NTSE

National Talent Search Examination

MAT + SAT

[Stage I]

Time : 180 Min | Max. Marks : 180

Read the following instructions carefully.

1. Answers are to be given on a separate answer sheet. Use only HB Pencil.
2. Write your Roll No. very clearly (only one digit in one block) on this booklet and on the answer sheet.
3. This test consists of 180 questions of one mark each. All the questions are compulsory.
4. Answer to each question by filling the correct alternative among the four choices on the answer sheet.

Example

	Q. No.	Alternatives
Correct way	1	① ② ● ④
	Q. No.	**Alternatives**
Wrong way	1	⊗ ② ③ ④

5. Now, turn to the next page and start answering the questions.

Paper I : Mental Ability Test

Directions (Q. Nos. 1-5) *In following questions, complete the given series. Find out the missing term by choosing the correct alternative.*

1. 21, 25, 33, 49, 81, ...
a. 145 *b.* 147 *c.* 146 *d.* 144

2. 8, 10, 14, 18, ..., 34, 50, 66.
a. 25 *b.* 26 *c.* 24 *d.* 22

3. 1, 2, 6, 24, ...
a. 30 *b.* 48 *c.* 96 *d.* 120

4. 4, 32, 128, ...
a. 145 *b.* 160 *c.* 256 *d.* 64

5. 34, 18, 10, 6, 4, ...
a. 3 *b.* 2 *c.* 4 *d.* 1

Directions (Q. Nos. 6-8) *In the following questions, find out the alternative, which bears the same relationship to third word as the first two bears.*

6. Pigeon : Peace : : White flag : ?
a. Surrender *b.* Friendship *c.* Victory *d.* War

7. Man : Machine : : Master : ?
a. House *b.* Slave *c.* Manager *d.* Worker

8. Sorrow : Death : : Happiness : ?
a. Dance *b.* Birth *c.* Love *d.* Cry

Directions (Q. Nos. 9-12) *Find out the odd one out from given alternatives.*

9. *a.* Wheat *b.* Rice *c.* Mustard *d.* Peanut

10. *a.* Heart *b.* Ear *c.* Lung *d.* Hand

11. *a.* Barber *b.* Blacksmith *c.* Tailor *d.* Engineer

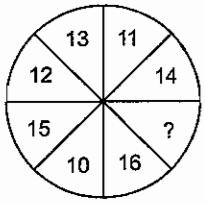
12. *a.* Fingers *b.* Elbow *c.* Foot *d.* Shoulder

13. In a cricket match, Ankit scored more runs than Mohit but not as many as Krishna. Vivek scored less than Mohit but more than Gaurav and Ayush. Whose score was the highest in the match?
a. Mohit *b.* Ankit
c. Krishna *d.* Ayush

14. Karina is shorter than Karishma, Rohan is shorter than Aasif and Faiz is shorter than Karishma who among them is the highest?
a. Karina *b.* Karishma
c. Data inadequate *d.* Cannot be determined

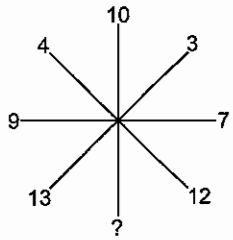
Directions (Q. Nos. 15-17) *Find the missing character in the following questions.*

15.



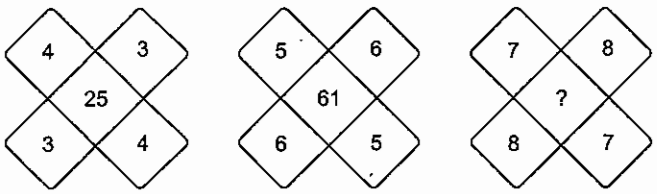
a. 17 *b.* 8 *c.* 9 *d.* 18

16.



a. 9 *b.* 7 *c.* 8 *d.* 6

17.



a. 64 *b.* 113 *c.* 49 *d.* 15

Directions (Q. Nos. 18-20) *In the following questions, arrange the given words in a logical order.*

18. 1. Water tank 2. Mug 3. Bucket 4. Bowl 5. Glass

a. (4), (2), (1), (3), (5) *b.* (5), (4), (2), (1), (3) *c.* (4), (5), (2), (3), (1) *d.* (3), (2), (1), (5), (4)

19. 1. Whale 2. Elephant 3. Mosquito 4. Horse 5. Cat

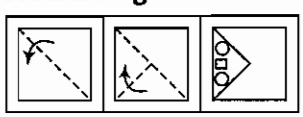
a. (1), (2), (3), (4), (5) *b.* (5), (4), (3), (2), (1) *c.* (3), (2), (1), (5), (4) *d.* (3), (5), (4), (2), (1)

20. 1. Child 2. Job 3. College 4. School 5. Salary

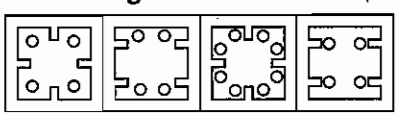
a. (1), (2), (3), (4), (5) *b.* (1), (4), (3), (2), (5) *c.* (3), (4), (1), (2), (5) *d.* (5), (4), (3), (2), (1)

Directions (Q. Nos. 21-23) *In the following questions, select the answer figure from the given alternatives which is closest to the unfolded piece of paper.*

21. **Problem Figures** **Answer Figures**

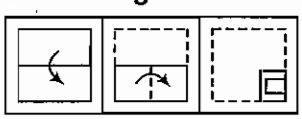


(x) (y) (z)

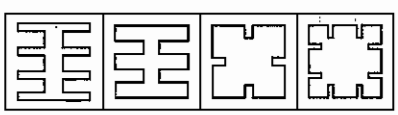


a. *b.* *c.* *d.*

22. **Problem Figures** **Answer Figures**



(x) (y) (z)

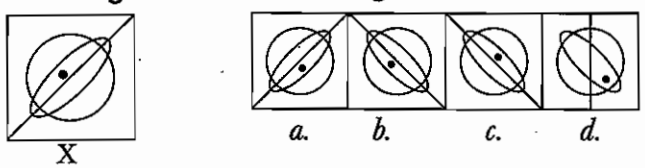


a. *b.* *c.* *d.*

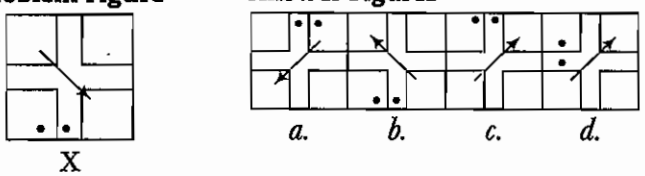
23. **Problem Figures** **Answer Figures**

Directions (Q. Nos. 24-25) *In the following questions, choose the correct water image from amongst the four alternatives a, b, c and d given along with it.*

24. **Problem Figure** **Answer Figures**

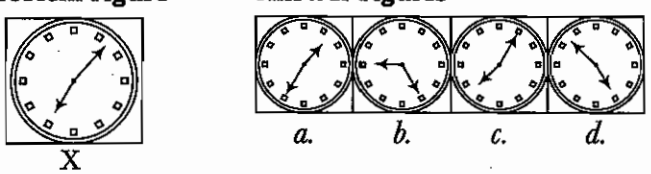


25. **Problem Figure** **Answer Figures**

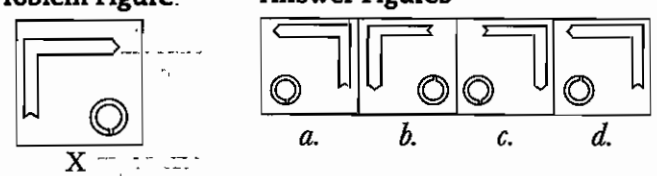


Directions (Q. Nos. 26-27) *In the following questions, choose the correct mirror image from amongst the four alternatives a, b, c and d given along with it.*

26. **Problem Figure** **Answer Figures**

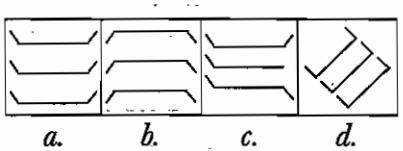


27. **Problem Figure** **Answer Figures**

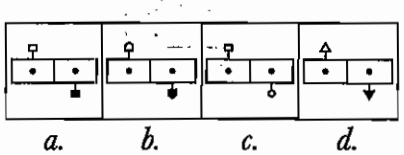


Directions (Q. Nos. 28-30) *In the following question, find out the odd one out figure from the given alternatives.*

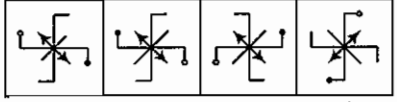
28.



29.



