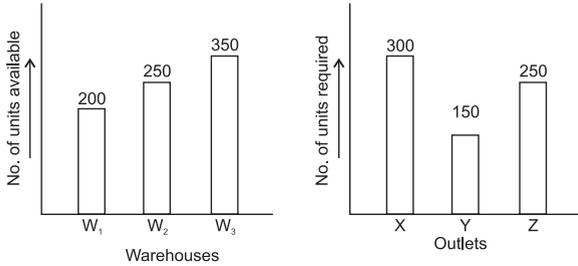
- (1) Data insufficient (2) 17 : 33
 (3) 16 : 41 (4) 16 : 58

128. The train begins its onward journey from City A and it is extended to beyond City H to a City M due to some unavoidable reason. The train starts its return journey immediately after it reached City M. The train returns with a speed of 90 km/hr without any stoppages in between and reaches City A at 2:25 AM. Find the distance between City H and City M.

- (1) 40 km (2) 90 km
(3) 70 km (4) 10 km

Directions (Questions 129-132) : Examine the following bar graphs to answer these questions.

Transportation Schedule of a Company from its Warehouses to its Outlets



129. If only warehouse W₂ was available, then the minimum cost at which it can supply all the quantity available is:

- (1) Rs 1,750 (2) Rs 750
(3) Rs 1,250 (4) Rs 950

130. If each warehouse is allowed to supply to only one outlet so that the quantity required for the outlet is fully met from the quantity available at the warehouse, then the cost to be incurred is:

- (1) Rs 4,900 (2) Rs 5,000
(3) Rs 5,500 (4) Rs 4,700

131. If the outlet Y alone is available, then cost of transporting 100 units from each of the warehouses W₁, W₂, W₃ is:

- (1) Rs 1,500 (2) Rs 2,000
(3) Rs 1,400 (4) Rs 1,600

132. If goods in W₁ are rejected due to manufacturing defect and the corresponding supplies are made from W₃, the cost incurred in transporting the shipped quantity is:

- (1) Rs 2,620 (2) Rs 2,740
(3) Rs 2,670 (4) Rs 2,690

Directions (Questions 133-136) : Study the following table to answer these questions.

Projected Population of Light Motor Vehicles (in Millions)

S.No.	Country	1975	2030
1.	United States	141	382
2.	Japan	120	238
3.	France	67	164
4.	China	63	117
5.	Italy	18	61
6.	Germany	21	58
7.	U.K.	15	47
8.	Canada	5	17
9.	Switzerland	1.5	3

133. The average population of LMVs of the middle three countries in 1975 bears to the average population of LMVs of the last three countries, a ratio of nearly:

- (1) 19 : 4 (2) 11 : 3
(3) 7 : 2 (4) 5 : 1

134. The percentage growth of the average population of LMVs for the last three countries between the year 1975 and 2030 is approximately:

- (1) 71 (2) 212
(3) 172 (4) 221

135. For China, assuming a linear growth in LMVs population, extrapolate nearly, when will the growth in population be 108% beyond year 2030?

- (1) 2048 (2) 2050
(3) 2032 (4) 2038

136. The percentage growth of the projected LMVs population between 1975 and 2030 among the last five countries is maximum in:

- (1) Italy (2) Switzerland
(3) Canada (4) U.K.

Directions (Questions 137-140) : Study the following table to answer these questions.

Allotment of Shares by a Multinational Company

No. of Shares Applied for	No. of Shares Allotted	Ratio of Allottees to Applicants	No. of Allottees
100	100	1 : 50	8001
200-500	100	2 : 41	7624
600-900	200	1 : 15	6202
1000-3000	200	3 : 28	1515
3100-10000	200	1 : 6	1633
10200-21000	300	2 : 5	404
25000	350	1 : 1	11

137. Find the total number of applicants who had applied for 3100-25000 share.

- (1) 2048 (2) 10819
(3) 445 (4) 7562

138. Find the average number of shares allotted to an allottee.

- (1) 100 (2) 150

- (3) 140 (4) 200

139. Find the ratio between the number of applicants who applied for 1000-3000 shares and those for 10200-21000 shares.

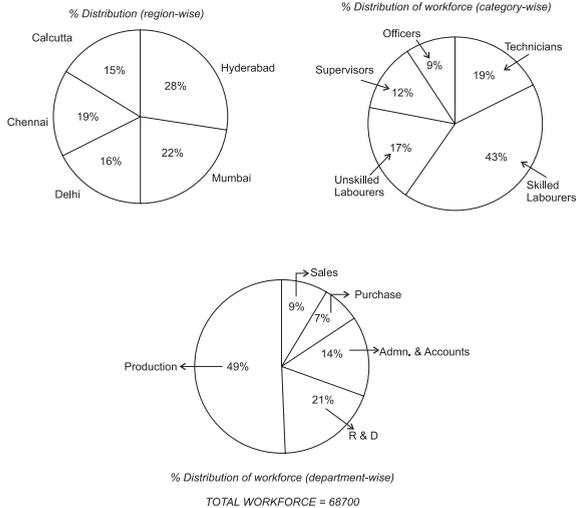
- (1) 56 : 15 (2) 15 : 56
(3) 70 : 3 (4) 14 : 1

140. If the face value of a share is Rs 100 and the company wanted a subscription of 1 lakh rupees, how much was it oversubscribed?

- (1) Rs 45,000 (2) Rs 4,500
(3) Rs 15,000 (4) Rs 10,000

Directions (Questions 141-144) : Study the following pie charts to answer these questions.

DISTRIBUTION OF WORKFORCE IN A COMPANY



141. If 22% of the Production department persons are posted at Hyderabad region, then what % of Hyderabad workforce are in Production department?

- (1) 38.5 (2) 78 (3) 68 (4) 22

142. How many supervisors are posted in Calcutta region?

- (1) 1237 (2) 985
(3) 1144 (4) Data insufficient

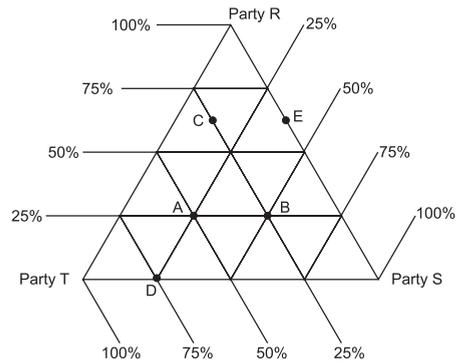
143. If 11% officers of the company are in Administration and Accounts department, of which 75% are posted at Calcutta, then what % of total officers of the company are posted at Administration and Accounts, Calcutta?

- (1) 11 (2) 8.25
(3) 3.75 (4) Data insufficient

144. If under expansion programme, the company recruits 12% of workforce of Hyderabad and Mumbai regions, but 6% of workforce of Calcutta region retires, and workforce at other regions remains the same, then what will be total workforce of the company?

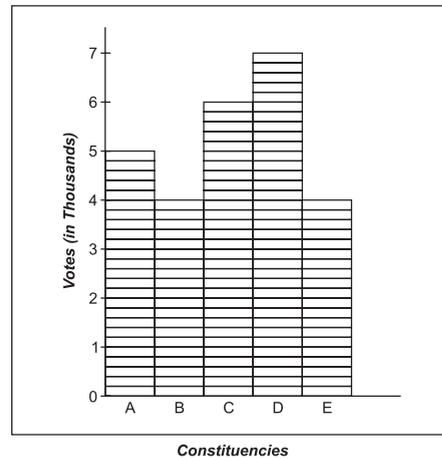
- (1) 65,196 (2) 68,238
(3) 72,204 (4) 69,430

Directions (Questions 145-148) : Following questions are based on the triangular diagram and bar diagram given below. Study them carefully to answer these questions.



The above triangle diagram shows the distribution of votes among three parties R, S and T in five different constituencies in an election.

The following diagram shows the total votes cast for the three parties in these five constituencies.



