Sainik School

Entrance Exam (Class IX)

SOLVED PAPER 2020

Time : 3 Hr **Max. Marks : 400**

Instructions

1. This question paper contains 125 questions in Paper I and 25 questions in paper II. Paper I is divided into following four sections.
   Section I Mathematics (50 Questions); **Section II** English (25 Questions); **Section III** General Science (25 Questions) and **Section IV** Social Studies (25 Questions) and **Section V** Intelligence Test.
2. In **Section I** Mathematics each question carries 4 marks and in **Section II** English, **Section III** General Science & **Section IV** Social Studies and **Section V** Intelligence Test each question carries 2 marks and in Paper II each question carries 2 marks.
3. The candidate is expected to attempt all questions.

Paper I

Section I Mathematics

1. The value of
$\left(-\frac{3}{2}\times\frac{4}{5}\right)+\left(\frac{9}{5}\times\frac{-10}{3}\right)-\left(\frac{1}{2}\times\frac{3}{4}\right)$?
(a) $\left(-\frac{503}{40}\right)$ (b) $\left(-\frac{203}{40}\right)$
(c) $\left(-\frac{403}{40}\right)$ (d) $\left(-\frac{303}{40}\right)$

2. The abscissa of a point is its distance from the
(a) Origin (b) X-axis (c) Y-axis (d) None

3. What is the value of m, if
$\left(\frac{2}{9}\right)^{3}\times\left(\frac{2}{9}\right)^{-6}=\left(\frac{2}{9}\right)^{2m-1}$
(a) m = 1 (b) m = – 2 (c) m = – 1 (d) m = 2

4. If a number when divided by 4 leaves remainder 2 or 3, then which one is the correct statement?
(a) The number is not a perfect square
(b) The number is a perfect square
(c) The number is a prime number
(d) None of the above

5. The value of $\frac{\sqrt{0.2304}+\sqrt{0.1764}}{\sqrt{0.2304}-\sqrt{0.1764}}$
(a) 15 (b) 16
(c) 5 (d) 150

6. Three numbers are in the ratio 2 : 3 : 4. The sum of their cubes is 33957. The numbers are
(a) 16, 24 and 32 (b) 12, 18 and 24
(c) 14, 21 and 28 (d) 18, 27 and 36

7. Find the least square number divisible by each one of 8, 9 and 10.
(a) 360 (b) 36
(c) 3600 (d) 3.6×10^{2}

8. If $\overline{14810\text{la}095}$ is a multiple of 11, where a is a digit, the value of a is
(a) 0 (b) 4 (c) 1 (d) 2

9. Find the value of A and B in

$$\begin{array}{r} \text{B A} \\ \times\ \text{B 3} \\ \hline \text{57 A} \end{array}$$

(a) A = 5 and B = 2 (b) A = 5 and B = 5
(c) A = 2 and B = 2 (d) A = 2 and B = 5

10. Find the value of Z for which the number 471Z8 is divisible by 9.
(a) 4 (b) 5 (c) 7 (d) 8

11. If the area of an equilateral triangle is $64\sqrt{3}\ cm^2$, then the side of the triangle is ...
(a) $18\sqrt{3}$ cm (b) 9 cm
(c) 16 cm (d) $3\sqrt{2}$ cm

12. The value of $\frac{4m^2 - a^2 + 2ab - b^2}{2m + a - b}$ is
(a) (2m − a + b) (b) (2m − a − b)
(c) (2m + a + b) (d) (2m + a − b)

13. The ratio between the speeds of two trains A and B is 3 : 5. If train B runs 300 km in 4 h, the speed of train A will be
(a) 40 km/h (b) 60 km/h
(c) 30 km/h (d) 45 km/h

14. Two years ago, Dilip was three times as old as his son and two years hence, twice his age will be equal to five times that of his son. The present age of son and Dilip are
(a) 14 yr, 38 yr (b) 16 yr, 40 yr
(c) 12 yr, 36 yr (d) None of these

15. The probability of getting a 7 in a single thrown of a dice is
(a) 1 (b) 0
(c) 1/6 (d) 1/2

16. A's income is 60% more than that of B. By what per cent is B's income less than A's?
(a) 37% (b) 37.5%
(c) 36.5% (d) 36%

17. By joining (−3, 2), (−3, − 3) and (−3, 4), which of the following is obtained?
(a) A triangle
(b) A straight line parallel to *X*-axis
(c) A straight line parallel to *Y*-axis
(d) A straight line passing through origin

18. The number of times a particular observation occurs in a given data is called its
(a) Frequency (b) Range
(c) Mean (d) None of these

19. By selling 33 m of cloth, a draper loses an amount equal to the selling price of 3 m of cloth. Find his gain or loss per cent.
(a) gain $8\frac{1}{3}\%$ (b) loss $8\frac{1}{3}\%$
(c) gain 7% (d) loss 7%

20. Three cubes of metal whose edges are 6 cm, 8 cm and 10 cm, respectively are melted to Form a single cube. The edge of the new cube is ..... .
(a) 24 cm (b) 20 cm
(c) 18 cm (d) 12 cm

21. Find the single discount equivalent to two successive discounts of 20% and 10%.
(a) 25% (b) 30%
(c) 28% (d) 10%

22. Which of the following is not a case of direct variation?
(a) Number of sheets of some kind are increased when their total weight is increased
(b) More quantity of petrol is required to travel more distance with a fixed speed
(c) More fees would be collected if number of students increase in a class
(d) Time taken will be less, if number of workers is increased to complete the same work

23. If $a + b + c = 9$ and $ab + bc + ca = 23$, then the value of $a^2 + b^2 + c^2$ equals to
(a) 35 (b) 81
(c) 127 (d) 217

24. On dividing 200 into two parts, $\frac{1}{3}$ of the first part and $\frac{1}{2}$ of the second part are equal.
The larger of the parts is .....
(a) 80 (b) 120
(c) 40 (d) 150

25. On selling a fan for ₹ 810, Sunil gains 8%. For how much did he purchase it?
(a) ₹ 700 (b) ₹ 675
(c) ₹ 650 (d) ₹ 750

26. Find the value of x.
$3^{2x} \times 3^{x+3} \times 3^{4-x} = (\sqrt{3})^{10}$
(a) −1 (b) 0
(c) 1 (d) 2

27. $\sqrt[3]{\frac{(-a^6 \times b^3 \times c^{21})}{c^9 \times a^{15}}} =$
(a) $\frac{-bc^3}{a^3}$ (b) $\frac{bc^4}{a^2}$
(c) $\frac{-ab^4}{c^3}$ (d) $\frac{-bc^4}{a^3}$

28. If n is a perfect cube, then every prime factor of 'n' occurs .....
(a) One time (b) Two times
(c) Three times (d) Four times

29. Find the greatest number of four digits which is a perfect square.
(a) 9800 (b) 9864
(c) 9999 (d) 9801

30. If the ratio of the ages (in years) of x and y, 8 yr ago is 7 : 6, then which of the following can be the sum of their ages 8 yr from now?
(a) 82 (b) 97
(c) 75 (d) 94

31. The age of the boy is one-fifth of the age of his mother and sum of the ages of the son and the mother is equal to the age of the father. After 15 yr, the sum of the ages of the son and his mother will be four-third of his father's age. Find the ratio of the present ages of son, mother and father respectively.
(a) 1 : 5 : 7 (b) 2 : 10 : 10
(c) 1 : 5 : 6 (d) 2 : 8 : 9

32. The ratio of the income of P and Q is 5 : 4. The ratio of expenditure is 4 : 3. The saving of P is more than that of Q by $16\frac{2}{3}\%$. What per cent of his income does P spend?
(a) $53\frac{2}{3}\%$ (b) $53\frac{1}{3}\%$
(c) $54\frac{1}{3}\%$ (d) $51\frac{2}{3}\%$

33. Mohan invested a sum of ₹ 12500 at 12% per annum compound interest. He received an amount of ₹ 15680 after x year. Then, the value of x is .....
(a) 1 (b) 4
(c) 3 (d) 2

34. Find the compound interest on ₹125000 for 9 months at 8% per annum, compounded quarterly.
(a) 7551 (b) 7651
(c) 7650 (d) 7655

35. Pipe A can fill a tank in 12 h and pipe B can empty the tank in 18 h. Both pipes are opened at 6 AM and after some time, pipe B is closed and tank is full at 8 PM. At what time was the pipe B closed?
(a) 10 AM (b) 8 AM
(c) 9 AM (d) 11 AM

36. A car covers 300 km at a constant speed. If its speed was 10 km/h more, it would have taken 1 h less to travel the same distance. Find the speed of the car.
(a) 60 km/h (b) 50 km/h
(c) 40 km/h (d) 75 km/h

37. Two trains are travelling in opposite direction with speed of 25 m/s and 30 m/s respectively. If the length of one train is 300 m and that of the other train is 250 m, then find the time taken by the trains to cross each other.
(a) 8 s (b) 10 s
(c) 12 s (d) 14 s

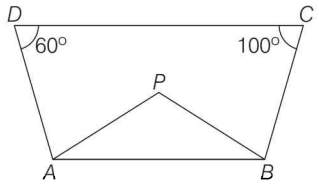
38. The sum of the digits of a two digit number is 9. If 27 is subtracted from the number, then the digits get reversed. Find the number.
(a) 81 (b) 72
(c) 36 (d) 63

39. There are some four-wheelers and six-wheelers in a garage. The total number of wheels of these vehicles is 120. The number of four-wheelers is 3/2 times the number of six-wheelers. Find the number of six-wheelers in the garage.
(a) 20 (b) 5
(c) 15 (d) 10

40. What is the minimum interior angle possible for a regular polygon?
(a) 60° (b) 75°
(c) 90° (d) None

41. What is the number of diagonals in a hexagon?
(a) 4 (b) 6
(c) 9 (d) 10

42. In the adjacent figure, the bisectors of ∠A and ∠B meet at a point P. If ∠C = 100° and ∠D = 60°, find the measure of ∠APB.