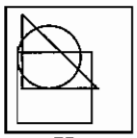
30.



a. *b.* *c.* *d.*

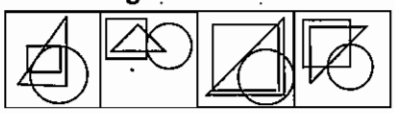
Directions (Q. Nos. 31-33) *Find the correct alternative in the answer figures, the relation between the problem figure (X) and answer figure (a, b, c, d) must be same.*

31. **Problem Figure**



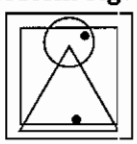
X

Answer Figures



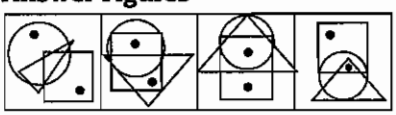
a. *b.* *c.* *d.*

32. **Problem Figure**



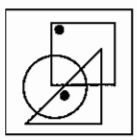
X

Answer Figures



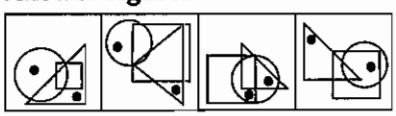
a. *b.* *c.* *d.*

33. **Problem Figure**



X

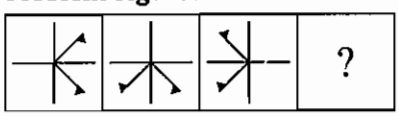
Answer Figures



a. *b.* *c.* *d.*

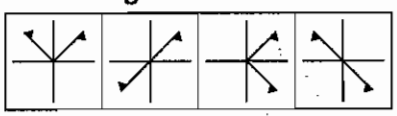
Directions (Q. Nos. 34-36) *In the following question, select the answer figure from given alternatives which continues the problem figure.*

34. **Problem Figures**



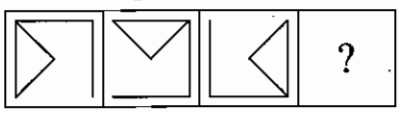
(A) (B) (C) (D)

Answer Figures



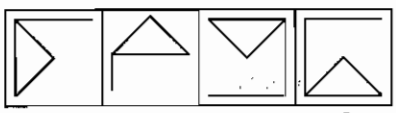
a. *b.* *c.* *d.*

35. **Problem Figures**



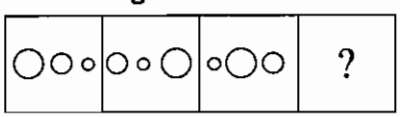
(A) (B) (C) (D)

Answer Figures



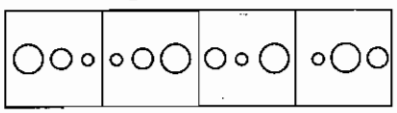
a. *b.* *c.* *d.*

36. **Problem Figures**



(A) (B) (C) (D)

Answer Figures



a. *b.* *c.* *d.*

37. In a row, Mona is 18th from the left and 16th from the right, then how many candidates are there in the row?

a. 35 *b.* 34 *c.* 33 *d.* 40

38. If the average of 5 even numbers is 14, then find out the least number.

a. 20 *b.* 10 *c.* 14 *d.* 18

39. The age of mother today is thrice as that of her daughter. After 12 yr, the age of the mother will be twice that of her daughter. The age of daughter today is

a. 12 yr *b.* 14 yr *c.* 16 yr *d.* 6 yr

Directions (Q. Nos. 40-42) *In the following question, read the following information and answer the questions below.*
If '+' means '×, '×means '+', '−' means '÷ and '÷' means '−'.

40. $40 - 2 \div 2 + 5 \times 3 = ?$

a. 19 *b.* 14 *c.* 13 *d.* 69

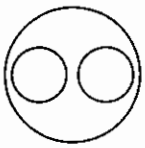
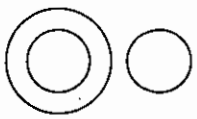
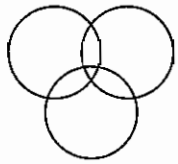
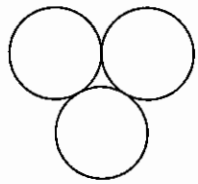
41. $35 - 7 \div 2 + 4 \times 4 = ?$

a. 13 *b.* 1 *c.* 5 *d.* 72

42. $31 \div 12 - 2 \times 2 + 2 = ?$

a. 34 *b.* 38 *c.* 21 *d.* 33

Directions (Q. Nos. 43-46) *In the following question you have to choose out from the four Venn-diagrams that best illustrates the relationship among three given classes or groups in the questions below.*

a.  *b.*  *c.*  *d.* 

43. Window, Bus, Cell phone

44. Soldiers, Teachers, Army

45. Women, Housewives, Politicians

46. Book, Words, Pictures

Directions (Q. Nos. 47-50) *Study the following information carefully and answer the questions given below.*
There are two married couples, Vikram has two kids named, Mohit and Sona. Priya is the wife of Sanjay. Sanjay is the father of Vikram and Narendra. Meeta is married with Mohit's father.

47. How Meeta is related to Sanjay?

a. Daughter-in-law *b.* Sister *c.* Mother *d.* Aunt

48. How Sanjay is related to Sona?

a. Grandfather *b.* Father *c.* Brother *d.* Brother-in-law

49. Which option represents the group of females having first letter only?

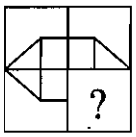
a. VKN *b.* MSK *c.* PMS *d.* MVP

50. How Narendra is related to Priya?

a. Father *b.* Husband *c.* Brother *d.* Son

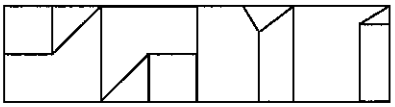
Directions (Q. Nos. 51-53) *In the following questions, find the answer figure, which completes the problem figure from the given alternatives.*

51. **Problem Figure**



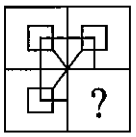
X

Answer Figures



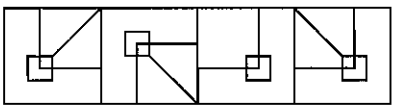
a. *b.* *c.* *d.*

52. **Problem Figure**



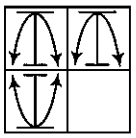
X

Answer Figures



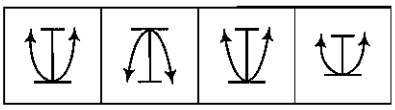
a. *b.* *c.* *d.*

53. **Problem Figure**



X

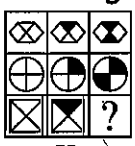
Answer Figures



a. *b.* *c.* *d.*

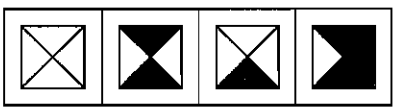
Directions (Q. Nos. 54-56) *In the following questions, choose the correct alternative from amongst the four a, b, c and d which completes the figure matrix?*

54. **Problem Figure**



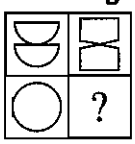
X

Answer Figures



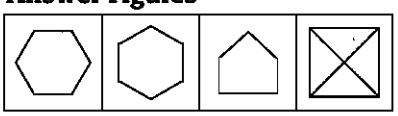
a. *b.* *c.* *d.*

55. **Problem Figure**



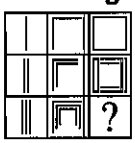
X

Answer Figures



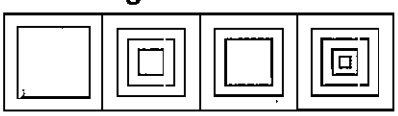
a. *b.* *c.* *d.*

56. **Problem Figure**



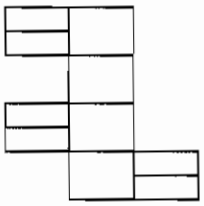
X

Answer Figures



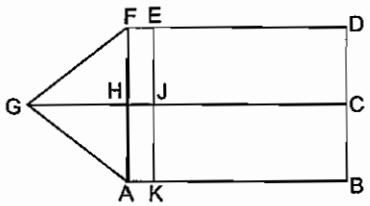
a. *b.* *c.* *d.*

57. Count the number of rectangles in the figure, given below .



a. 21 *b.* 18 *c.* 19 *d.* 20

58. Find the number of rectangles contained in the figure given below.



a. 9 *b.* 8 *c.* 14 *d.* 11

59. How many 7's are there in the following number sequence which are immediately preceded by 5 and followed by 3?

7735573375573773373

a. One *b.* Two *c.* Four *d.* None of these

Directions (Q. Nos. 60-62) *Study the following information carefully and answer the questions given below.*

There are four friends named Govind, Shantanu, Mohan and Vishu. All the 20 m far from a point. Vishu is 40 m West to Shantanu. Govind is 40 m North from Mohan. From that point, Govind is 20 m North and Shantanu is 20 m East.

60. In which direction Vishu in from the centre point?

a. North *b.* South *c.* West *d.* East

61. In which direction Mohan is from the centre point?

a. North *b.* West *c.* South *d.* East

62. In which direction Shantanu is, in respect of Mohan?

a. North-West *b.* North-East *c.* South-West *d.* South-West

Directions (Q. Nos. 63-64) *Study the following number series carefully and answer the questions given below.*

78289385238478 19885

63. How many 8's in the series which is preceded by 2 and followed by 9?

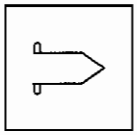
a. One *b.* Two *c.* Three *d.* Four

64. How many even numbers are there in the series?

a. 11 *b.* 10 *c.* 9 *d.* 12

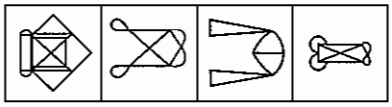
Directions (Q. Nos. 65-67) *In the following question, trace out the correct alternative in which figure (X) is embedded.*

65. **Problem Figure**



X

Answer Figures

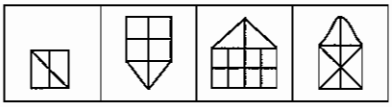


a. *b.* *c.* *d.*

66. **Problem Figure**

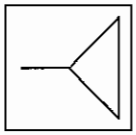
X

Answer Figures



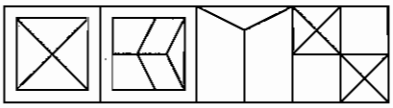
a. *b.* *c.* *d.*

67. **Problem Figure**



X

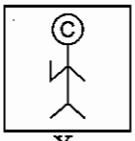
Answer Figures



a. *b.* *c.* *d.*

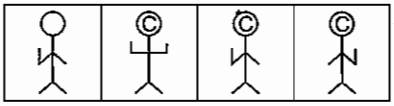
Directions (Q. Nos. 68-70) *In the following questions, which figure is similar to problem figure?*