145. The constituency which casts more votes for S than for T is:

- (1) A (2) C (3) B (4) D

146. Which constituencies cast the same number of votes for Party R?

- (1) A, B (2) B, E (3) B, C (4) None of these

147. Total number of votes secured by T in the five constituencies together is:

- (1) 2,000—4,000 (2) 8,000—10,000
(3) 4,000—6,000 (4) 10,000—12,000

148. If no party was voted by less than 25% and more than 50% of the total number of votes in the five constituencies, the total number of voters in the five constituencies should be between:

- (1) 20,000 and 31,000 (2) 21,000 and 31,400
(3) 20,500 and 31,200 (4) 21,500 and 32,000

Directions (Questions 149-152) : The following questions are accompanied by three statements A, B and C. You have to determine which statement(s) is/are sufficient/necessary to answer the questions.

149. Find three positive consecutive even numbers.

- A. The average of four consecutive even numbers starting from the last of the given numbers is 17.
 B. The difference of the highest and the lowest number is 4.
 C. The sum of the squares of the three numbers is 440.

- (1) A alone is sufficient
- (2) C is sufficient
- (3) A and B are sufficient
- (4) Either A or C is sufficient

150. Sonu's income is how much more than Monu's?

- A. Sonu's income is 30% less than her husband's whose provident fund deduction at the rate of 5% is Rs 975 per month.
- B. Monu spends 30% of her income on house rent, 15% of which is electricity bill.
- C. Sonu's expenditure on house rent is Rs 4,500 more than that of Monu's.

- (1) Only B and C are sufficient
- (2) Any two statements are sufficient
- (3) Only A and C are sufficient
- (4) Even all together are not sufficient

151. Find out the share of B out of the combined share of A, B and C of Rs 946.

- A. The share of A is 2/9 of the combined share of B and C.
- B. The share of B is 3/19 of the combined share of A and C.
- C. The share of C is 2.143 times the combined share of B and A.

- (1) Only statements A and C are sufficient
- (2) Only statement B alone is sufficient
- (3) Any two statements are sufficient
- (4) Either statements A and C together or B alone is sufficient

152. Mohan is 6 years older than Sohan. What will be the sum of their present ages?

- A. After 6 years the ratio of their ages will be 6 : 5.
- B. The ratio of their present ages is 5 : 4.
- C. 6 years ago the ratio of their ages was 4 : 3.

- (1) Only B alone is sufficient
- (2) Only A alone is sufficient
- (3) Only A and C together are sufficient
- (4) Any one of A, B and C is sufficient

Directions (Questions 153-156) : Each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and give answer as:

- (1) if the data in statement I alone are sufficient to answer the question, while the data in statement II alone are not sufficient to answer the question.
- (2) if the data either in statement I alone or in statement II alone are sufficient to answer the question.
- (3) if the data in statement II alone are sufficient to answer the question, while the data in statement I alone are not sufficient to answer the question.
- (4) if the data even in both statements I and II together are not sufficient to answer the question.

153. In a two-digit number, the digit at units place is 4 more than the digit at tens place. Find the two-digit number.

- I. Sum of their digits is 10.
- II. The difference between the number and the number obtained by interchanging the position of the digits is 36.

154. What is the average age of the children in a class?

- I. The age of the teacher is as many years as the number of children.
- II. The average age increases by 1 year if the teacher's age is also included.

155. Which newspaper has the maximum circulation in Delhi.

- I. 2 lakh copies of newspaper X are sold in Delhi while the circulation of newspaper Y is estimated at 3 lakh.
- II. The circulation of newspaper Y is 55 per cent of the total circulation of newspapers.

156. What is the difference between the shares of profits of Rekha and Nutan out of a profit of Rs 6,000 at the end of the year?

- I. Rekha invested Rs 50,000 and withdrew Rs 1,000 after 4 months.
- II. For the last 8 months, Nutan's capital was 125% of Rekha's.

Directions (Questions 157-160) : Following questions consist of two quantities, one in Column A and one in Column B. You are to compare the two quantities. Mark the answer as:

- (1) if the quantity in Column A is greater;
- (2) if the two quantities are equal;
- (3) if the quantity in Column B is greater;
- (4) if the relationship cannot be determined from the information given.

Column A	Column B
157. $(-3)^9$	$(-3)^9$
158. $9 \times 682 \times 7$	$10 \times 682 \times 6$
159. $\frac{c^2 d^2 e^2}{c^3 d^3 e^3}$	$\frac{cde}{3}$
160. 0.0005	$\frac{1}{2}\%$

Directions (Questions 161-180) : Read the following passages carefully to answer the questions that follow each passage.

PASSAGE—I

Agriculture dominates change in India through its causal links with factor and product markets. It employs 60 per cent of the labour force and contributes 26 per cent of the gross domestic product. In the poorer States, its contribution to the domestic product is close to 40 per cent. Low productivity in agriculture has led to the concentration of the poor in this sector. Due to the sheer size of the agricultural economy and the importance of its major products (cereals) in the diets of the poor, gains in agricultural productivity have significant potential impact on poverty. Theoretically, it is possible to reduce poverty as well as expand the domestic market for industry by raising labour productivity in agriculture and spreading its gains among the low income groups. Modelling of the linkages between agricultural and industrial growth has shown that a 10 per cent increase in agricultural output would increase industrial output by 5 per cent and urban workers would benefit by both increased industrial employment and price deflation. However, there is a symmetry of adjustments in the demand and supply of agricultural goods. An increase in non-agricultural production would lead to an immediate increase in demand for intermediate and final agricultural goods, whereas supply-side adjustments involving re-allocation of resources and net additional investment for capacity expansion take a much longer period. There is a widely held view that in a large country like India, the

demand stimulus for industrialization would come mainly from agriculture with less social and economic costs.

Interdependencies in food and labour market are important for the development process. An upward shift in the food supply curve would simultaneously result in an upward shift in the labour demand curve. The magnitude of the interdependence depends on the technique of production causing the shifts in the food supply curve. Similarly, an upward shift in the labour supply curve shifts up the food demand curve. The extent of interdependence between the forces of labour supply and food demand depends on the employment output elasticity and the income elasticity of demand for food. The recent estimate of the employment output elasticity in agriculture is around 0.5, income elasticity of food is in the range of 0.55-0.60 and that for cereals is 0.25-0.30. The other important inter-dependency, which plays a crucial role in inducing indirect employment, is that between food and other sectors through demand linkages. Since food accounts for a major share in the budget of the poor and any reduction in the food price levels a significant proportion of income for other items, a lower food price stimulates employment in industrial and service sectors. On the other hand an increase in the food price would increase the wage costs of industrial products and hence the prices of industrial products. In the absence of adjustments through exports, it would result in demand deficiency. Clearly, the most favourable situation in India is one in which labour demand outpaces its supply and food supply outpaces its demand.

Wage rate cannot fall below a certain minimum determined by the costs of subsistence living and the labour supply curve turns elastic at the subsistence wage rate. Demographic pressure cannot push the wage rate below the subsistence level. People would be willing to starve rather than work unless the energy expended in physical work is compensated by the energy provided by food. Food grain price usually determines the subsistence wage rate in agricultural as well as in the urban informal sector since food grains account for about four-fifth of the calorie intake of the poor.

161. Which of the following is meant by “the labour supply curve turns elastic at the subsistence wage rate” as used in the passage?

- (1) People refuse to work at the minimum wage rate.
- (2) People are eager to work at the minimum wage rate.
- (3) People still work at the minimum wage rate.
- (4) People have no option but to work at the minimum wage rate.

162. Which of the following statements is *not* true in the context of the passage?

- (1) Increase in labour productivity in agriculture can reduce poverty.
- (2) Agricultural sector can increase the demand for labour forces.
- (3) Agricultural sector can provide the impetus for greater industrialization at lower cost.
- (4) All are true.

163. Which of the following in addition to employment output elasticity, according to the passage, creates indirect employment?

- (1) Inter-linkage of demand of food and other sectors.
- (2) Income elasticity of demand for food.
- (3) Inter-dependence of forces of labour supply and food demand.
- (4) All the above

164. Why, according to the passage, does lower food price

stimulate employment in the industrial and service sectors?