(a) 60° (b) 70°
(c) 90° (d) 80°

43. A square and a rectangle each have a perimeter of 40 m. The difference between areas of the two figures is 9 m^2. What are the possible dimensions of the rectangle?
(a) 13 m, 7 m (b) 14 m, 6 m
(c) 108 m, 1 m (d) 15 m, 5 m

44. In a parallelogram ABCD, AB = 6 cm, BC = 5 cm and AC = 7 cm. Find the perpendicular distance between AB and CD.
(a) $6\sqrt{6}$ cm (b) $12\sqrt{6}$ cm
(c) 5 cm (d) $2\sqrt{6}$ cm

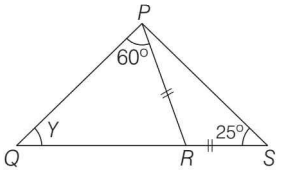
45. Some cubic metres of earth is dug out to sink a well which is 16 m deep and which has a radius of 3.5 m. If that amount of earth when taken out is spread over a rectangular plot of dimensions 25 m × 16 m, what is the height of the platforms so formed?
(a) 1.54 m (b) 1.50 m
(c) 1.52 m (d) 1.53 m

46. What is the difference between the total surface area and curved surface area of a cylinder whose radius is equal to 10 cm?
(a) 200π cm^2
(b) 300π cm^2
(c) 100π cm^2
(d) 10π cm^2

47. The mean of six numbers is 15. If 2 is taken away from every number, the new mean would be
(a) 13 (b) 4
(c) 17 (d) 8

48. The sides of the triangle are 45 cm, 60 cm and 75 cm. Find the length drawn to the longest side from its opposite vertex.
(a) 27 cm
(b) 21 cm
(c) 39 cm
(d) 36 cm

49. In the following figure, find the value of Y.



(a) 50° (b) 65° (c) 60° (d) 70°

50. A cylindrical tank has a capacity of 5632 m^3. If the diameter of its base is 16 m, find its depth.
(a) 28 m (b) 25 m (c) 16 m (d) 29 m

Section II English

51. Candidates must ..... the general conditions for admission.
(a) do (b) prepare
(c) satisfy (d) create

52. He resorts ..... sharp practice in his dealings.
(a) at (b) to
(c) in (d) for

53. ..... English is an international language.
(a) No article (b) The
(c) A (d) An

54. The word 'Industrious' means
(a) working in industry
(b) labour in factory
(c) hard working
(d) laid back

55. Choose the correct order to make the sentence below meaningful.

Wear/these/people/almost/a/majority/of /

1 2 3 4 5 6 7

days/a watch

8 9

(a) 4 5 6 7 3 1 9 2 8 (b) 4 5 7 6 1 3 8 2 9
(c) 4 5 6 7 9 2 3 1 8 (d) 4 5 6 7 3 1 2 8 9

56. Select the word closest in meaning to 'Mortal'.
(a) Recurrent (b) Trivial
(c) Fatal (d) Eternal

57. Mark the word with the correct spelling.
(a) Maintenance (b) Maintennance
(c) Maintanance (d) Maintainance

58. The coach insisted that Ronaldo ..... the centre position, even though he's too short for that position. (Use the correct verb)
(a) play (b) played
(c) plays (d) None of these

59. ... Kind of Scotland saw ..... spider trying to climb up to ..... ceiling of the cave. (Use Articles)
(a) The, a, the
(b) A, a, the
(c) No article, a, no article
(d) The, a, no article

60. Raja relishes not only Chinese ..... continental food. (Use appropriate conjunction)
(a) also (b) but
(c) but also (d) rather

61. You must learn ..... English every day to improve it. (Use appropriate determiner)
(a) a few (b) a little
(c) a lot of (d) None of these

62. Arrange the jumbled words to form a meaningful sentence.

most/inventor/world/Thomas/Alva/Edison/the /in/is/remarkable/the

(a) The remarkable inventor in the most world is Thomas Alva Edison.
(b) Thomas Alva Edison is the most remarkable inventor in the world.
(c) Is the most remarkable inventor in the world Thomas Alva Edison.
(d) In the world most remarkable inventor is Thomas Alva Edison.

Directions (Q.Nos. 63-67) *Read the following passages and answer the questions that follow.*

The moon's role in causing tides is much more high and important than that of the Sun. The reason is that the moon enjoys more proximity to the Earth than the Sun. As such its force is greater than that of the Sun in attracting the surface water. Tides are of immense importance. In trade, navigation and fishing, tides are very useful. During the high tide, the water depth near the coast goes up and helps big ships to reach the ports.

Kandla port in Gujarat and Diamond Harbour in West Bengal owe their very existence to the tides only. The significance of both London and Kolkata also depends on the tides. Tides also keep the harbours clear of refuse and mind brought down by rivers and thus they do not allow the harbours to be silted. Commonly, the tidal rivers are navigable. For the purpose of generating electricity, tidal waves are harnessed. Tides do not allow the sea water to be frozen by keeping the sea water in motion. Tides are also made use by the fishermen for sailing into the sea returning to the harbour. In countries like Canada, U.K., France and Japan, tidal power stations are set up.

63. Why does the moon play a greater role than the Sun in causing tides?
(a) The Moon is closer to the Earth as compared to the Sun.
(b) The Moon has greater gravitational pull.
(c) The Moon shine in night.
(d) None of the above

64. How are tides useful for the economy of the country?
(a) Tides bring treasure of sea with them.
(b) During high tides, big ships can reach the ports thus opening new vistas for business.
(c) Tides destroy enemies of the country.
(d) None of the above

65. How are tides useful in cold countries?
(a) They bring fish for eating.
(b) They bring water for drinking.
(c) They don't allow sea water to be frozen.
(d) They keep the port silted.

66. How can tides solve the power problem of the world?
(a) Electricity is being produced through tidal waves.
(b) Tidal waves keep the steamers in motion.
(c) Tidal waves melt the ice and save power.
(d) None of the above

67. Which word in the passage means 'to bring under control'?
(a) Proximity (b) Silted
(c) Immense (d) Harness

68. She plays better than ..... do. (Choose appropriate pronoun)
(a) I (b) my
(c) may (d) myself

69. I ..... in a school in Delhi since 2017. (Choose appropriate form of tense)
(a) has studied
(b) has been studying
(c) have been studying
(d) will study

70. There isn't any smog in the Highlands of Scotland, ... ? (Choose appropriate question tag)
(a) aren't it (b) isn't it
(c) is there (d) there isn't

71. Choose the best meaning of the Idiom 'To play to the gallery'.
(a) To watch the play with interest
(b) To enact the play in the gallery
(c) To endeavour to gain cheap popularity
(d) To sit comfortably

72. The speckled tortoise walks steadfastly toward his goal? (Choose the adverb)
(a) Speckled (b) Steadfastly
(c) Towards (d) Goal

73. I wrote an article for the school magazine. (Change from active to passive voice)
(a) An article for the school magazine I had written.
(b) An article was written by me for the school magazine.
(c) I have written an article for the school magazine.
(d) The school magazine and an article I wrote for.

74. Empty vessels ..... much noise. (Select the correct form of verb)
(a) make (b) are making
(c) have made (d) makes

75. Gullible (choose the word with opposite meaning)
(a) Trusting
(b) Cynical
(c) Clever
(d) Resourceful

Section III General Science

76. The metal present in Chlorophyll is
(a) Iron (b) Calcium
(c) Oxygen (d) Magnesium

77. Name the gas present in LPG.
(a) Hydrogen (b) Oxygen
(c) Methane (d) Butane

78. Which gas is used to replace CFC?
(a) HCFC (b) RCFC
(c) DHFC (d) HHFC

79. The first Menstrual flow at puberty is termed
(a) Menopause (b) Menstruation
(c) Puberty flow (d) Menarche

80. Which among the following statement is incorrect about all organelles?
(a) They are found in all Eukaryotic cells.
(b) They are found in multicellular organisms only.
(c) They coordinate to produce new cell.
(d) They are small sized and mostly internal.

81. The boy is pulling a cart by a force of 100 N. The frictional force experienced by the cart is 20 N. The force causing the motion of the cart is
(a) 100 N (b) 120 N
(c) 80 N (d) 5 N

82. The cans used for storing food are made by electroplating
(a) Silver onto iron
(b) Chromium onto iron
(c) Gold onto iron
(d) Tin onto iron

83. The impression of an image does not vanish immediately from the retina. It persists for
(a) (1/60)th of a second
(b) (1/12)th of a second
(c) (1/6)th of a second
(d) (1/16)th of a second

84. The Sun appears to rise in the East and set in the West because
(a) Earth rotates from East to West on its axis
(b) Earth rotates from West to East on its axis
(c) The Sun is at the centre of universe
(d) None of the above

85. Pressure is equal to
(a) Area/force on which it acts
(b) Force/area on which it acts
(c) Volume/force on which it acts
(d) Force/volume on which it acts

86. An ultrasound equipment works at a frequency
(a) higher than 20,000 Hz
(b) higher than 10,000 Hz
(c) lower than 20,000 Hz
(d) lower than 10,000 Hz

87. When electrodes are immersed in water and electricity is passed, the bubbles formed on the negative terminal is actually ..... gas.
(a) Hydrogen (b) Carbon dioxide
(c) Oxygen (d) Nitrogen

88. If tight falls perpendicularly on a plane mirror, the angle in which light will be reflected is .....
(a) 45 degrees (b) 90 degrees
(c) 180 degrees (d) 360 degrees

89. All non-living things are known as .....
(a) Biotic Resource
(b) Exhaustible Resource
(c) Abiotic Resource
(d) Human Resource

90. Malarial parasite is carried by
(a) *Culex* mosquito
(b) Male *anopheles* mosquito
(c) Female *anopheles* mosquito
(d) *Aedes* mosquito

91. Internal fertilisation does not occur in
(a) Dog (b) Cow
(c) Parrot (d) Frog

92. Regeneration is observed in
(a) *Planaria* (b) *Spyrogyra*
(c) *Yeast* (d) *Amoeba*

93. Rapid combustion is
(a) when gas burns, it produces heat and light
(b) when material suddenly burst into flames
(c) when there is evolution of heat
(d) None of the above

94. A student is carrying out distillation process in a lab, water is boiling in distillation flask. Water that is collected in the receiver flask is refrigerated and ice cubes are formed. Ice cubes are then kept outside the refrigerator and they start melting. Arrange following phases of water in ascending order of their total (PE + KE) energy considering that the mass of water remains the same.
(i) Water collected in the receiving flask
(ii) Water boiling in the distillation
(iii) Steam passing through the delivery tube
(iv) Ice cubes formed in the refrigerator
(a) (iv), (iii), (ii), (i)
(b) (iv), (i), (ii), (iii)
(c) (iii), (iv), (ii), (i)
(d) (iv), (i), (iii), (ii)

95. The different samples of CO_2 were found to contain carbon and oxygen in the same ratio of their mass. This illustrates
(a) Law of conservation of mass
(b) Law of definite proportions
(c) Law of multiple proportions
(d) Law of reciprocal proportions

96. An atlas of India is drawn by taking scale 100 cm = 50,000 km. The actual distance between the city of Bhopal and Cochin is 1,500 km, the distance between the two places in the atlas will be ..... cm.
(a) 3 (b) 1 (c) 10 (d) 2

97. Both sound and light waves can be propagated through
(a) Vacuum (b) Air
(c) Both (a) and (b) (d) None of these

98. A man stands in front of a mirror and finds that his image is larger than himself. The mirror is a ..... mirror.
(a) Convex (b) Concave
(c) Plane (d) Both (a) and (b)

99. Each lung is enclosed in a double membrane called as pleura. The membrane which covers the surface of each lung is
(a) Visceral pleura
(b) Lung pleura
(c) Peritoneal pleura
(d) Parietal pleura

100. Nitrogenous waste products are eliminated mainly as .....
(a) urea in tadpole and ammonia in adult frog
(b) ammonia in tadpole and urea in adult frog
(c) urea in tadpole and adult frog
(d) urea in tadpole and uric acid in adult frog