68. **Problem Figure**



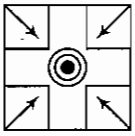
X

Answer Figures



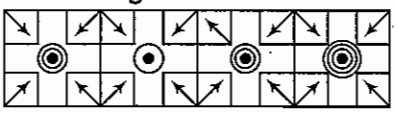
a. *b.* *c.* *d.*

69. **Problem Figure**



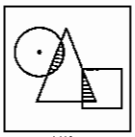
X

Answer Figures



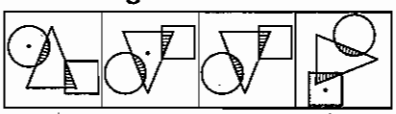
a. *b.* *c.* *d.*

70. **Problem Figure**



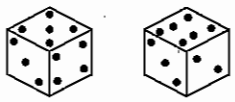
X

Answer Figures



a. *b.* *c.* *d.*

71. If the bottom face is marked as number 4, which number will be on the top among the following two figures?

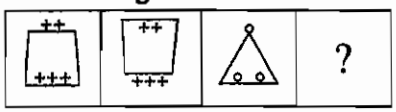


(i) (ii)

a. 2 *b.* 3 *c.* 4 *d.* 5

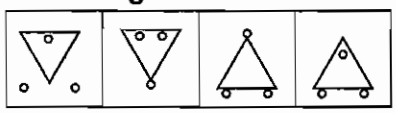
Directions (Q. Nos. 72-74) *In the following questions, figure 'A' related to 'B' same 'C' related to 'D' answer figure, find out the correct alternative from amongst the four.*

72. **Problem Figures**



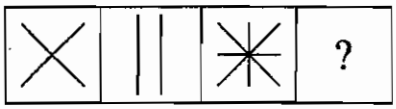
(A) (B) (C) (D)

Answer Figures



a. *b.* *c.* *d.*

73. **Problem Figures**

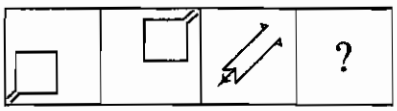


(A) (B) (C) (D)

Answer Figures

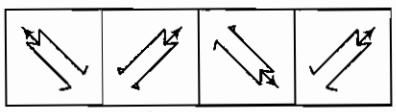
a. *b.* *c.* *d.*

74. **Problem Figures**



(A) (B) (C) (D)

Answer Figures

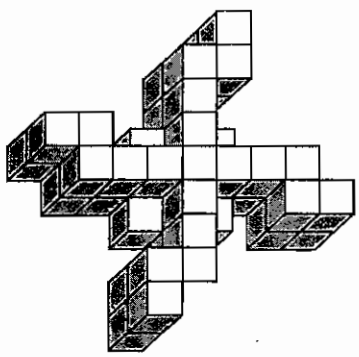


a. *b.* *c.* *d.*

75. If the total number of dots on opposite faces of a dice is 7, find the correct figure among the following.

a.  *b.*  *c.*  *d.* 

76. Count the number of cubes in the given figure.



a. 45 *b.* 46 *c.* 48 *d.* 49

Directions (Q. Nos. 77-81) *Read the following information carefully and answer the questions given below.*

There are four friends A, B, C and D. Those are the students of Maths, Chemistry, English and Hindi but not necessarily in the same order. All friends are sitting on a line and facing North. A is third to the left of D, who is student of Chemistry. B is the neighbour of A and C and not the student of Maths and Hindi. C is the student of Hindi.

77. A is the student of which subject?

a. Maths *b.* English *c.* Hindi *d.* Chemistry

78. What is the position of C in respect to A?

a. Immediate left *b.* Second to the right *c.* Immediate right *d.* None of these

79. Who are sitted an extreme ends of the arrangement?

a. AD *b.* DC *c.* BC *d.* CA

80. Which subject is related to B?

a. Hindi *b.* Chemistry *c.* Maths *d.* English

81. Who is the neighbour of D?

a. A *b.* B *c.* C *d.* D

Directions (Q. Nos. 82-86) *In the following questions, arrange the given words in alphabetical order and choose the one that comes in last.*

82. *a.* Sunderlal *b.* Soonderlal *c.* Sundaralal *d.* Sunder

83. *a.* Thermo *b.* Thermodynamics *c.* Thermometer *d.* Thermal

84. *a.* Central *b.* Census *c.* Center *d.* Ceramics

85. *a.* Develop *b.* Determination *c.* Determine *d.* Detect

86. *a.* Fluorescence *b.* Florentine *c.* Floriculture *d.* Flop

87. If you pick up from the following alphabet, the sixth and fourteenth letters from your right and then pick up the fifth and twentieth letters from your left and form a meaningful word, what is the first letter of the word?

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

a. M *b.* O *c.* N *d.* P

88. If it is possible to make a meaningful word with the second, sixth, ninth and twelfth letters of the word 'CONTRIBUTION', which of the following will be the last letter of that word?

a. N *b.* O *c.* T *d.* M

Directions (Q. Nos. 89-90) *Study the following questions carefully and answer the questions given below.*

89. M B L A L R U E

1 2 3 4 5 6 7 8

a. 7, 1, 2, 6, 8, 3, 5, 4 *b.* 1, 2, 3, 4, 5, 6, 7, 8 *c.* 8, 7, 2, 1, 4, 5, 3, 6 *d.* 1, 2, 3, 6, 7, 8, 4, 5

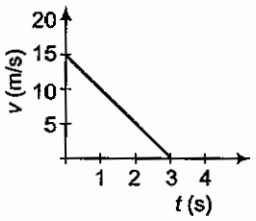
90. R G O Z I E A N

1 2 3 4 5 6 7 8

a. 3, 8, 7, 4, 5, 6, 1, 2 *b.* 3, 2, 1, 5, 8, 7, 4, 6 *c.* 3, 1, 2, 8, 7, 4, 5, 6 *d.* 3, 1, 2, 7, 8, 5, 4, 6

Paper II : Scholastic Aptitude Test

91. The velocity-time graph is shown in the figure for a particle. The acceleration of particle is



a. 22.5 m/s^2 *b.* 5 m/s^2 *c.* −5 m/s^2 *d.* −3 m/s^2

92. The intensity of the Earth's gravitational field is maximum at

a. the equator *b.* the centre of the Earth
c. the pole *d.* None of these

93. A large iceberg melts at the base but not at the top because

a. the base of iceberg remains in warmer conditions
b. ice at the base contains impurities
c. higher pressure at the base lowers the melting point of ice
d. ice at the top is different kind

94. Consider the following parts of spectra

(I) Visible (II) Infrared (III) Ultra violet (IV) Microwave

Which one of the following is/are the correct sequence in which their wavelength increase?

a. IV, III, I, II *b.* IV, I, II, III *c.* III, II, I, IV *d.* III, I, I, IV

95. The image formed on the retina of a human eye is

a. virtual and inverted *b.* virtual and erect *c.* real and erect *d.* real and inverted

96. Which has not the same unit as others?

a. Watt-second *b.* Kilowatt-hour *c.* eV *d.* J-s

97. If the current is flowing clockwise in a circular coil, the direction of magnetic lines of force inside the coil is

a. towards you *b.* away from you
c. towards the centre along the radius *d.* away from the centre along the radius

98. A magnet is placed in iron powder and then taken out, then maximum iron powder is at

a. some distance away from the North pole *b.* some distance away from the South pole
c. the middle of the magnet *d.* the end of the magnet

99. Hysteresis loss for steel is ..... that for iron.

a. less than *b.* equal to *c.* greater than *d.* Either 'b' or 'c'

100. A plane mirror reflects a pencil of light to form a real image. Then, the pencil of light incident on the mirror is

a. parallel *b.* convergent *c.* divergent *d.* None of these

101. A prism can have a maximum refracting angle of

a. 60° *b.* c *c.* 2c *d.* slightly less than 180°

102. When the power of eye lens increases, the defect of vision is produced. The defect is known as

a. short sightedness *b.* long sightedness *c.* colour blindness *d.* None of these

103. Consider the following statements

I. An amphoteric substance can act as both an acid and a base.

II. Bases are sometimes called alkalis.

Which of the statement(s) given above is/are correct?

a. Only I *b.* Only II *c.* Both I and II *d.* None of these

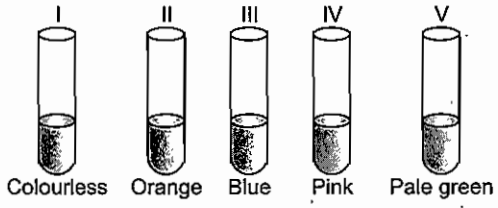
104. What is the most correct name for the ionic compound formed by $Fe^{2+} + Cl^-$?

a. Iron (I) chloride *b.* Iron (II) chloride *c.* Iron (IV) chloride *d.* Iron (III) chloride