- (1) Poorer people cannot afford to buy non-food products.
- (2) The production cost of non-agricultural products and services reduces.
- (3) Lower price of food items provides the poor with extra funds to buy other products and services.
- (4) Industrial sector can afford to employ more people at lower cost.

PASSAGE—II

The lithosphere, or outer shell, of the earth is made up of about a dozen rigid plates that move with respect to one another. New lithosphere is created at mid-ocean ridges by the upwelling and cooling of magma from the earth's interior. Since new lithosphere is continuously being created and the earth is not expanding to any appreciable extent, the question arises: What happens to the “odd” lithosphere?

The answer came in the late 1960s as the last major link in the theory of sea-floor spreading and plate tectonics that has revolutionized our understanding of tectonic processes, or structural deformation, in the earth and has provided a unifying theme for many diverse observations of the earth sciences. The old lithosphere is subducted, or pushed down, into the earth's mantle (the thick shell of red-hot rock beneath the earth's thin, cooler crust and above its metallic, partly melted core). As the formerly rigid plate descends it slowly heats up, and over a period of millions of years it is absorbed into the general circulation of the earth's mantle.

The subduction of the lithosphere is perhaps the most significant phenomenon in global tectonics. Subduction not only explains what happens to old lithosphere but also accounts for many of the geologic processes that shape the earth's surface. Most of the world's volcanoes and earthquakes are associated with descending lithospheric plates. The prominent island arcs—chains of islands such as the Aleutians, the Kuriles, the Marianas, and the islands of Japan—are surface expressions of the subduction process. The deepest trenches of the world's oceans, including the Java and Tonga trenches and all others associated with island arcs, mark the seaward boundary of subduction zones. Major mountain belts, such as the Andes and the Himalayas, have resulted from the convergence and subduction of lithospheric plates.

To understand the subduction process it is necessary to look at the thermal regime of the earth. The temperatures within the earth at first increase rapidly with depth, reaching about 1,200 degrees Celsius at a depth of 100 kilometers. Then they increase more gradually, approaching 2,000 degrees C at about 500 kilometers. The minerals in peridotite, the major constituent of the upper mantle, start to melt at about 1,200 C, or typically at a depth of 100 kilometers. Under the oceans the upper mantle is fairly soft and may contain some molten material at depths as shallow as 80 kilometers. The soft region of the mantle, over which the rigid lithospheric plate normally moves, is the asthenosphere. It appears that in certain areas convection currents in the asthenosphere may drive the plates, and that in other regions the plate motions may drive the convection currents.

Several factors contribute to the heating of the lithosphere as it descends into the mantle. First, heat simply flows into the cooler lithosphere from the surrounding warmer mantle. Since the conductivity of the rock increases with temperature, the conductive heating becomes more efficient with increasing depth. Second, as the lithospheric slab

- II. Transport costs
- III. Research costs

- (1) I only
- (2) I and II only
- (3) III only
- (4) II and III only

171. According to the passage, the problem of noise can be solved through:

- I. Active measures
- II. Passive measures
- III. Tax levies

- (1) I only
- (2) I and II only
- (3) III only
- (4) II and III only

172. According to the passage, the costs of some anti-pollution measures will have to be borne by individuals because:

- (1) individuals contribute to the creation of population
- (2) industry is not willing to bear its share
- (3) governments do not have adequate resources
- (4) individuals are more easily taxed than producers

PASSAGE—IV

Much as an electrical lamp transforms electrical energy into heat and light, the visual “apparatus” of a human being acts as a transformer of light into sight. Light projected from a source or reflected by an object enters the cornea and lens of the eyeball. The energy is transmitted to the retina of the eye whose rods and cones are activated. The stimuli are transferred by nerve cells to the optic nerve and then to the brain, man is a binocular animal, and the impressions from his two eyes are translated into sight—a rapid, compound analysis of the shape, form, colour, size, position, and motion of the things he sees. Photometry is the science of measuring light. The illuminating engineer and designer employ photometric data constantly in their work. In all fields of application of light and lighting, they predicate their choice of equipment, lamps, wall finishes, colours of light and backgrounds, and other factors affecting the luminous and environmental pattern to be secured, in great part from data supplied originally by photometric laboratory. Today, extensive tables and charts of photometric data are used widely, constituting the basis for many details of design. Although the lighting designer may not be called upon to the detailed work of making measurements or plotting data in the form of photometric curves and analyzing them, an understanding of the terms used and their derivation form valuable background knowledge. The perception of colour is a complex visual sensation, intimately related to light. The apparent colour of an object depends primarily upon four factors : its ability to reflect various colours of light, the nature of the light by which it is seen, the colour of its surroundings, and the characteristics and state of adaptation of the eye. In most discussions of colour, a distinction is made between white and coloured objects. White is the colour name most usually applied to a material that diffusely transmits a high percentage of all the hues of light. Colours that have no hue are termed neutral or achromatic colours. They include white, off-white, all shades of gray, down to black. All coloured objects selectively absorb certain wavelengths of light and reflect or transmit others in varying degrees. Inorganic materials, chiefly metals such as copper and brass, reflect light from their surfaces. Hence we have the term “surface” or “metallic” colours, as contrasted with “body” or “pigment” colours. In the former, the light reflected from the surface is often tinted. Most paints, on the other hand, have body or pigment colours. In these, light is reflected from the surface without much colour change, but the body

material absorbs some colours and reflects others; hence, the diffuse reflection from the body of the material is coloured but often appears to be overlaid and diluted with a “white” reflection from the glossy surface of the paint film. In paints and enamels, the pigment particles, which are usually opaque, are suspended in a vehicle such as oil or plastic. The particles of a dye, on the other hand, are considerably finer and may be described as colouring matter in solution. The dye particles are more often transparent or translucent.

173. According to the passage, lighting engineers need not:

- (1) plot photometric curves
- (2) utilize photometric data
- (3) understand photometric techniques
- (4) have mathematical expertise

174. The colour black is an example of:

- (1) a surface colour
- (2) an achromatic colour
- (3) an organic colour
- (4) a diffuse colour

175. Paint is an example of a substance containing:

- (1) inorganic material
- (2) body colours
- (3) surface colours
- (4) metallic colours

176. The perception of colour is:

- (1) a photometric phenomenon
- (2) a complex visual sensation
- (3) activated by the brain
- (4) light reflected by a source

PASSAGE—V

At the Fourth World Water Forum held in Mexico City in March 2006, the 120-nation assembly could not reach a consensus on declaring the right to safe and clean drinking water a human right. Millions of people the world over do not have access to potable water supply. But it is good times for the bottled-water industry, which is cashing in on the need for clean drinking water and the ability of urban elite to pay an exorbitant price for this very basic human need. The fortunes of this more-than-\$100-billion global industry are directly related to the human apathy towards the environment—the more we pollute our water bodies, the more the sales of bottled water. It is estimated that the global consumption of bottled water is nearing 200 billion liters—sufficient to satisfy the daily drinking water need of one-fourth of the Indian population or about 4.5 per cent of the global population.

In India, the per capita bottled water consumption is still quite low—less than five liters a year as compared to the global average of 24 liters. However, the total annual bottled water consumption has risen rapidly in recent times—it has tripled between 1999 and 2004—from about 1.5 billion liters to five billion liters. These are boom times for the Indian bottled water industry—more so because the economics are sound, the bottom line is fat and the Indian government hardly cares for what happens to the nation’s water resources. India is the tenth largest bottled water consumer in the world. In 2002, the industry had an estimated turnover of Rs 10 billion (Rs 1,000 crores). Today it is one of India’s fastest growing industrial sectors. Between 1999 and 2004, the Indian bottled water market grew at a compound annual growth rate (CAGR) of 25 per cent—the highest in the world. With over a thousand bottled water producers, the Indian bottled water industry is big by even international standards. There are more than 200 brands, nearly 80 per cent of which are local. Most of the small-scale producers sell non-branded products and serve small markets. In fact, making bottled water

is today a cottage industry in the country. Leave alone the metros, where a bottled-water manufacturer can be found even in a one-room shop, in every medium and small city and even some prosperous rural areas there are bottled water manufacturers.