Section IV Social Studies

101. Who granted East India Company the sole right to trade with the East?
(a) Robert Clive
(b) Queen Elizabeth I
(c) John Richardson
(d) Queen Elizabeth II

102. The first Indian woman to become President of the Indian National Congress was
(a) Sarojini Naidu
(b) Kamla Nehru
(c) Kasturba Gandhi
(d) Begum Rokeya Shakhawat Hossain

103. Land covered with grass shrubs on which animals can graze freely is known as
(a) Fallow land (b) Overgrazing
(c) Pasture (d) Agricultural land

104. Name of the first country in the world to develop hydroelectricity.
(a) Norway (b) Pakistan
(c) India (d) Switzerland

105. Breeding of fish in specially constructed tanks and ponds is known as
(a) Agriculture (b) Sericulture
(c) Pisciculture (d) Viticulture

106. Ahmedabad is referred as the ..... of India.
(a) Ruhr (b) Manchester
(c) Boston (d) Chicago

107. How many members are nominated by the President to the Rajya Sabha?
(a) 233 (b) 12 (c) 22 (d) 250

108. The Industrial Revolution started in ..... around 1750.
(a) France (b) Britain
(c) Russia (d) None of these

109. The British conquest of Bengal began with the Battle of ..... .
(a) Buxar (b) Plassey
(c) Seringapatam (d) Saraighat

110. The architect of New Delhi was .....
(a) Edwin Lutyens and H Baker
(b) King George V
(c) Lord Lytton
(d) Queen Elizabeth

111. The existence of more than one level of government is known as
(a) Federalism (b) Secularism
(c) Marginalism (d) Communalism

112. Money Bill is introduced
(a) Only in Rajya Sabha
(b) Only in Lok Sabha
(c) In both the Houses
(d) By the Speaker of Rajya Sabha

113. In which state of India is the "Jim Corbett National Park" situated?
(a) Uttarakhand (b) Gujarat
(c) Assam (d) Uttar Pradesh

114. Which state of India is the highest producer of Jute?
(a) Assam (b) West Bengal
(c) Bihar (d) Odisha

115. A form of government where people enjoy equal political right, elect their ruler and hold them accountable is known as
(a) Secular (b) Democratic
(c) Socialist (d) Republic

116. In order to prevent religion based exclusion and discrimination of 'lower castes', the Indian Constitution bans
(a) Untouchability (b) Religious practices
(c) Religion (d) Religious institution

117. Sustainable development seeks to prevent ..... .
(a) wastage of resources (b) pollution
(c) loss of biodiversity (d) All of these

118. Of the Earth's total water resources, the fresh water easily accessible for our use is
(a) More than 90%
(b) 50%
(c) 1%
(d) Less than 1%

119. These are made to protect our natural vegetation and wildlife
(a) National Park
(b) Wildlife Sanctuaries
(c) Biosphere reserves
(d) All of the above

120. The largest producer and exporter of mica in the world is
(a) Australia (b) India
(c) USA (d) Russia

121. Resources which can be renewed or reproduced are known as .....
(a) Exhaustible resource
(b) Non renewal source
(c) Renewal resource
(d) Useful resource

122. The Act on the 'Protection of Women from Domestic Violence' finally became a law in the year
(a) 2003 (b) 2004 (c) 2005 (d) 2006

123. Right to Information (RTI) act guarantees people's right to
(a) know governmental proceedings
(b) get universal primary education
(c) speak out their discontent freely
(d) hold meetings and public gathering

124. At the village level, the judicial functions are performed by the
(a) Nyaya Panchayat (b) Gram Panchayat
(c) District Judge (d) Munsif

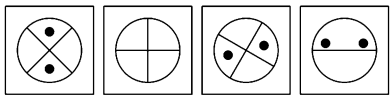
125. Many of India's most important mining and industrial centre and located in
(a) Jamshedpur (b) Rourkela
(c) Bokaro (d) All of these

Paper II

Section V Intelligence Test

Below are given examples of the type of questions that you may find in the test. The given examples are just suggestive and given for practice and your understanding. Now, look at these examples carefully and understand how they are solved.

A. Example There are four sets of figures in which three share a common property and make a group whereas, one of them is different. Find out which figure is different from the other three.



Out of the above figures A, B, C and D E except figure 'B' all figures have two black dots in the figure and thus form one group. Figure 'B' stands out as it does not have any black dot in it. So, the right answer is 'B' which is written in the answer box.

Answer is **b**

In a similar manner you may be asked to choose the set of alphabets or number which differ from their group. Try to understand the logic how they are grouped and solve the problem.

B. Example Given below, some numbers are arranged in a particular sequence but one of the number is missing. Find the missing number from the given choices to complete the series.

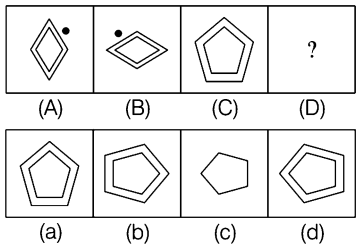
21 31 41 51 .....
(A) 81 (B) 51
(C) 61 (D) 71

In the above series, there is a gap of ten numbers between the first number and the second consecutive number. To continue the series, the missing number would be 61. Therefore choice 'B' is the correct answer to be written in the answer box.

Answer is **c**

In a similar manner you may be asked to choose the set of given options to complete the series for alphabets or figures. You have to grasp the sequence logic and solve the given problems.

C. Example Figure (A) and (B) have a particular relationship. Establish the similar relationship between figure (C) and (D) by choosing right figure amongst the four alternatives (a), (b), (c), (d) which would replace the question mark (?) in figure (D).



Answer is **d**

Now solve the following questions as directed. For a question or a group of questions certain additional instructions are given. Please read those and answer accordingly.

Directions (Q. Nos. 126-129) *Choose the letters group that best represents a relationship similar to the one expressed in the original pair of letters group in the following questions.*

126. FILM : ADGH :: MILK : ?
(a) ADGF (b) HDGE (c) HDGF (d) HEGF

127. EIGHTY : GIEYTH :: OUTPUT : ?
(a) TUOTUP (b) TUOUTP (c) UTOPTU (d) UOTUPT

128. CAT is to DDY as BIG is to
(a) CLL (b) CLM (c) CML (d) CEP

129. Bag is related to Luggage, in the same way as Ship is related to ..... .
(a) Coal (b) Stock (c) Cargo (d) Weight

Directions (Q. Nos. 130 and 131) *Which number completes the second pair in the same way as the first pair?*

130. 3 : 243 :: 5 ..... ?
(a) 425 (b) 465 (c) 546 (d) 3125

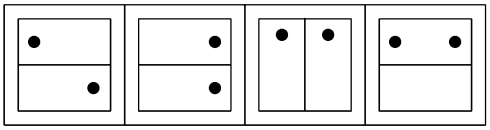
131. 6 : 24 :: 5 : ?
(a) 23 (b) 20 (c) 26 (d) 22

132. Find the missing character from among the given alternatives.

A2	C4	E6
G3	I5	?
M5	O9	Q14

(a) J15 (b) K8 (c) K15 (d) L10

133. Choose the figure, which is different from others.



134. Arrange the following words as per order in the dictionary.
1. Live 2. Litter
3. Little 4. Literacy
5. Living
(a) 3, 4, 2, 1, 5 (b) 3, 2, 4, 5, 1
(c) 4, 3, 5, 2, 1 (d) 4, 2, 3, 1, 5

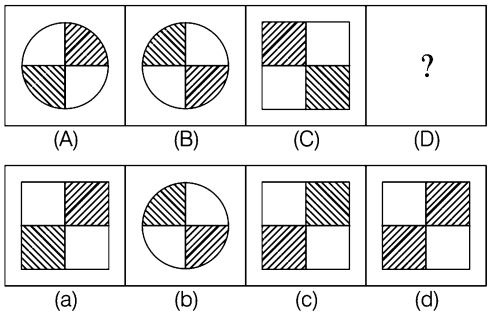
135. In a certain code, TEACHER is written as VGCEJGT. How is CHILDREN written in that code?
(a) EJKNEGTP (b) EGKNFITP
(c) EJKNFGTO (d) EJKNFTGP

136. If 30th January 2003 was Thursday, what was the day on 2nd March, 2003?
(a) Sunday (b) Monday
(c) Saturday (d) Tuesday

137. In the following series, how many KGN occur in such a way that 'G' is in the middle and 'K' and 'N' are adjacent to it on both sides?
A K G L M N D Q K G C S N G K T G K G N D Z P U X G K E
(a) 5 (b) 4
(c) 1 (d) 2

138. Which word cannot be formed by using the letters of the DISTRIBUTION word? Find that word.
(a) TRUST (b) SITUATION
(c) TUITION (d) DISTURB

139. Select the figure from the answer set that would come in place of the question mark (?).

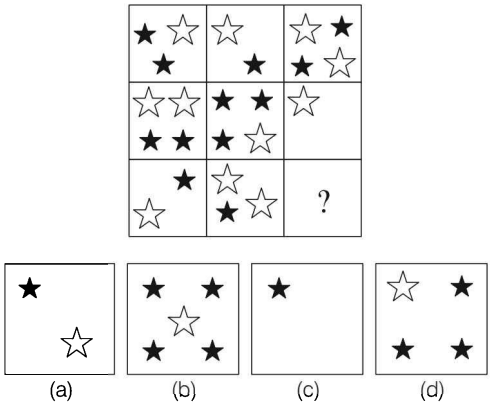


140. If Maya is the only daughter of Richa's grandmother's brother, how is Maya's daughter related to Richa?
(a) Niece (b) Cousin
(c) Aunt (d) Mother

141. It is 3 O'clock in a watch and it is rotated by 10 degrees in a manner such that if the minute hand points towards the North-East, then hour hand will point towards which direction?
(a) South (b) South-West
(c) North-West (d) South-East

142. Which one does not belong to the group?
(a) 63 (b) 65
(c) 84 (d) 91

143. Which square should replace the question mark (?)?



144. Village 'W' is 20 km to the North of village 'X'. Village 'Y' is 18 km to the East of village 'X'. Village 'Z' is 12 km to the West of village 'W'. If Mannu starts from village 'Y' and goes to village 'Z' via village 'W', in which direction is he from his starting point?
(a) North-West (b) South
(c) North-East (d) East

145. If the 7th day of a month is 3 days earlier than Friday, what day will it be on the 19th day of the month?
(a) Monday (b) Sunday
(c) Wednesday (d) Friday

146. Gaurav said to Tarun, ''That boy playing with the football is the younger of the two brothers of the daughter of my father's wife''. How is the boy playing football related to Gaurav?
(a) Son (b) Brother
(c) Cousin (d) Brother-in-law

Direction(Q. No. 147) *Study the following arrangement of the English alphabet and answer the question given below.*

F J M P O W R N B E Y C K A V L D G X U H Q I S Z T

147. Which of the following pairs of letters has as many letters between them in the above arrangement as there are between them in the English alphabet.
(a) AI (b) EL (c) LS (d) MO

Directions (Q. Nos. 148-150) *Study the following information carefully and answer the questions given below.*

A solid cube of each side 4 cm has been painted all faces. It is then cut into cubical blocks each of side 2 cm.