105. The most common oxidation number for silicon in a compound would be

a. + 1 *b.* + 2 *c.* + 3 *d.* + 4

106. A student took five test tubes containing solutions of different colours marked I, II, III, IV and V as shown below. The test tubes containing copper sulphate and ferrous sulphate solution could be the tubes



a. I and V *b.* II and IV *c.* III and V *d.* IV and V

107. Hydrocarbon having alternate single and double bonds arranged in the form of ring is

a. benzene *b.* cyclobutane *c.* hexene *d.* cyclohexene

108. Electron dot structure of chlorine have symbol Cl surrounded by seven dots.

Which atom would be represented by an identical dot arrangement has the atomic number?

a. 7 *b.* 9 *c.* 15 *d.* 19

109. $SnO_2 + H_2 \longrightarrow Sn + H_2O$. This is an unbalanced equation. Write its balanced equation.

a. $SnO_2 + H_2 \longrightarrow Sn + 2H_2O$ *b.* $SnO_2 + 2H_2 \longrightarrow Sn + 2H_2O$

c. $SnO_2(s) + 2H_2(g) \longrightarrow Sn(s) + 2H_2O(g)$ *d.* $SnO_2(s) + 2H_2 \longrightarrow Sn(s) + 2H_2O$

110. Match the following

List I	List II
A. CH_3CH_2OH	1. $CH_3CH_2CH_2OH$
B. Propanol	2. Ethanol
C. Acetone	3. HCHO
D. Formaldehyde	4. CH_3COCH_3

Codes

A B C D	A B C D	A B C D	A B C D
a. 2 1 4 3	*b.* 1 2 3 4	*c.* 2 4 1 3	*d.* 3 2 4 1

111. Write the electronic configuration of S (atomic no. 16) in sulphur dioxide.

a. 2, 8, 8, 3 *b.* 2, 8, 6 *c.* 2, 8, 4 *d.* 2, 8, 8

112. Consider the following statements

I. Selenium is a halogen.

II. Sodium is an alkali metal.

Which of the above statement(s) is/are correct?

a. Only I *b.* Only II *c.* Both I and II *d.* None of these

113. $AgNO_3(aq) + NaCl(aq) \longrightarrow AgCl(s) + NaNO_3(aq)$.

It is an example of

a. double displacement reaction *b.* displacement reaction

c. decomposition reaction *d.* redox reaction

114. Consider the following statements

I. Aluminium is a member of group 3, so it is not a transition metal.

II. Plutonium is an actinide and a rare earth element.

Which of the above statement(s) is/are correct?

a. Only I *b.* Only II *c.* Both I and II *d.* Neither I nor II

115. Consider the following statements

I. AIDS II. Cirrhosis

III. Hepatitis B IV. Syphilis

Which of the above diseases is/are transmitted from one person to another?

a. II, III and IV *b.* I, III and IV *c.* I and III *d.* All of these

116. Photochemical smog occurs in

a. cool and humid climate *b.* warm, dry and sunny climate

c. cool dry and sunny climate *d.* warm and humid climate

117. Bat can ascertain distances, directions, nature and size of the obstacles at night. This is possible by reflection of the emitted

a. ultrasonic waves from the bat *b.* ultrasonic waves from the distant objects

c. supersonic waves from the bat *d.* supersonic waves from the distant objects

118. Human stomach produces acid 'X' which helps in digestion of food. Acid 'X' is

a. acetic acid *b.* methanoic acid *c.* hydrochloric acid *d.* citric acid

119. 'Greenhouse effect' means

a. pollution in houses in tropical regions

b. trapping of solar energy due to atmospheric oxygen

c. trapping of solar energy due to atmospheric carbon dioxide

d. cultivation in Greenhouses, so as to check pollution

120. Which of the following is not a Rabi crop in India?

a. Wheat *b.* Barley *c.* Rapeseed *d.* Jute

121. Green Revolution in India became possible due to

I. Better irrigation, fertilisers and pesticides availability.

II. Intensive cultivation.

Which of the above statements given is/are correct?

a. Only I *b.* Only II *c.* Both I and II *d.* None of these

122. The region, where the nerve endings of one neuron come into contact with another neuron is called as

a. cyton *b.* receptor *c.* effector *d.* synapse

123. Consider the following statements

I. Organic farming is a method of farming where in synthetic chemical is not used in any form.

II. Transgenic tomatoes have longer shelf life due to delayed ripening.

Which of the statement(s) given above is/are correct?

a. Only I *b.* Only II *c.* Both I and II *d.* None of these

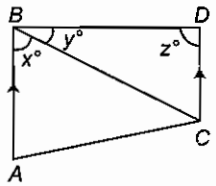
124. All carbohydrates contain carbon, hydrogen and oxygen. All proteins contain carbon, hydrogen, oxygen and what other element?

a. Nitrogen *b.* Chlorine *c.* Sulphur *d.* Fluorine

125. What is the name given to a species that can be used to tell something about the environment (*e.g.*, how much pollution there is in water)?

a. Indicator *b.* Pigment *c.* Chemical *d.* Bacteria

126. In figure $AB||CD$, if $x = \frac{4}{3}y$ and $y = \frac{3}{8}z$, then find the value of x.



a. 48° *b.* 96° *c.* 36° *d.* None of these

127. Pooja started her job with certain monthly salary and gets a fixed increment every year. If her salary was ₹ 4200 after 3 yr and ₹ 6800 after 8 yr of service, then what are her initial salary and the annual increment, respectively?

a. ₹ 2640, ₹ 320 *b.* ₹ 2460, ₹ 320 *c.* ₹ 2460, ₹ 520 *d.* ₹ 2640, ₹ 520

128. The roots of the equation $x^2 + px + q = 0$ are 1 and 2. The roots of the equation $qx^2 - px + 1 = 0$ must be

a. $-\frac{1}{2}$ and 1 *b.* $\frac{1}{2}$ and 1 *c.* $-\frac{1}{2}$ and -1 *d.* None of these

129. A solid is hemi-spherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and the height of its conical part is

a. 1 : 3 *b.* $1:\sqrt{3}$ *c.* 1 : 1 *d.* $\sqrt{3}:1$

130. ΔPQR is a right angled at Q. If X and Y are the mid-points of the sides PQ and QR respectively, then which one of the following is correct?

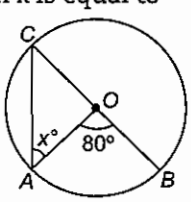
a. $RX^2 + PY^2 = 5XY^2$ *b.* $RX^2 + PY^2 = XY^2 + PR^2$

c. $4(RX^2 + PY^2) = 5PR^2$ *d.* $RX^2 + PY^2 = 3(PQ^2 + QR^2)$

131. Four angles of a 8-sided figure are each 154°. If the remaining four angles are equal, then the measure of each angle is

a. 100° *b.* 110° *c.* 116° *d.* 120°

132. If 'O' is the centre of circle, then x is equal to



a. 80° *b.* 60° *c.* 40° *d.* 20°

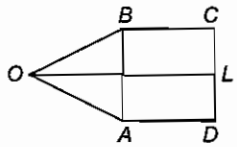
133. The mean of a set of number is $\bar{X}$. If each number is divided by 3, then the new mean is

a. $\bar{X}$ *b.* $\bar{X} + 3$ *c.* $3\bar{X}$ *d.* $\frac{\bar{X}}{3}$

134. An agent buys a TV set listed at ₹ 10000 and gets 10% and 20% successive discount. He spends 10% of CP on transport. At what price (in ₹) should he sell TV set to earn a profit of 10%?

a. 8692 *b.* 8699 *c.* 8700 *d.* 8712

135. $ABCD$ is a square of side a, ABO is an equilateral triangle and OL is perpendicular to CD. Then, area of the trapezium $AOLD$ is



a. $\frac{a^2}{2} + \frac{\sqrt{3}}{8}a^2$ *b.* $\frac{a^3}{2} + \frac{\sqrt{3}}{4}a^3$ *c.* $a^3 + \sqrt{3}\,a^3$ *d.* $\frac{a^3}{2} + \frac{\sqrt{3}}{2}a^3$

136. When two dice are rolled together, the probability of getting an even number on one dice and a multiple of 3 on the other, is

a. 1/6 *b.* 7/36 *c.* 4/9 *d.* 5/36

137. A triangle formed by the points A (2, 5), B (3, 8) and C (x, y). If the centroid of the triangle is (3, 5), what is the coordinate of point C?

a. (2, 4) *b.* (– 4, – 2) *c.* (4, 2) *d.* None of these

138. 1 L of water is evaporated from 6 L of a solution having 4% of sugar. The percentage of sugar in the remaining solution is

a. 4% *b.* 5% *c.* $4\frac{4}{5}\%$ *d.* $\frac{4}{5}\%$

139. 20 L of a mixture contains milk and water in the ratio 5 : 3. If 4 L of this mixture are replaced by 4 L of milk, the ratio of milk to water in the new mixture will become

a. 7 : 3 *b.* 8 : 3 *c.* 9 : 7 *d.* 4 : 6

140. If $a + b + c = 10$ and $ab + bc + ac = 31$, then the value of $a^2 + b^2 + c^2$ is

a. 48 *b.* 38 *c.* 28 *d.* 18

141. If a is an odd integer, then the number $a(a^2 - 1)$ is divisible by

a. 8 *b.* 32 *c.* 24 *d.* 16

142. If $\sin^2 x + \sin^2 y + \sin^2 z = (\sin x + \sin y + \sin z)^2$, then which of the following expressions must necessarily be true?

a. $\tan x + \tan y + \tan z$ *b.* $\cos x + \cos y + \cos z$

c. $\frac{1}{\sin x} + \frac{1}{\sin y} + \frac{1}{\sin z}$ *d.* $\frac{1}{\cos x} + \frac{1}{\cos y} + \frac{1}{\cos z}$