Despite the large number of small producers, this industry is dominated by the big players—Parle Bisleri, Coca-Cola, PepsiCo, Parle Agro, Mohan Meakins, SKN Breweries and so on. Parle was the first major Indian company to enter the bottled water market in the country when it introduced Bisleri in India 25 years ago. The rise of the Indian bottled water industry began with the economic liberalization process in 1991. The market was virtually stagnant until 1991, when the demand for bottled water was less than two million cases a year. However, since 1991-1992 it has not looked back, and the demand in 2004-05 was a staggering 82 million cases. Bottled water is sold in a variety of packages: pouches and glasses, 330 ml bottles, 500 ml bottles, one-liter bottles and even 20 to 50 liter bulk water packs. The formal bottled water business in India can be divided broadly into three segments in terms of cost: premium natural mineral water, natural mineral water and packaged drinking water.

Attracted by the huge potential that India's vast middle class offers, multinational players such as Coca-Cola and PepsiCo have been trying for the past decade to capture the Indian bottled water market. Today they have captured a significant portion of it. However, Parle Bisleri continues to hold 40 per cent of the market share. Kinley and Aquafina are fast catching up, with Kinley holding 20-25 per cent of the market and Aquafina approximately 10 per cent. The rest, including the smaller players, have 20-25 per cent of the market share.

The majority of the bottling plants whether they produce bottled water or soft drinks—are dependent on groundwater. They create huge water stress in the areas where they operate because groundwater is also the main source—in most places the only source—of drinking water in India. This has created huge conflict between the community and the bottling plants. Private companies in India can siphon out, exhaust and export groundwater free because the groundwater law in the country is archaic and not in tune with the realities of modern capitalist societies. The existing law says that “the person who owns the land owns the groundwater beneath”. This means that, theoretically, a person can buy one square metre of land and take all the groundwater of the surrounding areas and the law of land cannot object to it. This law is the core of the conflict between the community and the companies and the major reason for making the business of bottled water in the country highly lucrative.

177. According to the passage, which one of the following statements is *not* true?

- (1) Private companies are exploiting groundwater resources in India due to outdated law.
- (2) The growth of Indian bottled water industry is a pre-economic liberalization process.
- (3) Manufacturers excluding bigger players have approximately 20-25% of the market share of bottled water.
- (4) Bottled water production in India is a cottage industry today.

178. Which brand is having the largest pie in the Indian bottled water market?

- (1) Coca-Cola
- (2) Parle Bisleri
- (3) PepsiCo
- (4) Mohan Meakins

179. What is/are the reason(s) for the global growth of bottled

water industry?

- (1) Pollution of water bodies
- (2) Basic human need for clean drinking water
- (3) Paying capacity of the elite
- (4) All of the above

180. According to the passage, which of the following statements is/are true?

- A. In India, the increase in total annual bottled water consumption is followed by increase in per capita bottled water consumption.
- B. Indian bottled water market grew at the highest CAGR.
- C. The formal bottled water business in India is divided into broadly two segments in terms of cost.

- (1) A only
- (2) A and C both
- (3) B only
- (4) A, B and C

181. A polygon has 25 sides, the lengths of which starting from the smallest side are in A.P. If the perimeter of the polygon is 2100 cm and the length of the largest side 20 times that of the smallest, then the length of the smallest side and the common difference of the A.P. are:

- (1) 8 cm and $6\frac{1}{3}$ cm respectively
- (2) 8 cm and $5\frac{1}{3}$ cm respectively
- (3) 6 cm and $6\frac{1}{3}$ cm respectively
- (4) None of these

182. A car travels 25 km an hour faster than a bus for a journey of 500 km. If the bus takes 10 hours more than the car, then the speeds of the bus and the car are:

- (1) 25 km/hr and 40 km/hr respectively
- (2) 25 km/hr and 60 km/hr respectively
- (3) 25 km/hr and 50 km/hr respectively
- (4) None of these

183. When a group photograph is taken, all the seven teachers should be in the first row and all the twenty students should be in the second row. If the two corners of the second row are reserved for the two tallest students, interchangeable only between them, and if the middle seat of the front row is reserved for the principal; the number of such possible 'arrangements' is:

- (1) $720 \times 18!$
- (2) $1440 \times 18!$
- (3) $1370 \times 18!$
- (4) None of these

184. In a certain city, all telephone numbers have six digits, the first two digits always being 41 or 42 or 46 or 62 or 64. The number of telephone numbers having all six digits distinct is:

- (1) 8400
- (2) 9200
- (3) 7200
- (4) None of these

185. A person standing on the bank of a river finds that the angle of elevation of the top of a tower on the opposite bank is 45° . Which of the following statements is correct?

- (1) Breadth of the river is twice the height of the tower.
- (2) Breadth of the river is half of the height of the tower.
- (3) Breadth of the river and the height of the tower are the same.
- (4) None of these

186. Three groups A, B, C are contesting for a position on the Board of Directors of a company. The probabilities of their winning are 0.5, 0.3, 0.2 respectively. If the group A wins, the probability of introducing a new product is 0.7 and the corresponding probabilities for

group B and C are 0.6 and 0.5 respectively. The probability that the new product will be introduced, is:

- (1) 0.52 (2) 0.74 (3) 0.63 (4) None of these

187. An article manufactured by a company consists of two parts A and B. In the process of manufacture of part A, 9 out of 10 are likely to be defective. Similarly 5 out of 100 are likely to be defective in the manufacture of part B. The probability that the assembled part will not be defective, is:

- (1) 0.8645 (2) 0.9645 (3) 0.6243 (4) None of these

188. A firm of readymade garments makes both men's and women's shirts. Its average profit is 6% of sales. Its profits in men's shirts average 8% of sales and women's shirts comprise 60% of output. The average profit per sales rupee in women's shirts is:

- (1) 0.0466 (2) 0.0666 (3) 0.0166 (4) None of these

189. In a certain town 25% families own a phone and 15% own a car, 65% families own neither a phone nor a car. 2,000 families own both a car and a phone. Consider the following statements in this regard:

- I. 10% families own both a car and a phone.
- II. 35% families own either a car or a phone.
- III. 40,000 families live in the town.

Which of the above statements are correct?

- (1) I and II (2) II and III (3) I and III (4) I, II and III

190. The hands of a clock are 10 cm and 7 cm respectively. The difference between the distance traversed by their extremities in 3 days 5 hours is:

- (1) 4552.67 cm (2) 4557.67 cm
(3) 4555.67 cm (4) 4559.67 cm

191. A circular grass plot, whose diameter is 70 m, contains a gravel walk 5 m wide round it, 15 m from the edge. The cost to turf the grass plot at Rs 2 per m² is:

- (1) Rs 6,000 (2) Rs 6,400
(3) Rs 6,200 (4) Rs 6,600

192. The trunk of a tree is a right cylinder 1.5 m in radius and 10 m high. The volume of the timber which remains when the trunk is trimmed just enough to reduce it to a rectangular parallelepiped on a square base is:

- (1) 44 m³ (2) 46 m³ (3) 45 m³ (4) 47 m³

193. A semicircular sheet of paper of diameter 28 cm is bent to cover the exterior surface of an open conical ice cream cup. The depth of the ice cream cup is:

- (1) 10.12 cm (2) 8.12 cm (3) 12.12 cm (4) 14.12 cm

194. If $\log_a b = \frac{1}{2}$, $\log_b c = \frac{1}{3}$ and $\log_c a = \frac{K}{5}$, the value of K

is:

- (1) 25 (2) 35 (3) 30 (4) 20

195. The H.C.F. and L.C.M. of two numbers are 21 and 4641 respectively. If one of the number lies between 200 and 300, the two numbers are:

- (1) 273, 357 (2) 273, 361
(3) 273, 359 (4) 273, 363

ANSWERS AND EXPLANATIONS

Qs. 1-5: (On data reasoning)

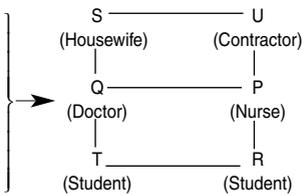
1st organise/assemble the data systematically, by quickly plotting a table as follows:

Days	Dates	Plays
Mon	5	D
Tue	6	B
Wed	7	E
Thurs	8	C
Fri	9	F
Sat	10	A

1. (3) From above table.
2. (2) From above table.
3. (1)
4. (1)
5. (4) DBECFA

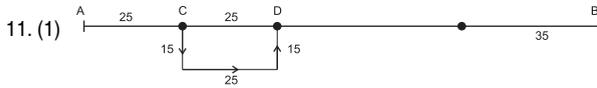
Qs. 6-9. (On Relationship Reasoning)

6. (4) R may be sister or brother.
7. (3) Refer figure alongside.
8. (3) Refer figure alongside.
9. (1) Refer figure alongside.