148. How many cubes are there in all of an edge 2 cm?
(a) 2 (b) 4 (c) 8 (d) 16

149. How many cubes have no face painted?
(a) 0 (b) 2 (c) 4 (d) 8

150. How many cubes have only one face painted?
(a) 0 (b) 2 (c) 4 (d) 8

Answers

1	(d)	2	(c)	3	(c)	4	(a)	5	(a)	6	(c)	7	(c)	8	(b)	9	(a)	10	(c)
11	(c)	12	(a)	13	(d)	14	(a)	15	(b)	16	(b)	17	(c)	18	(a)	19	(b)	20	(d)
21	(c)	22	(d)	23	(a)	24	(b)	25	(d)	26	(a)	27	(d)	28	(c)	29	(d)	30	(b)
31	(c)	32	(b)	33	(d)	34	(b)	35	(c)	36	(b)	37	(b)	38	(d)	39	(d)	40	(a)
41	(c)	42	(d)	43	(a)	44	(d)	45	(a)	46	(a)	47	(a)	48	(d)	49	(d)	50	(a)
51	(c)	52	(b)	53	(a)	54	(c)	55	(a)	56	(c)	57	(a)	58	(a)	59	(a)	60	(c)
61	(b)	62	(b)	63	(a)	64	(b)	65	(c)	66	(a)	67	(d)	68	(a)	69	(c)	70	(c)
71	(c)	72	(b)	73	(b)	74	(a)	75	(b)	76	(d)	77	(d)	78	(a)	79	(d)	80	(c)
81	(c)	82	(d)	83	(d)	84	(b)	85	(b)	86	(a)	87	(a)	88	(*)	89	(c)	90	(c)
91	(d)	92	(a)	93	(a)	94	(b)	95	(b)	96	(a)	97	(b)	98	(b)	99	(a)	100	(b)
101	(b)	102	(a)	103	(c)	104	(a)	105	(c)	106	(b)	107	(b)	108	(b)	109	(b)	110	(a)
111	(a)	112	(b)	113	(a)	114	(b)	115	(b)	116	(a)	117	(d)	118	(c)	119	(d)	120	(b)
121	(c)	122	(c)	123	(a)	124	(a)	125	(d)	126	(c)	127	(a)	128	(a)	129	(c)	130	(d)
131	(b)	132	(b)	133	(d)	134	(d)	135	(d)	136	(a)	137	(d)	138	(b)	139	(a)	140	(b)
141	(d)	142	(b)	143	(d)	144	(a)	145	(b)	146	(b)	147	(d)	148	(c)	149	(a)	150	(a)

Hints & Solutions

1. (d) Given expression

$$=\left(-\frac{3}{2}\times\frac{4}{5}\right)+\left(\frac{9}{5}\times\frac{-10}{3}\right)-\left(\frac{1}{2}\times\frac{3}{4}\right)$$

$$=-\frac{6}{5}+(-6)-\frac{3}{8}$$

$$=\frac{-48-240-15}{40}=-\frac{303}{40}$$

2. (c) The abscissa of a point is its distance from the *Y*-axis.

3. (c) $\left(\frac{2}{9}\right)^{3}\times\left(\frac{2}{9}\right)^{-6}=\left(\frac{2}{9}\right)^{2m-1}$

$\Rightarrow \quad \left(\frac{2}{9}\right)^{3-6}=\left(\frac{2}{9}\right)^{2m-1} \quad [\because a^m\times a^n=a^{m+n}]$

$\Rightarrow \quad \left(\frac{2}{9}\right)^{-3}=\left(\frac{2}{9}\right)^{2m-1}$

Comparing the indices of both sides

$-3=2m-1 \Rightarrow 2m=-3+1$

$\Rightarrow \quad 2m=-2$

$\therefore \quad m=-1$

4. (a) We know every even perfect square number is complete divisible by 4 and every odd perfect square number, when divided by 4 leaves remainder 1.

So, the number is not a perfect square.

The number in form of 4P + 2 or 4P + 3, P is an integer and quotient.

If

P =1, then number 6 or 7, 7 is prime.

P =2 , then number 10 or 11, 11 is prime.

P =3, then number 14 or 15, 15 is not prime.

Hence, option (a) is correct answer.

5. (a) Given expression

$$=\frac{\sqrt{0.2304}+\sqrt{0.1764}}{\sqrt{0.2304}-\sqrt{0.1764}}$$

$$=\frac{\sqrt{\frac{2304}{10000}}+\sqrt{\frac{1764}{10000}}}{\sqrt{\frac{2304}{10000}}-\sqrt{\frac{1764}{10000}}}$$

	48		42
4	2304	4	1764
+4	16	+4	16
88	704	82	164
	704		164
	×		×

$$=\frac{\frac{48}{100}+\frac{42}{100}}{\frac{48}{100}-\frac{42}{100}}=\frac{\frac{1}{100}[48+42]}{\frac{1}{100}[48-42]}=\frac{90}{6}=15$$

6. (c) Let three numbers are 2x, 3x and 4x.

According to the question,

Sum of their numbers = 33957

$\Rightarrow (2x)^3+(3x)^3+(4x)^3=33957$

$\Rightarrow 8x^3+27x^3+64x^3=33957$

$\Rightarrow \quad 99x^3=33957$

$\Rightarrow \quad x^3=\frac{33957}{99}=343$

$\Rightarrow \quad x=\sqrt[3]{343}=\sqrt[3]{7\times7\times7}$

$\therefore \quad x=7$

Hence, the numbers are 14, 21 and 28.

7. (c) Prime factors of 8, 9 and 10,

$8=2\times2\times2$

$9=3\times3$

$10=2\times5$

$\therefore$ LCM of 8, 9 and $10=2\times2\times2\times3\times3\times5=360$

$\therefore$ The least square number divisible by each one 8, 9 and 10

$=$ n $\times$ LCM of 8, 9 and 10

[n is a positive integers]

$=n\times360$

$=10\times360$ [for least value n =10]

$=3600$

8. (b) Given, 148101*a*095 is a multiple of 11, where *a* is a digit. We know that, a number will be multiple of 11 if the difference of the sum of digits at odd place and sum of digits at even place is zero or multiple of 11.

$\therefore (1+8+0+a+9)-(4+1+1+0+5)=0$

or multiple of 11

$\Rightarrow 18+a-11=0$ or multiple of 11

$\Rightarrow \quad a+7=0$ or multiple of 11

If $a+7=0\Rightarrow a=-7$ it is not possible.

If $a+7=11$

$\Rightarrow \quad a=4$

Hence, $a=4$

9. (a) Given,

$$\begin{array}{r} B\ \ A \\ \times B\ \ 3 \\ \hline 57\ A \end{array}$$

According to the question, A is the unit digit of $3 \times A$

$\therefore A = 5$ because $3 \times 5 = 15$, Here carry 1

and 7 is the unit digit of $3 \times B$.

$\therefore \quad 3 \times B + 1 = 7, 17, 27 \ldots\ldots$

If $B = 2$, then $3 \times 2 + 1 = 7$

$\therefore$

$$\begin{array}{r} B\ A \\ \times B\ 3 \\ \hline 5\ 7\ A \end{array} \rightarrow \begin{array}{r} 2\ 5 \\ \times 2\ 3 \\ \hline 7\ 5 \\ 5\ 0\ \times \\ \hline 5\ 7\ 5 \end{array}$$

It is correct. Hence, A = 5 and B = 2

10. (c) Given, 471Z8 is divisible by 9.

We know that, a number will be divisible by 9 if the sum of digits this number is complete divisible by 9.

$\therefore 4 + 7 + 1 + Z + 8$, is divisible by 9

$\Rightarrow 20 + Z$, is divisible by 9

$\therefore Z = 7$ because $20 + 7 = 27$ is divisible by 9.

11. (c) Let side of equilateral triangle be a.

$$\therefore \text{Area of equilateral triangle} = \frac{\sqrt{3}}{4}a^2$$

$$\Rightarrow \quad 64\sqrt{3} = \frac{\sqrt{3}}{4}a^2 \Rightarrow a^2 = 64 \times 4 = 256$$

$$\Rightarrow \quad a = \sqrt{256} = \sqrt{16 \times 16}$$

$$\therefore \quad a = 16$$

Hence, side of equilateral triangle is 16 cm.

12. (a) Given expression

$$= \frac{4m^2 - a^2 + 2ab - b^2}{2m + a - b}$$

$$= \frac{4m^2 - (a^2 - 2ab + b^2)}{2m + a - b}$$

$$= \frac{(2m)^2 - (a - b)^2}{2m + a - b}$$

$$[\because (a - b)^2 = a^2 - 2ab + b^2]$$

$$= \frac{(2m + a - b)(2m - a + b)}{(2m + a - b)}$$

$$[\because a^2 - b^2 = (a + b)(a - b)]$$

$$= 2m - a + b$$

13. (d) Let speeds of two trains A and B are 3x and 5x respectively.

Train B runs 300 km in 4 h

$$\therefore \text{Speed of train B} = \frac{\text{Distance}}{\text{Time}}$$

$$\Rightarrow \quad 5x = \frac{300}{4} \Rightarrow x = \frac{300}{4 \times 5}$$

$$\Rightarrow \quad x = 15$$

$\therefore$ Speed of train A $= 3 \times 15 = 45$ km/h

14. (a) Let the present age of Dilip and his son be x and y respectively.

According to the question,

$$x - 2 = 3(y - 2) \Rightarrow x - 3y = -6 + 2$$

$$\Rightarrow \quad x - 3y = -4 \qquad \ldots(i)$$

and $\quad 2(x + 2) = 5(y + 2)$

$$\Rightarrow \quad 2x - 5y = 10 - 4$$

$$\Rightarrow \quad 2x - 5y = 6 \qquad \ldots(ii)$$

Solving Eqs. (i) and (ii), x = 38, y = 14

Hence, present age of son and Dilip are 14 yr and 38 yr respectively.

15. (b) Total number of times of a single throw of a dice, n(S) = 6

Number of times 7 turned up on a single throw of a dice, n (E) = 0

$$\therefore \text{Required probability} = \frac{n(E)}{n(S)} = \frac{0}{6} = 0$$

16. (b) Let income of A and B are x and y respectively.