143. If a flagstaff of 6 m high placed on the top of a tower throws a shadow of $2\sqrt{3}$ m along the ground, then the angle that the Sun makes with the ground, is

a. 45° *b.* 60° *c.* 30° *d.* 90°

144. 7 men and 8 boys can do a piece of work in 2 days. 4 men and 12 boys can do 29/56 of the same work in 1 day. In how many days will 1 man do this work?

a. 24 days *b.* 25 days *c.* 27 days *d.* 28 days

145. A sum of money doubles itself at compound interest in 15 yr. It will becomes 8 times in
a. 30 yr *b.* 40 yr *c.* 60 yr *d.* 45 yr

146. Choose the correct sequence to indicate the following statements as True (T) or False (F).
I. The authority of the rules of the Constitution is the same as that of any other law.
II. Constitution lays down how different organs of the government will be formed.
III. Rights of citizens and limits on the power of the government are laid down in the Constitution.
IV. A Constitution is about institutions, not about values.
a. F, T, T, F *b.* T, F, T, F *c.* F, T, T, T *d.* T, F, F, T

147. The constituent assembly that framed the Constitution of independent India was set-up
a. under the Indian Independence Act, 1947
b. by the Indian National Congress
c. under the Cabinet Mission Plan, 1946
d. through a resolution of the Provisional Government

148. The Preamble to the Constitution includes all except
a. fraternity *b.* adult franchise *c.* equality of status *d.* justice

149. Which among the following decisions can be taken on their own by the President of India?
a. Select the person of his liking as Prime Minister
b. Dismiss a Prime Minister, who has a majority in Lok Sabha
c. Ask for reconsideration of a Bill passed by both the Houses
d. Nominate the leaders of his choice to the Council of Ministers

150. Taking inspiration from which of the following models, most countries in the contemporary world have chosen to begin their Constitutions with a Preamble?
a. British model *b.* Swiss model *c.* American model *d.* Canadian model

151. Match the following

List I	List II
A. Sovereign	1. Government will not favour any religion
B. Republic	2. People should live like brothers and sisters
C. Fraternity	3. Head of the state is an elected person
D. Secular	4. People have the supreme right to make decisions

Codes

A B C D	A B C D	A B C D	A B C D
a. 4 3 2 1	*b.* 3 4 2 1	*c.* 1 2 3 4	*d.* 2 1 3 4

152. Consider the following statements
I. A Minister flags off a new train in his constituency a week before polling day.
II. A candidate promises he will get a new train for the constituency if he is elected.
III. Supporters of the candidate distribute blankets in slums in returns for a promise for vote.
IV. The candidate criticised the government in his speech.
Which of the above activities is/are part of the unfair electoral practices?
a. II and III *b.* I, II and III *c.* III and IV *d.* II, III and IV

153. Match the Harappan settlements with the banks of river on which they were located.

List I	List II
A. Harappa	1. Ghaggar
B. Moheanjodaro	2. Sutlej
C. Ropar	3. Indus
D. Kalibangan	4. Ravi

Codes

	A	B	C	D
a.	3	4	2	1
b.	4	3	2	1
c.	1	2	3	4
d.	2	1	3	4

154. Arrange the following in the chronological order

I. Ghadar Party II. Khilafat Movement
III. Dandi March IV. Champaran Satyagraha

The correct chronological sequence is

a. IV, I, II, III *b.* I, IV, III, II *c.* IV, I, III, II *d.* I, IV, II, III

155. Amir Khusro was the famous poet in the court of

a. Akbar *b.* Ibrahim Lodi *c.* Alauddin Khilji *d.* Iltutmish

156. Arrange the following in chronological order

I. Dandi March II. Simon Commission
III. Poona Pact IV. Gandhi-Irwin Pact

The correct chronological sequence is

a. II, I, III, IV *b.* II, I, IV, III *c.* IV, III, I, II *d.* IV, III, II, I

157. The Mathura School of Art was influenced by

a. Amravati School of Art *b.* Bodh Gaya School of Art
c. Roman School of Art *d.* Gandhara School of Art

158. Which one of the following is the main cause of land degradation in Punjab?

a. Intensive cultivation *b.* Overgrasing *c.* Over irrigation *d.* Deforestation

159. Terrace cultivation is the common feature in which of the following states?

a. Punjab *b.* Haryana *c.* Uttar Pradesh *d.* Uttarakhand

160. The system of agriculture in which farmer clear a patch of land and produce crops, when soil fertility decreases. Farmer shift and clear a fresh patch of land, known as

a. jhum farming *b.* alternate farming *c.* commercial farming *d.* None of these

161. The crop sown in between the Rabi and Kharif seasons known as

a. horticulture *b.* zaid *c.* subsistance farming *d.* None of these

162. Consider the following

I. Availability of raw material.
II. Labour and capital.
III. Power and market.

Which of the above factors influence the industrial locations?

a. Only I *b.* I and II *c.* II and III *d.* All of these

163. Which of the following is not a tertiary activity?

a. Banking *b.* Education *c.* Health *d.* Forestry

164. People as a resource is a way of referring to a country's working people in terms of their existing productivity

a. Skills and abilities *b.* Working capital *c.* National income *d.* None of these

165. Activity that involves remuneration to anyone, who performs activity performed for pay or profit, is called

a. market activity *b.* national activity *c.* primary activity *d.* None of these

166. Ibn Battuta an African traveller visited India during the time of

a. Alivardi Khan *b.* Alauddin Khilji

c. Iltutmish *d.* Muhammad Bin Tughluq

167. Match the following

List I	List II
A. ChanhuDaro	1. Discovery of skeleton of horse
B. Kalibangan	2. Bead making
C. Lothal	3. Traces of a dock and ship on seal
D. Surkotada	4. Evidence of ploughing the fields

Codes

	A	B	C	D
a.	2	4	3	1
b.	2	1	3	4
c.	1	2	3	4
d.	2	1	3	4

168. Match the following

List I	List II
A. Peshwa	1. Foreign affairs
B. Pandit Rao	2. Audit and accounts
C. Amatya	3. Providing grants to scholars
D. Sumant	4. General supervision

Codes

	A	B	C	D
a.	4	3	2	1
b.	3	4	2	1
c.	1	2	3	4
d.	2	1	3	4

169. International trade is regulated and monitored by

a. United Nations Organisation

b. General Agreement on tariffs and trade

c. World Trade Organisation

d. UNCTAD (United Nations Conference on Trade and Development)

170. Match the following

List I	List II
A. National Highway-7	1. Delhi-Amritsar
B. National Highway-1	2. Delhi-Mumbai
C. National Highway-8	3. Varanasi-Kanyakumari
D. National Highway-15	4. Covers most of Rajasthan

Codes

	A	B	C	D
a.	3	1	2	4
b.	4	3	2	1
c.	3	4	2	1
d.	1	2	3	4

171. Which of the following is the largest public sector undertaking in the country?

a. Roadways *b.* Indian Railways

c. Shipping Corporation of India *d.* Oil and Natural Gas Corporation

172. Pipeline transport network is a new arrival on the transportation map of India. This is used for the transportation of

a. crude oil *b.* petroleum product *c.* natural gas *d.* All of these

173. Which of the following persons was the first Secretary General of the United Nations Organisation?

a. U Thant *b.* Trygve Lie *c.* Nelson Mandela *d.* Ho Chi Minh

174. Which of the following teams won the 67th edition of the Santosh trophy football championship held at Kochi?

a. Kerala *b.* Services *c.* Mohan Bhagan *d.* Goa

175. 'Go back to the Vedas' was the motto of

a. Raja Ram Mohan Roy *b.* Swami Vivekananda
c. Swami Dayanand Saraswati *d.* MG Ranade

176. Which one of the following has been the ma . feature of the South Indian temple architecture?

a. Sikhara *b.* Gopuram *c.* Vimana *d.* Mandapa

177. Consider the following scripts

I. Brahmi II. Kharoshthi
III. Greek IV. Aramaic

Which of the above scripts used in the Ashokan inscriptions?

a. III and IV *b.* I and II *c.* I, II and III *d.* All of these

178. Which one of the following dynasties was ruling over North India at the time of Alexander's invasion?

a. Nanda *b.* Maurya *c.* Sunga *d.* Kanva

179. Consider the following events

I. Cripps Mission II. Quit India Movement
III. Individual Satyagraha IV. August Offer

The correct chronological order is

a. IV, III, II, I *b.* IV, III, I, II *c.* III, IV, I, II *d.* III, IV, II, I

180. Who among the following was responsible for the partition of Bengal in 1905?

a. Lord Minto *b.* Lord Lytton *c.* Lord Curzon *d.* None of these

Paper I : Mental Ability Test

1. (a) 21, 25, 33, 49, 81, [145]
+4 +8 +16 +32 +64

2. (b) 8, 10, 14, 18, [26], 34, 50, 66
+2 +4 +4 +8 +8 +16 +16

3. (d) 1, 2, 6, 24, [120]
×2 ×3 ×4 ×5

4. (c) 4, 32, 128, [256]
×8 ×4 ×2

5. (a) 34, 18, 10, 6, 4, [3]
+2+1 +2+1 +2+1 +2+1 +2+1

6. (a) Pigeon is the symbol of 'peace' and white Flag is the symbol of surrender.

7. (b) Machine is made to work according to the instruction of man. Similarly, slave works under the instruction of his master.

8. (b) First is the feeling associated with the second.

9. (b) All except 'rice' are rabi crops.

10. (a) All except 'heart' are present in the human body in a pairs.