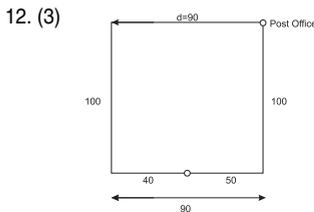


10. (1) D W Z L O K D
 ↓ ↓ ↓ ↓ ↓ ↓ ↓
 E X A M P L E

★ Each letter is being replaced by the next letter, as in the given example on TRIANGLE → sqhzmfKd. (Go reverse for actual answer)

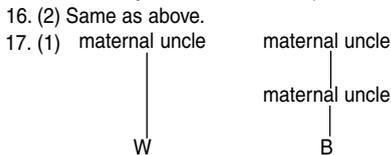


$$\begin{aligned} \text{Required } d &= 150 - (35 + 50) \\ &= 150 - 85 \\ &= 65 \text{ km} \end{aligned}$$



13. (1) 256 is not a cube of a natural number.
14. (2) Logic is: D-4-F-H-J-L-12-N-14

15. (4) From statements 1 and 3, muk = and
 From statements 2 and 3, so = body
 From remaining words, nee or pic, means grave or concern.
 and ill or so, means every or else.
 Thus, concern = nee or pic
 and every = ill or so
 Probably 3, but not for sure (if order of words not same).



18. (4) Height Age
 (1) Rupa Neelam
 (2) Kamini Monica
 (3) Neelam Rupa
 (4) Pooja Kamini
 (5) Monica Pooja (Ans Neelam).

19. (4) Pooja
20. (1)
21. (1) Established in 1966, at Manila (Philippines).
22. (4) The main objective of the national wage policy is to ensure a minimum wage for all workers, whether in agriculture, industry or services sector.
 The 5th pay commission prescribed the minimum and maximum salary on the basis of National Productivity Council's criteria.

23. (4) Hockey.
24. (3) Also called regur or cotton soil, e.g. in central India.
25. (1)
26. (2) Only 3702 km².
27. (3) 904 persons/km².
28. (2) Called Russian International Airlines or Russian Civil Aviation.
29. (4) Thomas and Uber Cups are associated with world championships in badminton.

30. (3) Reflects Acer's care by providing people with IT tools.
31. (4) Indore
32. (3) Sir Vidiadhar Surajprasad Naipaul, in 2001.
33. (2) HSBC.
34. (2) Beijing, China, 2008 Summer Olympics.
35. (4) By Bharat Petroleum.
36. (4) India born steel tycoon, ranks 3rd after Bill Gates and Warren Buffet.
37. (4)
38. (3) March 2006, 71 (all member nations took part). Next: 2010, New Delhi.
39. (2)
40. (3) An Indian genius from diversity, deals in historical and cultural identity.

Qs. 41 - 45. (Based on Inferences).

41. (1) The last sentence states this fact explicitly.
 $\frac{1}{6}$ of 651 \approx 100
42. (2) Refer to the use of the expression "the only one" in question 42. No such hint is made in the given passage.
43. (4) If a project is undertaken, it can be fairly assumed that it is going to be beneficial and is under demand.

$$44. (1) \frac{67.82 \times 10^7}{1.5 \times 10^6} \approx 452$$

45. (3) Refer 1st and the last statements. 'Granted clearance' means that environment is of course cared for. However, the last sentence points out exploitation of 1/6 of forest land. Thus, the given statement in Q. 45 is only probably true.

Qs. 46-50 (Based on courses of action)

46. (2) This question poses a problem and requires valid solution.
 - I. Wrong—To stop further pollution, nature of the effluents must be established first.
 - II. Correct—To ensure drinking water supply, which is the grave problem under consideration.
 - III. Correct—Appropriate action.
47. (2) This is a fact and improvement, type question:

OBJECTIVE-TYPE QUESTIONS

- I. No. Passage talks about government schools only at present.
 II. Yes. It will help in improving.
 III. Yes. It will help reduce clustering around a few schools.
48. (3) I. Impractical step (would not help here).
 II. Practically feasible step.
 III. Congestion cannot be due to a few airport-bound vehicles only. The passage is talking about peak-hour general congestion on the roads.
49. (3) I. Would not solve the problem.
 II. Can help cover the losses.
 III. No such hint is made about the machines.
50. (4) I. Earthquake has already occurred.
 II. Relevant as per needs of the given passage.
 III. Alternative to above step.
- Qs. 51 - 55 (Based on statements and assumptions)
51. (3) I. When the letter was being written, it is assumed that some action will also be taken on it.
 II. 'restore normalcy' \Rightarrow normally there is enough water.
 III. This is not an assumption but mere a restatement of the given facts.
52. (4) All are valid assumptions.
53. (3) I. It is an outcome, not an assumption.
 II. Valid assumption.
 III. Valid since notices are issued so that people pay heed to them.
54. (2) I. When a directive is issued, it is to be followed.
 II. Valid assumption. That is why the step has been undertaken.
 III. No such hint is made. Otherwise also, it is impractical assumption and goes against the given passage.
55. (1) I. 'surprisingly' \Rightarrow not expected
 II. *not* managed ... no such hint.
 III. *always*, not possible.
- Qs. 56-60 (Assertion and Reason Type)
56. (2) Between equator and on the tropic of cancer.
57. (1) Electricity is needed for electrolytic refining of bauxite ore of aluminium.
58. (1) As per Ferrel's law.
59. (4) Noise pollution is non-accumulating in nature. It soon changes to other forms of mechanical energies and dies out.
60. (3) Both are correct but erosion is avoided as the roots bind the soil particles together.
61. (2) Manufactured exports had 73.7% share in merchandise. The highest was held by engineering goods.
62. (3) Chiefly because of oil price hike (US\$1,06,121) = Rs 476201 crores. Growth rate = 34.7% from 20% in previous 2 years.
63. (1) 25% of GDP, employing 57% people in 1999-2000.
64. (1)
65. (4) Value-weighted index with April 1979 as base year (100). They A/c for 1/5th of market of BSE.
66. (1) He is the chairman of the Planning Commission.
67. (1)
68. (4)
69. (3) Sony, Japan
70. (3) Washington D.C. Also, offices in Paris and Geneva.
71. (2)

72. (2)
 73. (3)
 74. (2)
 75. (2) 25.6% in US \$ terms.
 * was only 13.5% in 2003.
76. (3) enables e-banking, booking, etc also facilities.
77. (2) $9 + 7$ (new) = 16.
78. (1) Plan period 2002-07, 8% an year.
79. (2) Previous in 2001, held every 10 years.
80. (3) NW University in USA.
- Qs. 81-100 (based on General English)
81. (4) paradoxical—contradictory, anomalous, inconsistent and clemency—mercy, compassion, sympathy, pity.
82. (1) Aptitude—talent, skill, gift and but ... no 'interest' makes the sentence meaningful.
83. (1) *Even (4) would not be a bad choice in the strict sense of matching.
84. (4) inkling—slight suspicion.
85. (2) superior to 'what'? and also, before but.
86. (1) 'may be' is wrong.
87. (3) Vth is incorrect. Use either 5th or V.
88. (1) Instead of 'nevertheless' illiterate, use 'however' illiterate.
89. (4) A and D are synonymous.
90. (4) B and D refer to disturbed conditions.
91. (4) They are antonyms.
92. (1) they are antonyms.
93. (1) 94. (4) 95. (3) 96. (2) 97. (1)
 98. (3) 99. (4) 100. (3)