According to the question,

A's income = 60% more than income B's

$$\Rightarrow \quad x = y + 60\% \text{ of } y$$

$$\Rightarrow \quad x = y + \frac{60y}{100} \Rightarrow x = \frac{160y}{100}$$

$$\Rightarrow \quad x = \frac{8y}{5} \Rightarrow y = \frac{5x}{8}$$

B's income less than A's $= x - \frac{5x}{8} = \frac{3x}{8}$

$$\therefore \text{ Less per cent of } B\text{'s income} = \frac{\frac{3x}{8}}{x} \times 100$$

$$= \frac{3}{8} \times 100 = 37.5\%$$

Alternate Method

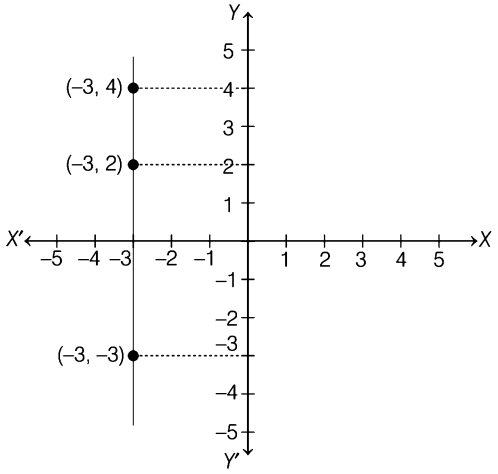
$\therefore$ Less per cent of B's income

$$= \frac{x}{100+x}100\% = \frac{60}{100+60}\times 100$$

$$= \frac{6000}{160} = 37.5\%$$

17. (c) Given points are (–3, 2), (–3, – 3) and (–3, 4).

Draw these points on cartesian plane.



It is clear that the given points formed a straight lines, which is parallel to Y-axis.

18. (a) The number of times a particular observation occurs in a given data is called 'Frequency'.

19. (b) Let selling price of 1m cloth be x.

$\therefore$ Selling price of 33m cloth = 33x

and loss on selling for 33m cloth = 3x

$\therefore$ Cost price of 33m cloth = SP + loss

$$= 33x + 3x = 36x$$

$\therefore$ Cost price of 1m cloth $= \frac{36x}{33} = \frac{12x}{11}$

There are get loss because CP > SP.

$\therefore$ Loss per cent $= \frac{CP - SP}{CP}\times 100$

$$= \frac{\frac{12}{11}x - x}{\frac{12}{11}x}\times 100$$

$$= \frac{1}{12}\times 100 = \frac{25}{3} = 8\frac{1}{3}\%$$

20. (d) Given, edges of three cubes are 6 cm, 8 cm and 10 cm respectively.

According to the question,

Volume of new cube = sum of volume of three cubes

$\Rightarrow$ $(\text{side})^3 = (6)^3 + (8)^3 + (10)^3$

$\Rightarrow$ $(\text{side})^3 = 216 + 512 + 1000$

$\Rightarrow$ $(\text{side})^3 = 1728$

$\Rightarrow$ $\text{side} = \sqrt[3]{1728} = \sqrt[3]{12\times 12\times 12}$

$\Rightarrow$ $\text{side} = 12\,\text{cm}$

Hence, the side of new cube is 12 cm.

21. (c) Given, $d_1 = 20\%$, $d_2 = 10\%$

$\therefore$ Single discount

$$= \left[100 - 100\times\frac{100-d_1}{100}\times\frac{100-d_2}{100}\right]\%$$

$$= \left[100 - 100\times\frac{100-20}{100}\times\frac{100-10}{100}\right]\%$$

$$= \left[100 - 100\times\frac{80}{100}\times\frac{90}{100}\right]\%$$

$$= [100 - 72]\% = 28\%$$

22. (d) Option (a), number of sheets of same kind are increased, when their total weight is increased. In this case of direct variation.

Option (b), more quantity of petrol is required to travel more distance with a fixed speed. In this case of direct variation.

Option (c), more fees would be collected if number of students increase in a class. In this case of direct variation.

Option (d), time taken will be less, if number of workers is increased to complete the same work. In this case not direct variation.

23. (a) Given, $a + b + c = 9$ and $ab + bc + ca = 23$

We know that,

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

$\Rightarrow$ $a^2 + b^2 + c^2 = (a + b + c)^2 - 2(ab + bc + ca)$

$$= (9)^2 - 2(23) = 81 - 46 = 35$$

24. (b) Let first part be x.

$\therefore$ Second part = $200 - x$

According to the question,

$\frac{1}{3}$ of the first part = $\frac{1}{2}$ of the second part

$$\Rightarrow \quad \frac{1}{3}\times x = \frac{1}{2}\times(200-x)$$

$$\Rightarrow \quad 2x = 600 - 3x$$

$$\Rightarrow \quad 2x + 3x = 600$$

$$\Rightarrow \quad 5x = 600$$

$$\Rightarrow \quad x = \frac{600}{5} = 120$$

$\therefore$ First part = 120

and second part = 200 − 120 = 80

Hence, the larger of the parts is 120.

25. (d) Selling price (SP) of a fan = ₹ 810

Gains = 8%

$\therefore$ Cost price of a fan $= SP \times \frac{100}{100 + \text{gain}\%}$

$$= 810 \times \frac{100}{100+8}$$

$$= \frac{810\times100}{108} = ₹\,750$$

26. (a) $3^{2x} \times 3^{x+3} \times 3^{4-x} = (\sqrt{3})^{10}$

$$\Rightarrow \quad (3)^{2x+x+3+4-x} = (3)^{\frac{10}{2}} \qquad [\because a^m \times a^n = a^{m+n}]$$

$$\Rightarrow \quad (3)^{2x+7} = (3)^5$$

Comparing the indices of both sides,

$$2x + 7 = 5$$

$$\Rightarrow \quad 2x = 5 - 7$$

$$\therefore \quad x = \frac{-2}{2} = -1$$

27. (d) Given expression

$$= \sqrt[3]{\frac{(-a^6 \times b^3 \times c^{21})}{c^9 \times a^{15}}}$$

$$= \sqrt[3]{\frac{-b^3 \times c^{21-9}}{a^{15-6}}} = \sqrt[3]{\frac{(-1)^3 \times b^3 \times c^{12}}{a^9}}$$

$$= \sqrt[3]{\frac{(-1)^3 \times b^3 \times (c^4)^3}{(a^3)^3}}$$

$$= \sqrt[3]{\left(\frac{-bc^4}{a^3}\right)^3} = \left(\frac{-bc^4}{a^3}\right)^{3\times\frac{1}{3}}$$

$$= \frac{-bc^4}{a^3}$$

28. (c) If n is a perfect cube, then every prime factor of n occurs **three times**.

29. (d) The greatest number of four digits = 9999

Taking square roots of 9999

	99
9	9999
+9	81
189	1899
	1701
	198

$\therefore$ The greatest number of four digits which is a perfect square = 9999 − 198 = 9801

30. (b) Let the ages of x and y , 8 yr ago are 7k and 6k respectively.

$\therefore$ Present age of x = 7k + 8

and present age of y = 6k + 8

Now, sum of their ages 8 yr from now

= 7k + 8 + 8 + 6k + 8 + 8

= 13k + 32

From option (a), 13k + 32 = 82

$$\Rightarrow \quad 13k = 50$$

$\Rightarrow k = \frac{50}{13}$, it is not possible.

From option (b), 13k + 32 = 97

$$\Rightarrow \quad 13k = 65$$

$\Rightarrow k = \frac{65}{13} = 5$, it is possible.

From option (c), 13k + 32 = 75

$$\Rightarrow \quad 13k = 43$$

$\Rightarrow k = \frac{43}{13}$, it is not possible.

From option (d), 13k + 32 = 94

$$\Rightarrow \quad 13k = 62$$

$\Rightarrow k = \frac{62}{13}$, it is not possible.

So, possible value of k, to get from option (b).

Hence, the sum of ages of x and y, 8 yr ago from now can be 97.

31. (c) Let mother age bex.

According to the question,

Age of boy (son) $= \frac{1}{5} \times$ age of mother

$$\Rightarrow \quad \text{Age of son} = \frac{x}{5}$$

and age of father = age of son + age of mother

$\Rightarrow$ age of father $= \frac{x}{5} + x = \frac{6x}{5}$

$\therefore$ Required ratio = age of son: age of mother : age of father

$= \frac{x}{5} : x : \frac{6x}{5}$

$= 1 : 5 : 6$ [multiplying by $\frac{5}{x}$ in each]

32. (b) Let the income of P and Q are 5x and4x respectively and expenditure of P and Q are 4y and 3y, respectively.

$\therefore$ Saving of P = 5x − 4y

and saving of Q = 4x − 3y

According to the question,

Saving of P $= 16\frac{2}{3}\%$ more than saving of Q

$\Rightarrow \quad 5x - 4y = (4x - 3y)\left(\frac{100 + 16\frac{2}{3}}{100}\right)$

$\Rightarrow \quad 5x - 4y = (4x - 3y) \times \frac{350}{300}$

$\Rightarrow \quad 5x - 4y = (4x - 3y) \times \frac{7}{6}$

$\Rightarrow \quad 30x - 24y = 28x - 21y$

$\Rightarrow \quad 30x - 28x = 24y - 21y$

$\Rightarrow \quad 2x = 3y$

$\Rightarrow \quad y = \frac{2x}{3}$

$\therefore$ Spend of P $= 4y = 4 \times \frac{2}{3}x = \frac{8x}{3}$

$\therefore$ Spend per cent of P $= \frac{\text{Spend of P}}{\text{Income of P}} \times 100$

$= \frac{\frac{8}{3}x}{5x} \times 100$

$= \frac{8}{5 \times 3} \times 100 = \frac{160}{3}$

$= 53\frac{1}{3}\%$

33. (d) Given, P = ₹ 12500, r = 12%,

A = ₹ 15680 and n = x year

$\therefore \quad A = P\left(1 + \frac{r}{100}\right)^n$

$\Rightarrow \quad 15680 = 12500\left(1 + \frac{12}{100}\right)^x$

$\Rightarrow \quad \frac{15680}{12500} = \left(\frac{28}{25}\right)^x \Rightarrow \frac{784}{625} = \left(\frac{28}{25}\right)^x$

$\Rightarrow \quad \left(\frac{28}{25}\right)^2 = \left(\frac{28}{25}\right)^x$

Comparing the indices of both sides,

$x = 2$

Hence, the value of x is 2.

34. (b) P = ₹ 125000, n = 9 months, r = 8%

$\because$ Compound interest to give quarterly, then

$n = 4 \times \frac{9}{12} = 3$, and $r = \frac{8}{4} = 2\%$

$\therefore \quad A = P\left(1 + \frac{r}{100}\right)^n = 125000\left(1 + \frac{2}{100}\right)^3$

$= 125000 \times \left(\frac{51}{50}\right)^3$

$= 125000 \times \frac{51}{50} \times \frac{51}{50} \times \frac{51}{50}$

= ₹ 132651

$\therefore$ Compound interest

= A − P = 132651 − 125000 = ₹ 7651

35. (c) The part fill in 1 h by pipe A $= \frac{1}{12}$

The part empty in 1h by pipe B $= \frac{1}{18}$

Total time for open both pipe = 8 PM − 6 AM

= 14 h

Let pipe B closed after x h for 6 AM, then according to the question,

$\frac{14}{12} - \frac{x}{18} = 1$

$\Rightarrow \quad \frac{x}{18} = \frac{14}{12} - 1$

$\Rightarrow \quad \frac{x}{18} = \frac{2}{12}$

$\Rightarrow \quad x = \frac{2 \times 18}{12} = 3\text{ h}$

$\therefore$ Pipe B closed = 6AM + 3h

= 9 AM

36. (b) Let speed of the car be x km/h.