11. (a) All except 'barber' require raw material to work.

12. (c) All except 'foot' are parts of hand.

13. (c) Krishna > Ankit > Mohit > Vivek > Gaurav or Ayush
∴ Krishna scored highest in the match.

14. (c) Karishma > Karina
Aasif > Rohan
Karishma > Faiz
So, data is not complete to give the appropriate answer.

15. (c) Quarter part of circle = 25
$12 + 13 = 25$
$11 + 14 = 25$
$15 + 10 = 25$
$? + 16 = 25$
$? = 25 - 16 = 9$
So, answer will be 9.

16. (d) Sum of number on a line is equal to 16, so answer will be 6.

17. (b) $(4 \times 4) + (3 \times 3) = 25$
$(5 \times 5) + (6 \times 6) = 61$
Similarly, $(7 \times 7) + (8 \times 8) = 113$

18. (c) Arrange in increasing order
Bowl → Glass → Mug → Bucket → Water tank

19. (d) Animals must be arranged in increasing body size.

20. (b) Firstly, child will go to school, then college and after completed his/her college he or she will go to job there they get salary.

21. (c) **22.** (b) **23.** (d) **24.** (b)

25. (c) **26.** (d) **27.** (a)

28. (c) In figure (c) direction of figure is different but it is same for other.

29. (c) In figure (c) both outer shapes are unfilled.

30. (c) In figure (c) arrow direction is different from the terminal dots.

31. (d) **32.** (b) **33.** (c)

34. (a) Figure moves 90° in clockwise direction.

35. (d) Figure moves 90° in clockwise direction.

36. (a) Shape in figure move right to left.

37. (c) When both sides given, then add the both sides and – 1.
$= 18 + 16 - 1$
Number of candidates = 33

38. (b) Average of seven number is = 14
Then, number is $= 5 \times 14 = 70$
10
12
Middle term is = 14
16
18
70

39. (a) Let the age of daughter be x.
Age of mother = $3x$
12 yr later, daughter = $x + 12$
and mother = $3x + 12$
$\therefore \quad 2(x + 12) = 3x + 12$
$\Rightarrow \quad 2x + 24 = 3x + 12$
$\therefore \quad x = 12$

Solutions (Q. Nos. 40-42) According to 'BODMAS',

40. (c) $40 - 2 \div 2 + 5 \times 3$
$\Rightarrow \quad 40 \div 2 - 2 \times 5 + 3$
$\Rightarrow \quad 20 - 10 + 3 = 13$

41. (*b*) $35 - 7 \div 2 + 4 \times 4$

$\Rightarrow \quad 35 \div 7 - 2 \times 4 + 4$

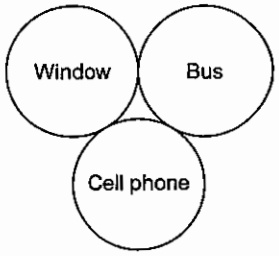
$\Rightarrow \quad 5 - 8 + 4 = 1$

42. (*d*) $31 \div 12 - 2 \times 2 + 2$

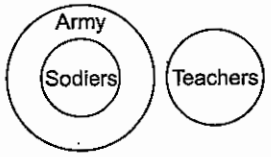
$\Rightarrow \quad 31 - 12 \div 2 + 2 \times 2$

$\Rightarrow \quad 31 - 6 + 4 = 33$

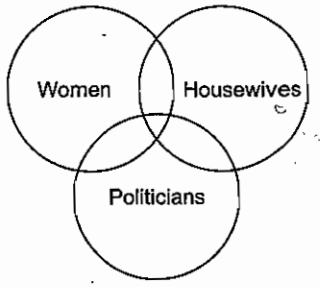
43. (*d*)



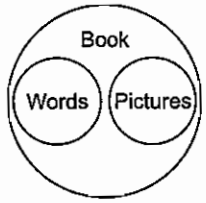
44. (*b*)



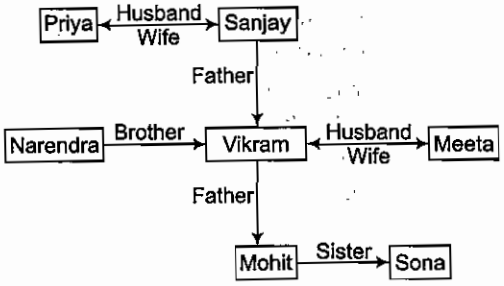
45. (*c*)



46. (*a*)



Solutions (Q. Nos. 47-50)



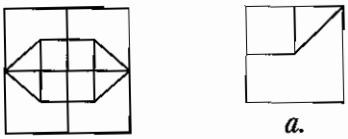
47. (*a*) Meeta is daughter-in-law of Sanjay.

48. (*a*) Sanjay is grandfather of Sona.

49. (*c*) Females are Priya, Meeta, Sona $\Rightarrow$ PMS

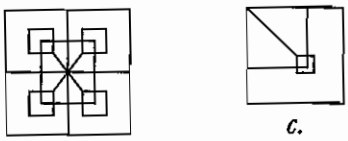
50. (*d*) Narendra is the son of Priya.

51. (*a*)



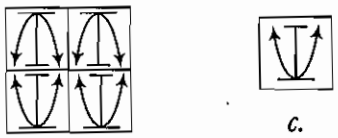
a.

52. (*c*)



c.

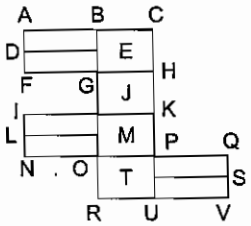
53. (*c*)



c.

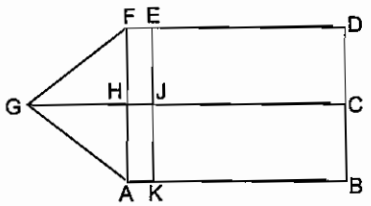
54. (*b*) **55.** (*b*). **56.** (*b*)

57. (*a*)



Rectangles are □ ABED, □ DEGF, □ ABGF, □ ACHF, □ BCHG, □ IJML, □ LMON, □ IJON, □ IKPN, □ OPKJ, □ PQST, □ STVU, □ PQUV, □ OQRV, □ OPRU, □ BCOP, □ BCJK, □ JKRU, □ GHRU, □ BCRU and □ GHJK *i.e.*, 21.

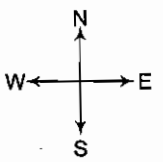
58. (*a*)

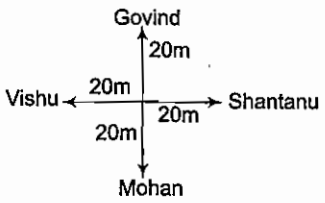


Rectangles are □ ABDF, □ KBDE, □ AKEF, □ JCDE, □ JKBC, □ FHCD, □ HCAB, □ HJEF and □ HJAK *i.e.*, 9.

59. (*b*) 7735573 375573 773373

Solutions (Q.Nos. 60-62)

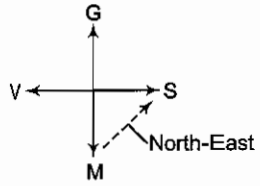




60. (*c*) West

61. (*c*) South

62. (*b*) North-East



63. (*a*) 78289338523847819885

64. (*b*) 8, 2, 8, 8, 2, 8, 4, 8, 8, 8

65. (*a*) **66.** (*d*) **67.** (*b*) **68.** (*c*) **69.** (*a*)

70. (*a*)

71. (*a*) It is clear from the figure that three, five, six and one dots cannot appear opposite to 4 dots. Therefore, it is clear that if 4 dots on bottom, then 2 dots will be on top.

72. (*a*) Inner item(s) and outer item(s) get exchanged.

73. (*c*) The number of lines are of first figure is same as in second figure.

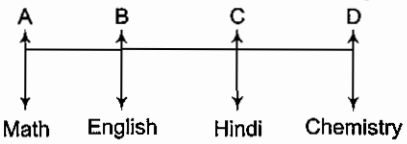
74. (*b*) Figure get reverted diagonally.

75. (*c*) Since, the sum of the number of dots on opposite faces of the block is always 7, we cannot get 1 dot adjacent to 6 dots, 2 dots adjacent to 5 dots and 3 dots adjacent to 4 dots. So, the figure 'a', 'b' and 'd' cannot be correct.

76. (*b*) There are 21 columns containing 2 cubes each and 4 columns of 1 cube each. So, the number of cubes in the figure is

$$= (21 \times 2) + (4 \times 1) = 46$$

Solutions (Q. Nos. 77-81)



77. (*a*) **78.** (*b*) **79.** (*a*) **80.** (*d*) **81.** (*c*)

82. (*a*) (a) Soonderlal (b) Sunder
(c) Sunderalal (d) Sunderlal

83. (*c*) (a) Thermal (b) Thermo
(c) Thermodynamics (d) Thermometer

84. (*d*) (a) Census (b) Center
(c) Central (d) Ceramics

85. (*a*) (a) Detect (b) Determination
(c) Determine (d) Develop

86. (*a*) (a) Flop (b) Florentine
(c) Floriculture (d) Fluorescence

87. (*a*) From left, fifth letter = E

Twentieth letter = T

By using these letters, the meaningful word is 'MUTE'. First letter of this word is 'M'.

88. (*b*) C O N T R I B U T I O N
2 6 9 12

So, letters are O, I, T and N and the meaningful word can be 'INTO'; last letter of this word is 'O'.