Quantitative Aptitude

101. (2) B + C's 1 day's work = $\frac{1}{12}$
 and B's 1 day's work = $\frac{1}{20}$
 \therefore C's 1 day's work = $\frac{1}{12} - \frac{1}{20} = \frac{10-6}{120}$
 $= \frac{4}{120} = \frac{1}{30}$
 Money will be distributed according to ratio of work done
 i.e. A : B : C : D = $\frac{1}{32} : \frac{1}{20} : \frac{1}{30} : \frac{1}{24}$
 $= 15 : 24 : 16 : 20$
 \therefore C's share = $\frac{16}{15 + 24 + 16 + 20} = \frac{16 \times 25}{75} = \frac{16}{3}$ Rs
102. (3) A takes 8 days \rightarrow 4 day's work = $\frac{4}{8} = \frac{1}{2}$
 Remaining work = $1 - \frac{1}{2} = \frac{1}{2}$
 Work done in 2 days (A + B) = $\frac{1}{8} \times 2 - \frac{1}{3} \times 2 = \frac{1}{4} - \frac{2}{3}$
 $= \frac{3-8}{12} = \frac{-5}{12}$
 Now Work done = $\frac{1}{2} - \frac{5}{12} = \frac{1}{12}$
 and Remaining work = $1 - \frac{1}{12} = \frac{11}{12}$
 Time taken by A for $\frac{11}{12}$ work is $\frac{11}{12} \times 8 = \frac{22}{3} = 7 \frac{1}{3}$ days

==== OBJECTIVE-TYPE QUESTIONS ====

103. (2) $(\frac{1}{12} \times \frac{7}{8} + \frac{1}{16} \times \frac{5}{6})x + (\frac{1}{12} + \frac{1}{16})3 = 1$
i.e. $\frac{12x}{96} + \frac{42}{96} = 1$
i.e. $x = 4 \frac{6}{12} = 4 \frac{1}{2}$ mins.

104. (1) $\frac{CP}{SP} = \frac{100}{(100 \pm x)}$
 $CP_1 = \frac{100 \times 500}{120}, CP_2 = \frac{100 \times 500}{88}$
i.e. Total CP $\approx 417 + 568 \approx 985$
 Since CP < SP \therefore Profit = 1000 - 985 = 15
 $\% P \approx \frac{15}{985} \times 100 \approx 1.5\%$

105. (3) Let the principal be P, SI = x (for 2 years)
 We have :
 $P \frac{2 \text{ years}}{x} = 720 \frac{5 \text{ years}}{1020}$
 Now, SI for 5 years = 300
 $\therefore \frac{\text{SI for 2 years} = x}{x = \frac{2}{5} \times 300 = \text{Rs } 120}$
 $\therefore P = 720 - x = \text{Rs } 600$
 Now, since SI = $\frac{PTR}{100} \therefore 120 = \frac{600 \times 2 \times R}{100}$
 $\therefore R = 10\%$

106. (2) $\frac{\text{distance} = D, \text{ speed of cycle} = x}{D, \text{ speed of scooter} = y}$
 Time = $\frac{\text{distance}}{\text{speed}}$
 Total time = $6 \frac{1}{2} = \frac{13}{2} = t_1 + t_2 = \frac{D}{x} + \frac{D}{y} \dots (1)$
 Also, new time (cycle) = 6:30 + 2:10 = 8:40
 $= 8 \frac{2}{3} = \frac{26}{3}$ hrs
 $\therefore \frac{D}{x} + \frac{D}{x} = \frac{2D}{x} = \frac{26}{3}$ or $\frac{D}{x} = \frac{13}{3} \dots (2)$
 Put value of $\frac{D}{x}$ in (1)
 $\frac{D}{y} = \frac{13}{2} - \frac{13}{3} = \frac{13}{6} = 2 \frac{1}{6}$ hrs
 For both ways, $2 \times \frac{D}{y} = 4 \frac{1}{3}$ hrs

107. (4) Train A: S = 90 kmph = $90 \times \frac{5}{18}$ m/s = 25 m/s
 $t = 36$ s
 Let length, L = x + y = time \times speed = 25 \times 36 = 900 m
 $L' = x + y' = 900 - 100 = 800$ m
 Speed = $45 \times \frac{5}{18} = \frac{25}{2}$ m/s
 $t = \frac{\text{Distance}}{\text{speed}} = \frac{800}{\frac{25}{2}} = \frac{1600}{25} = 64$ seconds

108. (2) A \rightarrow 20 hours \rightarrow 1 hour's work = $\frac{1}{20}$

B \rightarrow 30 hours \rightarrow 1 hour's work = $\frac{1}{30}$
 (A+B)'s 1 hour's work = $\frac{1}{20} + \frac{1}{30} = \frac{1}{12}$
 For $\frac{1}{3}$ rd work, *i.e.* $\frac{4}{12}$ work \rightarrow 4 hours

Remaining work done = $1 - \frac{1}{3} = \frac{2}{3}$
 Due to leakage, only $\frac{2}{3}$ input is obtained
 Remaining work = $\frac{2}{3} \times \frac{3}{2} = 1 \rightarrow$ 12 hours
 \therefore Total time taken = 4 + 12 = 16 hours

109. (2) Let speeds be x and y for train and car
 Then, $8 = \frac{160}{x} + \frac{600}{y} \dots (1)$
 and $8 \frac{1}{5} = \frac{240}{x} + \frac{(760-240)}{y} \dots (2)$
 Solving for x and y, we get 100 and 80 km/hr
 *You can also use the options straightaway, for such Qs.

110. (3) * By direct options, $\frac{500}{25} = 20, \frac{500}{20} = 25$
 *By mathematical method, the main steps are :
 $xy = 500 \dots (1)$ and $(x-5)(y+5) = 500 \dots (2)$
 From eqn. 2, $x-y = 5$ or $y = x-5$
 Put in eqn 1, $x(x-5) = 500$ or $x^2 - 5x - 500 = 0$
i.e. $x = 25$ and attended ones = $x-5 = 20$

111. (3) $D = 6000 = t \times s \dots (1)$
 and $D = 6000 = (t + \frac{1}{2})(s - 400) \dots (2)$
 Thus, $t(800t - 400) = 6000, 8t^2 - 4t - 60 = 0$
 $t = \frac{4 \pm \sqrt{1936}}{16} = \frac{4 \pm 44}{16} = 3$ hours

112. (3) You can use A.P., $T_n = a + (n-1)d$
 $6000 = a + 2d \dots (1)$ and $7000 = a + 6d \dots (2)$
 Eqn (2) - Eqn (1) $\Rightarrow 1000 = 4d$
i.e. $d = 250$ and $a = 6000 - 500 = 5500$
 $T_{10} = 5500 + 9 \times 250 = 7750$

113. (3) $x + (x+400) + (x+800) + \dots = 48,000$
 $8x + (400+800+ \dots 400 \times 7) = 48,000$
 $8x + [\frac{7}{2} [800 + 6(400)]] = 4800$

*Use, $S_n = \frac{n}{2} [2a + (n-1)d]$ for A.P.
 $8x = 48,000 - 11,200 = 36800$
 $x = 4600$

114. (3) Balance payment = Rs 39,000 - Rs 17,000 = Rs 22,000
 Now, Instalment payment = Rs 4800 \times 5 = 24000
 Interest = 24,000 - 22,000 = Rs 2000
 Use, $SI = \frac{PTR}{100}$, etc
 or $*(1 + \frac{nR}{100})$ Balance due = $(1 + \frac{(n-1)R}{2400})nP$
 (DIRECT METHOD)