Time taken by car to cover 300km $= \frac{300}{x}$ h

If speed of the car 10 km/h more, then time taken by car to cover 300 km $= \frac{300}{x+10}$ h

According to the question,

$$\frac{300}{x} - \frac{300}{x+10} = 1$$

$$\Rightarrow \quad \frac{300x + 3000 - 300x}{x(x+10)} = 1$$

$$\Rightarrow \quad x^2 + 10x = 3000$$

$$\Rightarrow \quad x^2 + 10x - 3000 = 0$$

$$\Rightarrow x^2 + 60x - 50x - 3000 = 0$$

$$\Rightarrow \quad x(x+60) - 50(x+60) = 0$$

$$\Rightarrow \quad (x-50)(x+60) = 0 \quad \Rightarrow \quad x = 50$$

[$\because$ x = – 60, not possible]

Hence, the speed of the car is 50 km/h.

37. (b) Speed of first train = 25 m/s

Speed of second train = 30 m/s

Relative speed when trains are travelling in opposite direction

= (25 + 30) m/s = 55 m/s

Length of first train = 300 m

Length of second train = 250 m

$\therefore$ Cover distance by trains to cross each other

= 300 + 250 = 550 m

$\therefore$ Time taken by the trains to cross each other

$$= \frac{550}{55} \qquad \left[\because \text{Time} = \frac{\text{Distance}}{\text{Speed}}\right]$$

= 10s

38. (d) Let the unit digit of two digit number be x and ten digit of it number be y.

$\therefore$ Required number = 10y + x

According to the question, x + y = 9 ...(i)

and 10y + x – 27 = 10x + y

$$\Rightarrow \quad 10y + x - 10x - y = 27$$

$$\Rightarrow \quad 9y - 9x = 27$$

$$\Rightarrow \quad -x + y = 3 \qquad \ldots(ii)$$

Solving the Eqs. (i) and (ii), we get

y = 6, and x = 3

$\therefore$ Required number = 10 × 6 + 3 = 63

39. (d) Let the number of four-wheelers and six-wheelers in a garage be x andy respectively.

According to the question,

Total number of wheels of these vehicles = 120

$$\Rightarrow \quad 4x + 6y = 120$$

$$\Rightarrow \quad 2x + 3y = 60 \qquad \ldots(i)$$

and number of four-wheelers $= \frac{3}{2}$ number of six-wheelers

$$\Rightarrow \quad x = \frac{3}{2}y$$

$$\Rightarrow \quad 2x = 3y$$

$$\Rightarrow \quad 2x - 3y = 0 \qquad \ldots(ii)$$

Solving Eqs. (i) and (ii), we get x = 15, y = 10

Hence, the number of six-wheelers is 10.

40. (a) We know that, minimum number of sides in a regular polygon = 3(n) (In triangle)

$\therefore$ Minimum angle of a regular polygon

$$= \frac{(n-2) \times 180^\circ}{n}$$

$$= \frac{(3-2) \times 180^\circ}{3} = 60^\circ$$

Note: If the number of sides in a regular polygon is maximum, then interior angle of it polygon is maximum.

41. (c) The number of sides in a hexagon, n = 6

$\therefore$ The number of diagonals in a hexagon

$$= \frac{n(n-3)}{2}$$

$$= \frac{6(6-3)}{2} = 9$$

42. (d) We know that, the sum of angles of a quadrilateral = 360°

In quadrilateral ABCD,

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$\Rightarrow \quad \angle A + \angle B + 100^\circ + 60^\circ = 360^\circ$$

$$\Rightarrow \quad \angle A + \angle B = 360^\circ - 160^\circ$$

$$\Rightarrow \quad \angle A + \angle B = 200^\circ \qquad \ldots(i)$$

We have given the bisectors of $\angle A$ and $\angle B$ meet at a point P.

$$\therefore \quad \angle PAB = \frac{\angle A}{2} \text{ and } \angle PBA = \frac{\angle B}{2}$$

In ΔAPB,

$\angle PAB + \angle PBA + \angle APB = 180°$

[$\because$ sum of angles of a triangle be 180°]

$\Rightarrow \quad \frac{\angle A}{2} + \frac{\angle B}{2} + \angle APB = 180°$

$\Rightarrow \frac{1}{2}(\angle A + \angle B) + \angle APB = 180°$

$\Rightarrow \quad \frac{1}{2} \times 200° + \angle APB = 180°$ [from Eq. (i)]

$\Rightarrow \quad 100° + \angle APB = 180°$

$\Rightarrow \quad \angle APB = 180° - 100° = 80°$

43. (a) Let length and breadth of a rectangle be x and y and side of square be a .

According to the question,

perimeter of rectangle = 40

$\Rightarrow \quad 2(x + y) = 40$

$\Rightarrow \quad x + y = 20 \quad \ldots(i)$

Perimeter of square = 40

$\Rightarrow \quad 4a = 40$

$\Rightarrow \quad a = \frac{40}{4} = 10$

Difference between its area = 9

$\Rightarrow \quad a^2 - xy = 9$

[$\because$ area of square > Square of rectangle if both perimeter is same]

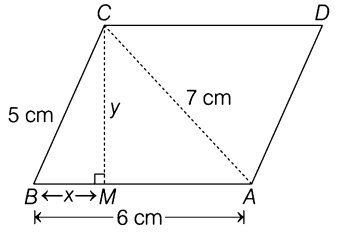
$\Rightarrow 100 - xy = 9$

$\Rightarrow \quad xy = 91 \quad \ldots(ii)$

Solving Eqs. (i) and (ii), we get $x = 13, y = 7$ or $x = 7, y = 13$

Hence, the possible dimensions of the rectangle are 13m, 7m.

44. (d) AB = 6 cm, BC = 5 cm, AC = 7 cm, and $\overline{AB}$ to $\overline{CD}$ i.e. AB||CD.



Let perpendicular distance between $\overline{AB}$ and CD be y.

$\therefore \quad$ CM = y and BM = x, then AM = 6 − x

In ΔCMB, $BC^2 = CM^2 + BM^2$

$\Rightarrow \quad 25 = y^2 + x^2 \quad \ldots(i)$

In ΔCAM, $AC^2 = CM^2 + AM^2$

$\Rightarrow \quad 49 = y^2 + (6 - x)^2$

$\Rightarrow \quad 49 = y^2 + 36 + x^2 - 12x$

$\Rightarrow \quad 49 = 25 + 36 - 12x$ [from Eq. (i)]

$\Rightarrow \quad 12x = 61 - 49$

$\Rightarrow \quad 12x = 12$

$\Rightarrow \quad x = \frac{12}{12} = 1$

From Eq. (i), $25 = y^2 + 1$

$\Rightarrow \quad y^2 = 24$

$\Rightarrow \quad y = \sqrt{24} = 2\sqrt{6}$

Hence, the perpendicular distance between $\overline{AB}$ and $\overline{CD}$ is $2\sqrt{6}$ cm.

45. (a) Given, depth of well, h = 16 m

Radius of well, $r = 3.5 \text{ m} = \frac{7}{2}\text{ m}$

$\therefore$ Volume of earth of well = $\pi r^2 h$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 16 = 616 \text{ m}^3$

Area of rectangular plot = Length × Breadth

$= 25 \times 16 = 400 \text{ m}^2$

Let height of the platform be x m.

According to the question,

Volume of earth of platform = Volume of earth of well

Area of platforms × height of platforms = 616

$\Rightarrow 400 \times x = 616$

$\Rightarrow \quad x = \frac{616}{400} = 1.54 \text{ m}$

46. (a) Given, radius of cylinder, r = 10 cm

$\therefore$ Required difference = Total surface area of cylinder − curved surface area of cylinder

$= (2\pi rh + 2\pi r^2) - 2\pi rh$

$= 2\pi r^2 = 2\pi \times (10)^2 = 200\pi \text{cm}^2$

47. (a) Given, mean of 6 numbers = 15

$\therefore$ Sum of 6 numbers = Mean × Total numbers

$= 6 \times 15 = 90$

If 2 is taken away from every number, then sum of 6 numbers

$= 90 - (6 \times 2) = 90 - 12 = 78$

$\therefore$ New mean $= \dfrac{\text{New sum of 6 numbers}}{6}$

$= \dfrac{78}{6} = 13$

Alternate method Suppose $\bar{x}$ is the mean of some numbers.

If *a* is taken away from every number, then new mean will be equal to $(\bar{x} - a)$.

Here, $\bar{x} = 15, a = 2$

$\therefore$ New mean $= \bar{x} - a = 15 - 2 = 13$

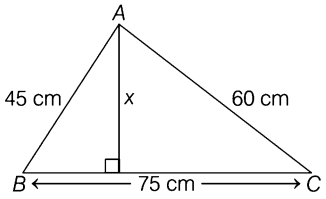
48. (d) Given, side of triangle 45 cm, 60 cm and 75 cm.

Here, $(75)^2 = (45)^2 + (60)^2$

$\Rightarrow$ $5625 = 2025 + 3600$

$\Rightarrow$ $5625 = 5625$

$\therefore$ This triangle will be right angle triangle.



$\therefore$ Area of triangle $= \dfrac{1}{2} \times 45 \times 60 = 1350\ \text{cm}^2$

Let the perpendicular length be x, which draw to longest side from its opposite vertex.

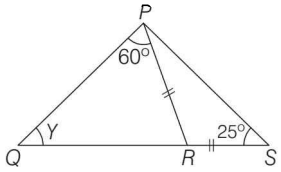
$\therefore$ Area of triangle $= \dfrac{1}{2} \times 75 \times x$

$\Rightarrow$ $1350 = \dfrac{1}{2} \times 75 \times x$

$\Rightarrow$ $x = \dfrac{1350 \times 2}{75} = 36\ \text{cm}$

$\therefore$ Length = 36 cm

49. (d) Given figure,



$\angle PSQ = \angle PSR = 25°$, $\angle QPR = 60°$ and $PR = RS$

In ΔPRS, $PR = RS$

$\therefore$ $\angle RPS = \angle PSR = 25°$

[$\because$ In a triangle, opposite angles be equal of equal sides]

$\therefore$ $\angle QPS = \angle QPR + \angle RPS$

$= 60° + 25° = 85°$

In ΔPQS,

$\angle QPS + \angle PSQ + \angle PQR = 180°$

[sum of angles of a triangle be 180°]

$\Rightarrow$ $85° + 25° + Y = 180°$

$\Rightarrow$ $Y = 180° - 110° = 70°$

50. (a) Given, diameter of cylindrical tank = 16 m

$\therefore$ Radius of cylindrical tank, $r = \dfrac{16}{2} = 8\ \text{m}$

Let the depth of cylindrical tank be h.