89. (*a*) 7 1 2 6 8 3 5 4
U M B R E L L A = UMBRELLA

90. (*d*) 3 1 2 7 8 5 4 6
OR G A N I Z E = ORGANIZE

Paper II : Scholastic Aptitude Test

91. (*c*) a = slope of v-t graph $= \frac{-15}{3} = -5\ m/s^2$

92. (*c*) Intensity is maximum at pole and minimum at equator.

93. (*c*) Due to high pressure at the bottom the iceberg melts.

94. (*d*) The correct sequence is ultraviolet, visible, infrared and microwave.

95. (*d*) The image formed is real and inverted.

96. (*d*) Rest all three are units of energy.

97. (*b*) The direction of magnetic lines of force is away from the coil.

98. (*d*) Magnetic pole strength is stronger at end part of magnet, so maximum iron powder is collected at the end point of magnet.

99. (*c*) Hystersis loss is a heat loss caused by the magnetic properties of armature.

100. (*b*) When convergent beam incident on a plane mirror, then mirror forms real image, for an virtual object.

101. (*c*) For $A > 2c$, the ray of light does not emerge from the opposite fall of the prism.

102. (*a*) In short sightedness, the focal length of eyelens decreases and so the power of eyelens increases.

103. (*c*) Some amphoteric substances are the oxides of elements like beryllium, aluminium, zinc, tin and lead.

104. (*b*) Iron (II) chloride is formed.

$$Fe^{2+} + Cl^- \longrightarrow FeCl_2$$

Ferrous chloride
or
Iron (II) chloride

105. (*d*) The most common oxidation number for silicon in a compound is +4. Oxidation number indicates the number of electrons lost, gained or shared as a result of chemical bonding.

106. (*c*) Copper sulphate is of blue colour while ferrous sulphate is of pale green colour.

107. (*a*) **Benzene** It has total 9 single and 3 double bonds. Out of these 3 single and 3 double bonds are endulged in the ring formation alternatively.

108. (*b*) The atom having atomic number 9, will have same electron dot structure as that of Cl. Because both have seven electrons in their outer shell.

109. (*c*) $SnO_2(s) + 2H_2(g) \longrightarrow Sn(s) + 2H_2O(g)$

110. (*a*) Ethanol - in making wines.

Propanol - as a precurser to trimethylolethane $[CH_3C(CH_2OH)_3]$

Acetone - as nail-paint remover.

Formaldehyde - in preserving specimens.

111. (*b*) Electronic configuration

$$\underset{S\,(Z=16)}{\overset{K\ L\ M}{2,\ 8,\ 6}}$$

Electron dot structure of S

112. (*b*) Selenium is a chalcogen and forms two oxides selenium dioxide (SeO_2) and selenium trioxide (SeO_3).

113. (*a*) $AgNO_3(aq) + NaCl(aq) \longrightarrow AgCl(s) + NaNO_3(aq)$

It is an example of double displacement reaction and it forms a white precipitate of silver chloride.

114. (*a*) All is not a transition metal but it belongs to group 13, as it has three electrons in its outermost shell.

115. (*b*) Cirrhosis is not contagious; it cannot be passed on from one person to another.

116. (*b*) Photochemical smog is much more common in cities with sunny; warm, dry climates and lots of motor vehicles such as Los Angeles, California.

117. (*b*) Bat can ascertain distances, directions, nature and size of the obstacles at night. This is possible by reflection of the emitted ultrasonic waves from the distant objects.

118. (*c*) HCl activates digestive enzymes and helps break down food into simpler components for the body to use. HCl is also known as 'gastric acid.'

119. (*c*) Greenhouse effect, where by the Earth's atmosphere traps solar radiation, caused by the presence in the atmosphere of gases such as carbondioxide, water vapor and methane.

120. (*d*) Jute is not a rabi crop of India.

121. (*c*) The tools of the Green Revolution-Pesticides, fertilisers and intensive irrigation.

122. (*d*) In the nervous system, a synapse is a structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another cell.

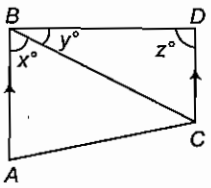
123. (*c*) Organic farming is a form of agriculture that relies on techniques such as crop rotation, green manure, compost and biological pest control.

Transgenic tomatoes have a longer shelf life due to delayed ripening.

124. (*a*) All macronutrients (protein, carbohydrates and fats) contain carbon, hydrogen and oxygen. Among these, only protein contains the additional nitrogen molecule.

125. (*a*) A species may delineate an ecoregion or indicate an environmental condition such as a disease outbreak, pollution, species competition or climate change.

126. (*a*) As, $AB \parallel CD$ and BD cuts them



$$\angle ABD = \angle BDC$$

so $\angle BDC = x$

So, $x + y + z = 180°$

In ΔBCD,

$$\frac{4}{3}y + y + z = 180°$$

$$\Rightarrow \quad \frac{7y}{3} + z = 180°$$

$$\frac{7}{3}\left(\frac{3}{8}z\right) + z = 180°$$

$$\Rightarrow \quad \frac{7}{8}z + z = 180°$$

$$\frac{15z}{8} = 180°$$

$$\therefore \quad z = 96°$$

So, $y = \frac{3}{8} \times 96° = 36°$

and $x = \frac{4}{3} \times 36° = 48°$

127. (*d*) Let Pooja's initial salary is ₹ x and fixed increment every year is ₹ y.

By given condition, $x + 3y = 4200$ ...(i)

and $x + 8y = 6800$ ...(ii)

On solving Eqs. (i) and (ii), we get

$x = ₹ 2640$

and $y = ₹ 520$

128. (*c*) The equation is $x^2 + px + q = 0$

Sum of roots $= -p = 1 + 2$

$$\Rightarrow \quad p = -3$$

Product of roots $= q = 1 \times 2 = 2$

$\therefore$ Equation $qx^2 - px + 1 = 0$ becomes

$$2x^2 - (-3)x + 1 = 0$$

$$\Rightarrow \quad 2x^2 + 3x + 1 = 0$$

$$\Rightarrow \quad (2x + 1)(x + 1) = 0$$

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

129. (*b*) As, here radius of cone = Radius of hemisphere = R

Then, $2\pi R^2 = \pi R\sqrt{R^2 + H^2}$ (by condition)

Here, H = Height of cone

$\therefore \quad 2R = \sqrt{R^2 + H^2}$

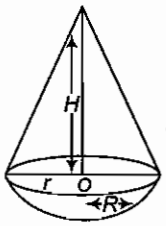
$4R^2 = R^2 + H^2$

$3R^2 = H^2$

$\frac{R^2}{H^2} = \frac{1}{3}$

$\therefore \quad \frac{R}{H} = \frac{1}{\sqrt{3}}$

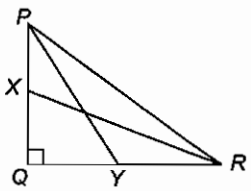
$R : H = 1 : \sqrt{3}$



130. (*c*) In ΔPQY,

$PY^2 = PQ^2 + QY^2$

$\Rightarrow \quad PY^2 = PQ^2 + \left(\frac{QR}{2}\right)^2$ ...(i)



and in ΔXOR,

$RX^2 = QX^2 + QR^2$

$\Rightarrow \quad RX^2 = \left(\frac{PQ}{2}\right)^2 + QR^2$ ...(ii)

On adding Eqs. (i) and (ii), we get

$PY^2 + RX^2 = \frac{5PQ^2}{4} + \frac{5QR^2}{4}$

$\Rightarrow \quad 4(PY^2 + RX)^2 = 5(PR)^2$

131. (*c*) Let measure of each angle be x, then

Measure of all angles = $(n-2)\,180 = 1080°$

$\therefore \quad 4 \times 154° + 4x = 1080°$

$4x = 1080° - 616° = 464°$

$x = \frac{464°}{4°} = 116°$

132. (*c*) $\angle OAC = \angle OCA$

$\Rightarrow \quad 2\angle OAC = 80°$ (external angle of ΔOAC)

$\Rightarrow \quad \angle OAC = \frac{80°}{2} = 40°$

$\therefore \quad x = 40°$

133. (*d*) Let $x_1, x_2, x_3, \ldots, x_n$ be n numbers, then $\bar{X} = \frac{1}{n}\sum_{i=1}^{n} x_i$

If each number is divisible by 3, then the new mean,

$\bar{z} = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i}{3}\right) = \frac{1}{3n}\sum_{i=1}^{n}(x_i)$

$= \frac{1}{3}\left(\frac{1}{n}\sum_{i=1}^{n} x_i\right) = \frac{1}{3}\bar{X}$

134. (*d*) Cost price of TV = $\frac{80}{100} \times \frac{90}{100} \times (10000)$

$= ₹\,7200$

$\therefore$ Amount spent on transport = $\frac{10}{100} \times 7200$

$= ₹\,720$

$\therefore$ Net cost price = 7200 + 720 = ₹ 7920

$\therefore$ Selling price of TV = 110% of 7920

$= \frac{110}{100} \times 7920 = ₹\,8712$

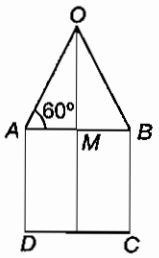
135. (*a*) As, OAB is equilateral triangle,

$\therefore \quad \angle OAM = 60°$ and $AB = OA = OB = a$

$\therefore$ OM (Altitude) = $\frac{\sqrt{3}}{2}$ side = $\frac{\sqrt{3}}{2}a$

$\therefore \quad OL = OM + ML = \frac{\sqrt{3}}{2}a + a$

$\therefore$ Area of trapezium = $\frac{1}{2}(AD + OL)AM$



$= \frac{1}{2}\left(a + \frac{\sqrt{3}}{2}a + a\right)\frac{a}{2} \quad \left(\because AM = \frac{1}{2}AB\right)$