OBJECTIVE-TYPE QUESTIONS

115. (3) $x\left(\frac{21}{20} + \frac{400}{441} + \frac{8000}{9264}\right) = 126000$... solve for x
 OR, $\frac{100P}{R} \left[1 - \left(1 + \frac{R}{100}\right)^{-n}\right] = \frac{\text{Amount}}{\left(1 + \frac{R}{100}\right)^2}$

(DIRECT METHOD)

116. (3) In ΔABC , $\tan 45^\circ = \frac{T}{\text{base}}$

$1 = \frac{T}{\text{base}}$ or base = T

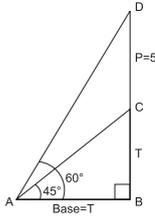
Now, In ΔABD ,

$\frac{5+T}{T} = \tan 60^\circ = \sqrt{3}$

$5+T = \sqrt{3} T$

$T(\sqrt{3}-1) = 5$

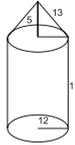
i.e. $T = \frac{5}{\sqrt{3}-1} = \frac{5(\sqrt{3}+1)}{3-1} = \frac{5}{2}(2.732) = 6.825 = 6.83\text{m}$



117. (2) $A = \pi r l + 2\pi r h = \pi r (l + 2h)$

$= \frac{22}{7} \times 12 \times (13 + 2 \times 11)$

$A = 1320 \text{ m}^2$



118. (2) $71.8 = \frac{71x + 73y}{x + y}$

$71.8(x + y) = 71x + 73y$

$0.8x = 1.2y$

$\frac{x}{y} = \frac{12}{8} = \frac{3}{2}$

119. (3) $5680 = \frac{5400 \times 25 + 5700 \times 30 + x(75 - 25 - 30)}{75}$

$4,26,000 = 1,35,000 + 1,71,000 + 20x$

$x = \frac{120,000}{20} = 6,000$

120. (1) Required p = $\frac{16}{200} = \frac{2}{25}$

and q = $1 - \frac{2}{25} = \frac{23}{25}$ ($\because p + q = 1$)

121. (2) from given table.

122. (4) $\frac{50}{400} \times 100$ * (450 - 400 = 50)

123. (3) Shortfall = 6960 - 5725 and 9745 - 9360
 = 1235 and 375

% Change = $\frac{-(1235 - 375) \times 100}{1235} = -68$

124. (1)

125. (4) $E \rightarrow F = \frac{574 - 468}{5} \approx 84$

$F \rightarrow G = \frac{750 - 574}{2} \approx 88$

$G \rightarrow H = \frac{860 - 750}{5} \approx 88$

126. (4) Overall average speed = $\frac{860}{16:25 - 5:00} = \frac{860}{11:25} \approx 75$

From A \rightarrow B = $\frac{140}{1:40} = \frac{140}{\frac{5}{3}} = 84$

From B \rightarrow C = $\frac{231 - 140}{1:20} = \frac{91}{\frac{4}{3}} = 68$

From C \rightarrow D = $\frac{380 - 231}{1:43} \approx 85$

and From D \rightarrow E = $\frac{468 - 380}{1:20} \approx 66$

Now, compare with overall speed

127. (2) Total stoppage time = 10 + 2 + ... 10 = 52 mins

and + 30% or 1 hour, 8 mins

\therefore New time $\approx 16:25$

$\frac{+ 01:08}{= 17:33 \text{ hrs}}$

128. (2) Total time = 2:25 am (next day) - 16:25 pm (last day)
 = 10:00 hrs

New time = $d_1 s_1 + d_2 s_2$

$10 = \frac{x}{88} + \frac{x + 860}{90}$. Solve for x

129. (2) Cost = 250 \times 3 = 750

130. (1) $W_1 Y \times 5 + W_2 Z \times 7$

Cost = 150 \times 5 + 250 \times 7 + 300 \times 8 = Rs 4900

131. (3) 100 \times 5 + 100 \times 3 + 100 \times 6 = 1400

132. (3) $W_1, 200 \rightarrow 50 \times 7 + 70 \times 9 + 80 \times 5$

= 350 + 630 + 400 = 1380

$W_3, 200 \rightarrow 100 \times 8 + 50 \times 6 + 50 \times 10$

= 800 + 300 + 500 = 1600

133. (4) Average of China + Italy + Germany = $\frac{102}{3}$

and Average of UK + Canada + Switzerland = $\frac{21.5}{3}$

\therefore Ratio $\approx 5:1$, etc

134. (2)

135. (4) % Growth rate of China = $\frac{117 - 63}{2030 - 1965}$

= $\frac{54}{55} \approx 1\%$ per year

\therefore 108% from 2030 (+8 yrs) 2038

136. (3) Italy = 61 - 18 = 43, % = $\left(\frac{43}{18}\right) \times 100 = 238.8\%$

UK = $\frac{32}{15} \times 100 = 213.33\%$,

Canada = $\frac{12}{5} \times 100 = 240\%$

137. (2) 3100 - 10,000 - 1633 \times 6 = 9798

10,200 - 21,000 - 202 \times 5 = 1010

25,000 - 1 \times 11 = $\frac{0011}{10,819}$

138. (4) $\frac{1450}{7} \approx 207$

139. (4) 1000 - 3000, 505 \times 28 : 202 \times 5
 = 14140 : 1010
 = 14 : 1

OBJECTIVE-TYPE QUESTIONS

140. (1) $1450 \times 100 = 1,45,000$ and $-1,00,000 = 45,000$
 141. (1) 142. (1)

143. (2) $\frac{11}{100} \times \frac{3}{4} \approx 8.25\%$

144. (3) 12% of $(28+22) = 12\%$ of $50\% = 6\%$
 and -6% of $15\% = -0.9\%$
 $\frac{\text{Total} = +5.1\%}{\text{Total} = +5.1\%}$

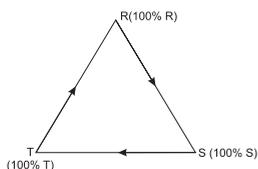
i.e. $687500 + 5.1\% = 72203.70$
 ≈ 72204

Qs. 145-148. (Based on Δ and Bar diagram).

** The given Δ must be understood in the following manner:-

R means 100% R, etc

Proceed in a clockwise increase, as below:-



Now, quickly arrange data from Δ and bar diagrams:

Constituency and votes	R	S	T
A = 5000	25% = 1250	25% = 1250	50% = 2500
B = 4000	25% = 1000	50% = 2000	25% = 1000
C = 6000	62½% = 3750	12½% = 750	25% = 1500
D = 7000	0% = 0	25% = 1750	75% = 5250
E = 4000	62½% = 2500	37½% = 1500	0% = 0
Total = 26,000	8,500	7,250	10,250

145. (3) $2000 > 1000$ (Refer above tabulated data).

146. (4) 147. (5)

148. (1) $7250 = 25\%$ of $x \rightarrow x = 29,000$
 and $10,250 = 50\%$ of $y \rightarrow y = 20,500$
 i.e. $20,500 \rightarrow 29,000$ as limits
 (matches best with (1))

149. (2) A. $\frac{x + (x+2) + (x+4) + (x+6)}{4} = 17$

$4x + 12 = 68$

$4x = 56, x = \frac{56}{4} = 14$ even, hence right

B. $d = x + 6 - x = 6$, wrong

Δ irrelevant, cannot be 4

C. $x^2 + (x-2)^2 + (x+2)^2 = 440$

$3x^2 = 432$

$x^2 = 144$ or $x = 12$ (correct)

Husband's = $20 \times 975 = 19,500$

150. (4) Sonu's = $19,500 \times \frac{70}{100} = 13,650$

B \times , as Monu's details not available

C \checkmark , B and C do not give result

151. (4) $A+B+C=946 \therefore B=946-(A+C)$

$\frac{3}{19}(A+C) = 946 - (A+C)$

$A+C = \dots \checkmark$ and $B = \dots \checkmark$

OR, B+C

152. (4) All are equally sufficient as they provide ratios.