$\therefore$ Capacity of cylindrical tank $= \pi r^2 h$

$5632 = \dfrac{22}{7} \times (8)^2 \times h$

$\Rightarrow$ $h = \dfrac{5632 \times 7}{22 \times 64} = 28\ \text{m}$

Hence, the depth of cylindrical tank is 28 m.

51. (c) According to the given sentence, 'satisfy' is the correct word to fill the blank.

52. (b) Here, preposition 'to' is used. Preposition 'to' is used to indicate the place, person or thing that someone or something moves toward or the direction of something.

53. (a) No article is used before the names of languages.

54. (c) The word 'industrious' means always working hard. So, option (c) is correct answer.

55. (a) To make the meaningful sentence, the correct sequence is 4 5 6 7 3 1 9 2 8 and the sentence formed is Almost a majority of people wear a watch these days.

56. (c) The word closest in meaning to the word 'mortal' is 'fatal' as both the words have same meaning i.e. that cannot live forever and must die.

57. (a) The correctly spelt word is Maintenance.

58. (a) Here, 'play' is the correct form of verb to fill the given blanks. The verb in subjunctive mood is always in present tense without the letter 's'.

59. (a) Here, king of Scotland is definite so 'the' is used before 'king'. The word 'spider' is starts with consonant letter and its initial sound is also consonant, So 'a' is used before it. And 'upto' is followed by 'the'. Hence, the correct set of articles is given in option (a) The, a, the.

60. (c) The appropriate conjunction to fill the given blank is but also. Not only ..... but also is a correlative conjunction that are used in pairs in order to show the relationship.

61. (b) According to the given sentence, the determiner 'a little' is used for the given blank. A little means not much but some.

62. (b) The meaningful sentence of the given jumbled words is Thomas Alva Edison is the most remarkable inventor in the world.

63. (a) The Moon play a greater role than the Sun in causing tides because the Moon is closer to the Earth as compared to the Sun.

64. (b) Tides are useful for the economy of the country as, during high tides, big ships can reach the ports thus opening new opportunities for business.

65. (c) Tides are useful in cold countries as they can't allow sea water to be frozen.

66. (a) Tides can solve the power problem of the world as electricity is being produced through tidal waves.

67. (d) In the passage, the word 'Harness' means to bring under control.

68. (a) Here, the subjective case pronoun 'I' is used in the given blank.

69. (c) The given sentence is in Present Perfect Continuous tense as 'since' is used. So, 'have been studying' is the correct form of tense to be used here.

70. (c) If the main clause is negative, the question tag is positive. So, 'is there' is the correct alternative to fill the blank.

71. (c) The idiom 'to play to the gallery' means to do things that one thinks will be popular among many people instead of doing what one thinks is right. So, 'to endeavour to gain cheap popularity' is its correct meaning.

72. (b) In the given sentence, option (b) 'steadfastly' is an adverb.

73. (b) The sentence is in Past tense and to convert it into passive voice, object + was / were + V_3 + by + subject is used.

The correct passive voice of the given sentence is given in option (b) 'An article was written by me for the school magazine'.

74. (a) Here 'make' should be used in the given blank, as it is a proverb that 'empty vessels make much noise'.

75. (b) The word 'gullible' means believing and trusting people too easily and therefore easily tricked.

Its correct opposite meaning word is cynical. Cynical means distrusting or disparaging the motives of others.

76. (d) Magnesium (Mg) is a metal found in the chlorophyll pigment of chloroplast. It helps green plant to trap solar radiation as a source of energy for the process of **photosynthesis**.

77. (d) Petrolium gas which is liquefied under pressure is known as Liquefied Petrolium Gas (LPG). It is a mixture of three hydrocarbons, i.e. butane (C_4H_{10}), propane (C_3H_8) and ethane (C_2H_6). However, its main constituent is butane.

78. (a) Chlorofluorocarbons (CFC) and Hydro chlorofluoro carbons (HCFC) are completely halogenated paraffin hydrocarbons that contain only carbon (C), hydrogen (H), chlorine (Cl) and fluorine (F) produced as volatile derivative of methane, ethane and propane. CFC have been used as refrigerants and solvents. It contributes to ozone depletion in the upper atmosphere. Therefore, CFC are being replaced with other products such as Hydro chloro fluoro carbons (HFC).

79. (d) The first menstrual flow at puberty is termed as menarche. It is repeated at the time interval of 28-29 days in young human females.

80. (c) Cells are the structural and functional unit of an organism. Cells combine to form tissue, which further combine to form organism. So cell is the basic structural unit for all unicellular and multicellular organisms and organs are play important role in all the life

process i.e. digestion, respiration and circulation etc.

81. (c) Force (F) = 100 N

Frictional force (f) = 20 N

The frictional force is applied in the opposite direction of motion. Hence, the required force causing the motion of the cart is

$$= F - f = 100 - 20 = 80\ N$$

82. (d) Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoil. Therefore, Tin cans used for storing food, are made by electroplating tin onto iron.

83. (d) The impression of an image does not vanish immediately from the retina. It remains on retina for sometime. Generally, the image perists for about 1/16th of the second. The movies which we watch are actually separate pictures which are made to move at a rate faster than 16 pictures per second. So, we see people in action.

84. (b) The Sun appears to rise in the East and set in the West because the Earth rotates from West to East on its axis.

85. (b) Pressure is the force acting perpendicularly on a unit area of an object i.e.

$$\text{Pressure (P)} = \frac{\text{Force}}{\text{area on which force acts}}$$

The SI unit of pressure is Nm^{-2} which is also called Pascal.

86. (a) An ultrasound equipment works at a frequency higher than 20,000 Hz, because the frequency of ultrasound is higher than 20,000 Hz. It cannot be heard by human beings. Dogs can hear ultrasonic sounds of frequency up to 50,000 Hz.

87. (a) When electrodes are immersed in water and electricity is passed, the bubbles formed on the negative terminal is actually hydrogen gas and the electrons liberated in the oxidation process get accumulated at the negative electrode.

88. (*) When a ray falls perpendicularly on a plane mirror, then angle of incidence (i) is zero. But according to the second law of reflection

angle of incidence (i) = angle of reflection (r)

i.e $\angle r = 0$

Hence, the reflected ray follows the same path as shown in the figure.

Note No options are correct in the question.

89. (c) All non-living physical and chemical elements in the ecosystem are known as Abiotic resources which are needed to sustain life on earth. These are mineral resources, fuel resources, air, water etc. These are usually obtained from lithosphere, atmosphere and hydrosphere.

90. (c) Malarial parasite is carried by female *Anopheles* mosquito. This disease is caused by a protozoa named *Plasmodium*. The material parasite requires two hosts to complete its life-cycle. Primary host is the female *Anopheles* mosquito and the Second host is Human being.

91. (d) Internal fertilization does not occur in frog. The female frog lays eggs in water. This process ussually occurs through external fertilization, where the female release her eggs from her body, then the male release sperm to fertilize them. The other animals given in the options show internal fertilization, i.e. sperms release inside the female body.

92. (a) Regeneration is observed in *Planaria*. It can be cut into small pieces and each piece can regenerate into a complete organism. Regeneration is depends on the presence of stem cells called neoblast.

93. (a) Rapid combustion is a form of combustion in which large amounts of heat and light energy are released. This combustion often occurs as a fire. Rapid combustion is used in the form of machinery, such as internal combustion engines weapons.

94. (b) If liquids in a mixture are miscible, boil without decomposition and possess different boiling points, then they can be separated by distillation. Distillation is used only if the liquids have a difference in boiling points of more than 25 K

$$\text{Liquid} \underset{\text{Cooling}}{\overset{\text{Heating}}{\rightleftharpoons}} \text{Vapour (Gas)}$$

Therefore, the ascending order of following phases are as given below

(iv), (i), (ii), (iii).

95. (b) According to law of definite proportions states that in a chemical substances the elements are always present in a definite proportion by mass. For instance, the ratio of carbon and oxygen in CO_2 obtained from any source is the same of their mass.

96. (a) According to the question,

50,000 km on the atlas = 100 cm

$$1 \text{ km on the atlas} = \frac{100}{50{,}000} \text{ cm}$$

The actual distance between Bhopal and Cochin = 1500 km

$$1500 \text{ km on the atlas} = \frac{100}{50{,}000} \times 1500 = 3 \text{ cm}$$

Hence, the distance between the two places in the atlas will be 3 cm.

97. (b) Sound and light wave can be propagated through air. Sound wave cannot travel in the vacuum but light wave can travel in the vacuum because the light wave is a electromagnetic wave but the sound wave is a mechanical waves.

98. (b) Concave mirror gives magnified image, whereas convex mirror gives diminished image and plane mirror gives image of equal size.

99. (a) Each lung is enclosed by two membranes called the pleura (layers of peritoneum of the thorax). The inner membrane, called the visceral pleuron, which is firmly bound to the surface of lungs. The outer membrane, called the parietal pleuron is held to the thoracic wall and diaphragm by connective tissue.

100. (b) The nitrogenous waste products are eliminated mainly as ammonia in tadpole and urea in adult frogs. Tadpoles live in water so ammonia gets diffused from their body as it needs lots of water for elimination from the body of an organism.

The process of excreting urea is called ureotelism. Animals, which do not live in high abundance of water convert ammonia produced in the body into urea (in the liver) and release it into the blood. Urea is less toxic as compare to ammonia.

101. (b) In 1600, Queen Elizabeth I granted the East India Company the sole right to trade with the East. This was done to encourage the company to continue its trade practices and in a hope to break the dutch monopoly of trading spices with the East. This also helped the company in getting advantage over other British traders.

102. (a) Sarojini Naidu was the first Indian women to become Congress President in 1925 at Kanpur Session. She was also the first Women Governor of an Indian state i.e. United Provinces (now Uttar Pradesh). The first woman President of Congress was Annie Besant who presided over the Calcutta Session held in 1917.

103. (c) Pastures are vast land areas covered with grasses and shrubs. Pasture lands are useful for animal grazing such as horses, sheep, domestic animals, cattle and livestock. Pasture lands receive average rainfall but the soil is not very fertile due to which trees cannot grow. Entire land is covered with grasses.

104. (a) Norway was the first country to develop hydroelectricity. It came into production in 1891 in the town of Hammerfest located North of Arctic circle. Hydroelectric power plants use the power of running water to produce electricity. They are built with the help of dams to contain the flow of water and turbines to generate electricity. World's 16% energy comes from hydroelectricity.

105. (c) Pisciculture also known as fish farming. It is the process of breeding and rearing of fish in artificial enclosures such as tanks and ponds specially constructed for this purpose.

It involves raising of fish for commercial purposes. Pisciculture can be done in freshwater and in marine water also.

106. (b) The city of Ahmedabad in Gujarat is known as Manchester of India. Manchester is an industrially developed region of UK and popular for cotton industries. In the same way, Ahmedabad has lot of cotton industries where cotton textiles are produced.