153. $x, y \rightarrow y+4, y$

$I \Rightarrow y+4+y=10 \rightarrow 2y=6 \therefore y=3, x=7$

\therefore No. is 73

$II \Rightarrow 10x+y-(10y+x)=36$

i.e. $x-y=4$

i.e. Same as the given data only

154. (4) I. Age of teacher = x

No. of children = x

\therefore Average = $x(+)$

155. (3) * Note difference between 'sale' and 'circulation'.

156. (4) P = Rs 6,000

$I \Rightarrow$ Rekha's = $50,000 \times 4 + 49,000 \times 8$

and Nutan's =? (no information of 1st 4 months!)

157. (1) A. $(-3)^8 = +\text{No.}$ } $\Rightarrow A > B$
 & B. $(-3)^9 = -\text{No.}$ }

158. (1) A. 682×63 } $\Rightarrow A > B$
 B. 682×60 }

159. (3) A. $\frac{c^2 d^2 e^2}{c^3 d^3 e^3} = \frac{1}{cde}$ } $\Rightarrow \frac{A}{B} = \frac{1}{3}, \text{ i.e. } B > A$
 B. $\frac{cde}{3}$ }

160. (2) A. $\frac{5}{1000} = \frac{1}{200}$ } $\Rightarrow A = B$
 B. $\frac{1}{2 \times 100} = \frac{1}{200}$ }

Qs. 161-180. (based on Passage Comprehension)

PASSAGE - I

161. (3) last para ... "people would be willing to starve rather than work ..." i.e. till the minimum level.

162. (4)

163. (4) refer middle of 2nd-last para or 2nd para.

164. (3) 2nd para : "since food accounts for a major share".

PASSAGE - II

165. (4) I—from para 4, II—from para IV, III—Paras 2 and 3

166. (4) Consider para 4, "appears ... may drive" shows that the knowledge is tentative.

167. (2) refer para 2 earth sciences, "unifying theme for many diverse observations ...". Same is being discussed in the other paras also.

168. (4) In last para, consider ..."add heat at a constant rate", not faster.

PASSAGE - III

169. (2) Refer para 2, last lines.

170. (2) I—from para 1, from 1st and 2nd sentences.

II—from para 4, from 2nd sentence.

171. (2) Last para ... 1st sentence.

172. (3) 2nd sentence, last para ... "costs are so prohibitive" ...

PASSAGE - IV

173. (1) Read the line ... "Although the lightning designer may not be called upon .."

OBJECTIVE-TYPE QUESTIONS

174. (2) "They include white ... down to black".
 175. (2) "Most paints ... have body or pigment colours".
 176. (2) "The perception of colour is a complex visual sensation"....

PASSAGE - V

177. (2) Began since 1991-92 (Para 4). However, since 1991-92 ... and the rise began in 1991.
 178. (2) (Para 5) ... However, Parle-Bisleri continues to hold 40% of the market share.
 179. (4) (Para 1) ... various points.
 180. (3) A. no such information is provided.
 B. mid-para 2 (... highest, 25% in the world).
 C. incorrect, there are 3 segments as per para 3, last lines.

181. (1) Use arithmetic progression, $l = 20a$

Here $n = 25$, $S_n = \frac{n}{2} [2a + (n-1)d] = \frac{n}{2} [a + l]$

$2100 = \frac{25}{2} [a + 20a]$

$a = 8$

Now, T_n , or $l = a + (n-1)d = 8 + 24d = 20a$

$20a = 8 + 24d$

$20 \times 8 = 8 + 24d$

$d = \frac{152}{24} = 6\frac{1}{3}$

182. (3) Let the speeds of bus and car be x and y

Here, $y = x + 25$

$\Delta t = 10 \rightarrow \frac{500}{x} - \frac{500}{x+25} = 10$

$500(x+25) - 500(x) = 10x(x+25)$

$x = 25, y = 50$

* For such questions, you can also use direct substitution from the given choices

183. (2) No. of permutations or arrangements :

Row 2 (back row) = $\angle 18 \times \angle 2 = \angle 18 \times \angle 2$

and Row 1 (front row) = $\angle 6 = \angle 720$

Total no. of permutations = $\angle 18 \times 1440$

184. (1) Consider numbers starting with 4

$4 \underline{1} (\underline{8} \times \underline{7} \times \underline{6} \times \underline{5})$ Place 1 is fixed

$4 \underline{2} \dots$ Place 2 in 3 ways (out of 1, 2, 6)

$4 \underline{6} \dots$ Similarly others in $8 \times 7 \times 6 \times 5$ ways

i.e. $1 \times 3 \times 1680 = 5040$ ways

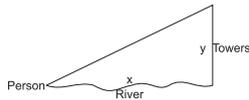
Similarly for nos. with 6 we have } Total = 8400 ways

3360 ways

185. (3) $\tan 45^\circ = \frac{y}{x}$

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

$y = x$ (i.e. same)



186. (3) Required probability,

$p = 0.5 \times 0.7 + 0.3 \times 0.6 + 0.2 \times 0.5$

$= 0.35 + 0.18 + 0.10 = 0.63$

187. (4) Required $p = 1 - (90\% \text{ of } 5\%)$

$= 1 - 0.045$

$= 0.955$

188. (1) Women's shirts = 60% output = Rs 60, P = ?

and Men's shirts = 40% output = Rs 40, P = 8% = Rs 3.20

Average Profit = 6%

6% of 100 (Let total = 100) = 6 = 3.2 + x% of 60

$6 = 3.2 + \frac{60x}{100}$

$x = 4.66$ and per Re = 0.0466

189. (2) 2000 = both = 5%

Total = 100%

$= 2000 \times 20$

$= 40,000$

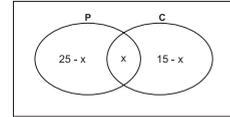
From venn-diagram,

$25 - x + x + 15 - x = 100 - 65\% = 35\%$

$x = 5\%$

I. x, II. ✓, III. ✓

Hence (2) follows



190. (2) 10 cm is the minute hand

In 1 hour, it goes 1 round

\therefore Total rounds = $3 \times 24 \text{ hrs} + 5 \text{ hrs} \times 1 = 77$ rounds

$d = n(2\pi r) = 77 (2 \times \frac{22}{7} \times 10) = 4840 \text{ cm}$ and 7 cm is

the hour hand

It completes only 2 rounds per day (24 hrs)

\therefore Total rounds = $6 + \frac{5}{12} = \frac{77}{12}$ rounds

$d = n'(2\pi r') = \frac{77}{12} (2 \times \frac{22}{7} \times 7) = 265.67$

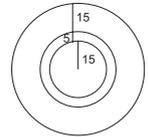
$\therefore \Delta d = 4840 - 282.33 = 4557.67$

191. (4) Area of gravel = $\frac{22}{7} (20^2 - 15^2) = \frac{22}{7} (175)$

Required area = $\frac{22}{7} \times 35 \times 35 - \frac{22}{7} (175)$

$= \frac{22}{7} (1225 - 175) = 150 \times 22$

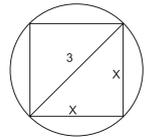
and Cost = $2 \times \text{Area} = \text{Rs } 6600$



192. (3) $2x^2 = 3^2$

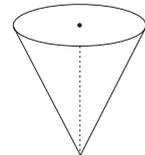
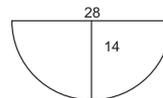
$x^2 = \frac{9}{2}$

$V = l bh = \frac{9}{2} \times 10 = 45$



193. (4) *Diameter of semicircle = top of cone = 28 cm

and height = 14 cm



194. (3) $\frac{\log B}{\log A} \times \frac{\log C}{\log B} \times \frac{\log A}{\log C} = \frac{1}{2} \times \frac{1}{3} \times \frac{K}{5}$

$1 = \frac{K}{30} \therefore K = 30$

195. (1) Note that 273 is common

HCF \times LCM = Product of 2 nos.

$21 \times 4641 = 273x$

$x = 357$