107. (b) As per the Indian Constitution, the Rajya Sabha consist of 250 members out of which 12 members are nominated by the President of India and 238 members are representatives of the state. The 12 members shall be amongst persons who have special knowledge or practical experience in respect of such matters as literature, science, art and social service.

108. (b) The Industrial Revolution started in Britain in the middle of 18th century. The revolution was a shift from the cottage industry, traditional agriculture and manual labour to factory based manufacturing system. This included complex machines, technology and energy to run the machines. The textile industry was the first to be revolutionised.

109. (b) The Battle of Plassey was fought in 1757 between English East India Company and Siraj-ud-Daulah, the Nawab of Bengal. The company won the battle and it was granted to right to free trade is Bengal, Bihar and Odisha. Therefore, Plassey opened the door of British conquest in Bengal.

110. (a) Sir Edwin Lutyens and Sir H. Baker were British architects who designed the city of New Delhi, after it was announced that the capital would be shifted from kolkata to Delhi in 1911. New Delhi was formally inaugrated on 13th February, 1931, by Viceroy and Governor General of India Lord Irwin.

111. (a) Federalism is an important feature of the Indian Constitution. It refers to the existence of more than one level of government in the country. In India, there is government at the Centre, the State and Panchayati Raj i.e. three tiers or three levels of the government.

112. (b) Money bills are bills related to taxation, borrowing of money or expenditure by the government. As per the Indian Constitution, Money bills can be introduced in the Lok Sabha only. After it is passed by Lok Sabha, it is then sent to Rajya Sabha. The Rajya Sabha, must return the Money bill to the Lok Sabha, after recommendations within 14 days.

113. (a) Jim Corbett National Park is located in Nainital and Pauri district of Uttarakhand. It is the oldest National Park of India established in 1936 as Hailey National Park. It covers an area of 521 km^2. The park is named after Jim Corbett, a well known hunter who later turned into naturalist and conservator.

114. (b) West Bengal is the highest producer of jute in India. Jute plant requires warm and wet climate, 160-200 cms of rainfall, temperature more than 25°C and high humidity along with fertile soil. All these conditions are met in West Bengal therefore it is highest producer of jute in India.

115. (b) A democratic form of government is where people enjoy equal political right i.e. they have the power to vote. Their elected representatives form the government and are held accountable for the work done by them. The government is run according to some basic rules as directed by the Constitution.

116. (a) Untouchability was banned in India when the country attained independence. It was an evil social practice that is based on discrimination. To ensure equality and secularism in the country, the Indian Constitution bans untouchability. It provides equal rights to all the people irrespective of caste, religion, social or economic situation.

117. (d) Sustainable Development is the development that meets the needs of the present without compromising the needs of the future generation. It is the aim of sustainable development to reduce wastage of resources so that these can be saved, finding new ways to reduce pollution and preventing the loss of biodiversity. Hence, option (d) is correct answer.

118. (c) Fresh water makes up a very small percentage of water on Earth i.e. only 2.5%. Out of which, just 1% of it is easily accessible. Rest of the fresh water is trapped in the form of frozen icebergs, glaciers etc. Therefore, the world is going through a water crises.

119. (d) National parks, wildlife sanctuaries and biosphere reserves are all made with the aim to protect and conserve natural vegetation and wildlife. So, option (d) is correct. National Park Large land areas for the protection of natural vegetation and wildlife with fixed boundaries.

Wildlife Sanctuaries Areas for the protection of wildlife but no fixed boundaries.

Biosphere Reserve Very vast areas to protect entire biodiversity.

120. (b) India has vast deposits of mica in the states of Jharkhand, Bihar, Andhra Pradesh and Rajasthan. Therefore, India is the largest producer of mica in the world.

Mica mining is a major activity in India and adds to country's overall growth.

121. (c) Renewal resources are those natural resources that can be used repeatedly (again and again) as they are replaced naturally. They reoccur and never run out. For example oxygen, solar energy, wind energy, biomass etc.

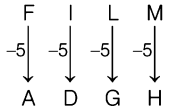
122. (c) The Protection of 'Women from Domestic Violence Act', 2005, is an Act of Parliament of India that was enacted to protect women from domestic violence. The act protects women not only from physical violence but also from emotional, verbal and economic abuse.

123. (a) Rights to Information (RTI) was enacted in 2005. It is a law enacted by the Parliament of India, giving the right to its citizens to access the records of the Central and State Governments. This is done in order to promote transparency and accountability in the government departments. Therefore, option (a) is correct.

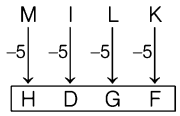
124. (a) Nyaya Panchayat is a system of settling disputes at the village level. It performs all the judicial functions and helps to maintain law and order in the villages. Nyaya Panchayats are part of the village panchayats.

125. (d) The cities of Jamshedpur, Rourkela and Bokaro (Jharkhand) and Rourkela (Odisha) are located near the iron ore mines. Coal deposits are also located nearby. Therefore, the steel plants are established in these cities so that cost of transportation of raw materials and finished goods is less. These three cities are also known as steel cities of India.

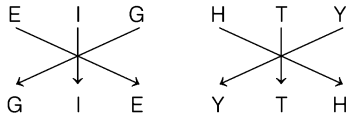
126. (c) As,



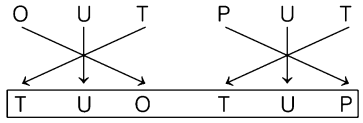
Similarly,



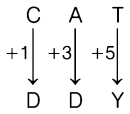
127. (a) As,



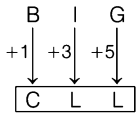
Similarly,



128. (a) As,



Similarly,



129. (c) As, Luggage is carried by Bag. Similarly, Ship is carried by Cargo.

130. (d) As, $3 : 243 \Rightarrow (3)^5 = 243$

Similarly, $5 : ? \Rightarrow (5)^5 = \boxed{3125}$

131. (b) As, $6 : 24 \Rightarrow 6 \times 4 = 24$

Similarly, $5 : ? \Rightarrow 5 \times 4 = \boxed{20}$

132. (b) Considering rowwise,

For Letters,

Row 1, $A \xrightarrow{+2} C \xrightarrow{+2} E$

Row 2, $G \xrightarrow{+2} I \xrightarrow{+2} \boxed{K}$

Row 3, $M \xrightarrow{+2} O \xrightarrow{+2} Q$

For numbers,

Row 1, $2 + 4 = 6$

Row 2, $3 + 5 = \boxed{8}$

Row 3, $5 + 9 = 14$

$\therefore$? = K8

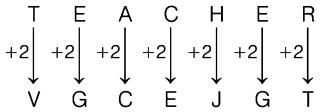
133. (d) Except figure (d), in all other figures both the dots are placed in different rectangles but in figure (d) both the dots are placed in same rectangle.

134. (d) The dictionary order of the given words is as follows,

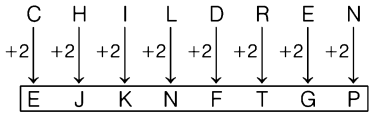
Literacy → Litter → Little → Live → Living

4 2 3 1 5

135. (d) As,



Similarly,



136. (a) Given, 30th January 2003 = Thursday

$\therefore$6th, 13th, 20th and 27th February = Thursday

$\therefore$28th February = Friday

$\therefore$ 1st March = Saturday

$\therefore$ 2nd March = Sunday

Alternate method,

Number of odd days between 30th January 2003 to 2nd March 2003 = 1 + 28 + 2 = 31

= 4 weeks and 3 odd days

$\therefore$Day on 2nd March 2003 = Thursday + 3 = Sunday

137. (d) Required condition = K G N or N G K

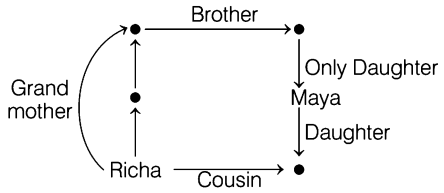
A K G L M N D Q K G C S N $\boxed{G}$ K T G K $\boxed{G}$ N D Z P U X G K E

Hence, above series has two such combinations.

138. (b) The word 'SITUATION' cannot be formed from the letters of the given word. Because the letter 'A' is not present in the given word 'DISTRIBUTION'.

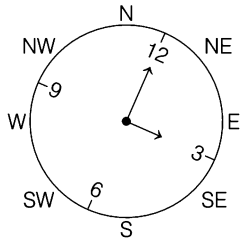
139. (a) Figure (A) is rotated through 90° anti-clockwise to obtain the figure (B). Similarly, figure (C) will be rotated through 90° anti-clockwise to obtain the answer figure as figure (a).

140. (b) The relationship diagram is as follows,



Clearly, Maya's daughter is the cousin of Richa.

141. (d)



Clearly, the hour hand is pointing in South-East direction.

142. (b) Except 65, all other numbers are completely divisible by 7.

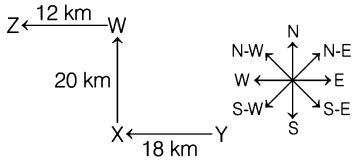
$63 \div 7 = 9$

$84 \div 7 = 12$,

$91 \div 7 = 13$

143. (d) In the given figure, each column/row has 5 black stars and 4 white stars. So, the missing block will consist of 3 black stars and 1 white star.

144. (a) The direction diagram is as follows,



If Mannu is at point Z in the end, then he is in North-West direction from his starting point i.e. Y.

145. (b) 3 days earlier than Friday

= Friday -3 = Tuesday

$\therefore$ 7th day of the month

= Tuesday

$\therefore$ 14th day = Tuesday

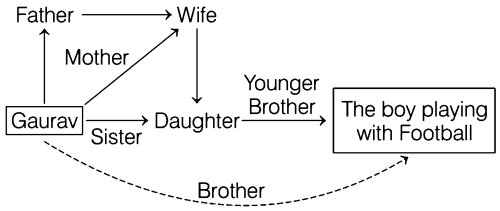
Now, 14 + 5 = 19 th day of the month

= Tuesday + 5

= Sunday

146. (b) Gaurav's father's wife is his mother. The daughter of Gaurav's mother is his sister. Therefore, the boy playing with the football is the younger brother of Gaurav's sister. Hence, the boy is the brother of Gaurav.

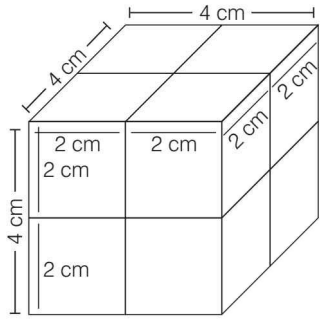
The relation diagram is as follows,



147. (d) F J M P O W R N B E Y C K A V L D G X U H Q I S Z T

In the above sequence, letters pair MO has one letter between them. Also, letters pair MO has one letter between them in the English alphabet.

Sol. (Q. Nos. 148-150)



148. (c) From the above figure, there are 8 cubes in all of an edge 2 cm.

149. (a) All the 8 small cubes have three faces painted. So, there is no cube with no face painted.

150. (a) All the 8 small cubes have three faces painted. So, there is no cube with one face painted.