$= \frac{\sqrt{3}}{8}a^2 + \frac{a^2}{2}$

136. (*a*) Probability of getting an even number = $\frac{3}{6}$

Probability of getting a multiple of three = $\frac{2}{6}$

$\therefore$ Required probabililty = $\frac{3}{6} \times \frac{2}{6} = \frac{1}{6}$

137. (*c*) Centroid of triangle

$= \left(\frac{2+3+x}{3}, \frac{5+8+y}{3}\right) = (3, 5)$

$\Rightarrow \quad \frac{5+x}{3} = 3$ and $\frac{13+y}{3} = 5$

i.e., $x = 4$ and $y = 2$

Thus, $(x, y) = (4, 2)$

138. (*c*) Amount of sugar in 6 L of solution

$= \frac{4}{100} \times 6 = 0.24$ L

After evaporation, sugar in 5 L = 0.24 L

$\therefore$ Percentage of sugar = $\left(\frac{0.24}{5} \times 100\right) = 4\frac{4}{5}\%$

139. (*a*) Remaining mixture = 20 – 4 = 16L

Milk = $16 \times \frac{5}{8} = 10$ L

$\therefore$ Water contains = 16 – 10 = 6 L

$\therefore$ Milk in new mixture

= 10 + 4 = 14 L and water = 6 L

$\therefore$ Ratio of milk and water in new mixture.

$= \frac{14}{6} = \frac{7}{3}$

140. (*b*) $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ac$

$$(10)^2 = (a^2+b^2+c^2)+2(31)$$

$$a^2+b^2+c^2 = 100-62$$

$$\Rightarrow \quad a^2+b^2+c^2 = 38$$

141. (*c*) If $a=3$, then $a^2-1=8$, so $a(a^2-1)=24$, which is divisble by 24.

At $a=5 \Rightarrow a(a^2-1)=5.24$,

At $a=7 \Rightarrow a(a^2-1)=7.48$ etc.

Also, all other integer have a factor 24.

142. (*c*) $\sin^2 x+\sin^2 y+\sin^2 z$

$$=(\sin x+\sin y+\sin z)^2$$

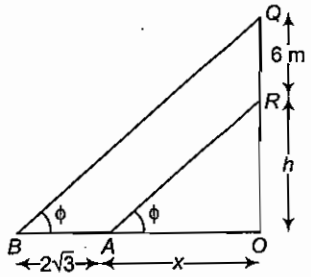
$$[\because (a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)]$$

$\Rightarrow \sin x \sin y+\sin y \sin z+\sin z \sin x = 0$

On dividing both sides by $\sin x \sin y \sin z$, we get

$$\Rightarrow \quad \frac{1}{\sin x}+\frac{1}{\sin y}+\frac{1}{\sin z}=0$$

143. (*b*) Let OA and AB be the shadows of tower OR and flagstaff RQ, respectively on the grounds.



Let the Sun makes an angle ϕ with the ground.

Let $OA = x$

In right angle ΔOAR,

$$\tan\phi = \frac{h}{x} \qquad \ldots(i)$$

and in ΔOBQ, $\tan\phi = \dfrac{h+6}{x+2\sqrt{3}}$ $\qquad \ldots(ii)$

From Eqs. (i) and (ii), we get

$$\therefore \quad \frac{h}{x} = \frac{h+6}{x+2\sqrt{3}}$$

$$h(x+2\sqrt{3}) = x(h+6)$$

$$2\sqrt{3}h = 6x$$

$$x = \frac{h}{\sqrt{3}} \Rightarrow \frac{h}{x} = \sqrt{3}$$

$$\Rightarrow \quad \tan\phi = \sqrt{3} \qquad \text{[from Eq. (i)]}$$

$$\therefore \quad \phi = 60°$$

144. (*d*) Let the man does it in '*a*' days and the boy in '*b*' days.

$$\therefore \quad \frac{7}{a}+\frac{8}{b}=\frac{1}{2} \qquad \ldots(i)$$

and $$\frac{4}{a}+\frac{12}{b}=\frac{29}{56} \qquad \ldots(ii)$$

From Eqs. (i) and (ii), we get

$$\frac{52}{b} = \frac{29}{8}-2 = \frac{13}{8}$$

$$\therefore \quad b = 32$$

On putting the value of b in Eq. (i), we get

$$\frac{7}{a}+\frac{8}{32}=\frac{1}{2}$$

$$\frac{7}{a} = \frac{1}{2}-\frac{1}{4} = \frac{1}{4}$$

$$\therefore \quad a = 28$$

So, a man will do it in 28 days.

145. (*d*) Let the sum be ₹ x. and rate be R% per annum.

Then, $$x\left(1+\frac{R}{100}\right)^{15} = 2x \qquad \text{(by given condition)}$$

$$\Rightarrow \quad \left(1+\frac{R}{100}\right)^{15} = 2 \qquad \ldots(i)$$

Suppose the sum becomes eight times in 'x' yr, then

$$x\left(1+\frac{R}{100}\right)^{n} = 8x \qquad \text{(by given condition)}$$

$$\Rightarrow \quad \left(1+\frac{R}{100}\right)^{n} = 8 = 2^3 \qquad \ldots(ii)$$

$$\left[\text{but } 2^3 = \left[\left(1+\frac{R}{100}\right)^{15}\right]^3 \text{ from Eq. (i)}\right]$$

$$\therefore \quad \left(1+\frac{R}{100}\right)^{n} = 2^3 = \left(1+\frac{R}{100}\right)^{45} \text{ (on comparing)}$$

$$\Rightarrow \quad n = 45 \text{ yr}$$

146. (*a*) The Constitution is the Supreme Law of the land and it describes the functions of the different organs of the government. It not only deals with the institutions but is also concerned about the values which the citizens must possess.

147. (*c*) The Constituent Assembly that framed the Constitution of India was setup under the Cabinet Mission Plan, 1946. The members of the Constituent assembly were elected indirectly on the basis of Hindu/Muslim and others.

148. (*b*) The adult franchise/or universal adult franchise or universal suffrage was given to adult citizens of the country under 'Representation of People Act'.

149. (*c*) After 42nd Amendment to the Constitution in 1976, it was made mandatory for the President to act upon the aid and advice of the Council of Ministers. In certain circumstances, he uses his discretionary power, *e.g.*, sending the bill for reconsideration, calling the leader of the political party to form the government after the general election when no political party gets clear cut majority.

150. (*c*) The Preamble which consists the basic or fundamental principles of the Constitution was first adopted by the Constitution of USA and later influenced the democratic Constitutions across the world.

151. (*a*)

152. (*a*) The moral code of conduct became operational immediately as the election dates were announced by the Election Commission of India. All the parties have to honour the code of conduct. Any violation to this will be strictly dealt with by the Election Commission, which has the power to cancel the nomination of any candidate, if he is found indulged in unfair activities.

153. (*b*)

154. (*a*) Champaran Satyagraha-1917
Ghadar Party -1913
Khilafat Movement-1920
Dandi March-1930

155. (*c*) Amir Khusro was the famous poet in the court of Allauddin Khilji. Although, he also enjoyed the patronage of court under the Tughluqs.

156. (*b*) Simon Commission-1927
Dandi March-1930
Gandhi-Irwin Pact-1931
Poona Pact-1932

157. (*d*) The Mathura School of Art was influenced by the Gandhara School of Art, which flourished during the reign of Ashoka and reached its peak during Khushan period.

158. (*b*) Land degradation is a human induced or natural process which negatively affects the land to function effectively within an ecosystem, land and soil face many difficulties like deforestation, erosion, flooding, water logging, urbanisation and salination. In state of Punjab the land degradation is caused by overgrasing.

159. (*d*) Terrace cultivation is the method of growing crops on sides of hills or mountains by planting on graduated terraces built into the slope. Graduated terrace steps are commonly used to farm on hilly or mountainous terrain.

160. (*a*) Jhum farming is an agricultural technique which involves cutting and burning of forests or woodlands to create fields. It is typically part of shifting cultivation agriculture and of transhumane livestock herding.

161. (*b*) In Indian sub-continent, the crops on irrigated lands which do not have to wait for moonsons, in the short duration between Rabi and Kharif crops season, mainly from March to June are called Zaid crops. Muskmelon, watermelon, gourds and cucumber are examples of Zaid crops.

162. (*d*) *The factors that influence the location of industries are following*

1. Availability of water
2. Availability of power
3. Availability of labour
4. Local government policies
5. Availability of infrastructure
6. Availability of raw materials, capital, transport and market

163. (*d*) The service sector consists of activities, where people offer their knowledge and time to improve productivity, performance, potential and sustainability. The basic characteristic of this sector is the production of services instead of end products.

164. (*a*) **165.** (*a*)

166. (*d*) Ibn Battuta visited India during the reign of Muhammad Bin Tughluq.

167. (*a*) **168.** (*a*)

169. (*c*) The World Trade Organisation deals with the global rules of trade between nations, its main function is to ensure that trade flows as smoothly and freely as is possible.

170. (*a*) **171.** (*b*)

172. (*d*) Pipeline transport is the transportation of goods through a pipe. Generally liquids and gases are sent, but the pneumatic tubes using compressed air can also transport solid capsules. As for gases and liquids, any chemically stable substance can be sent through a pipeline. The most valuable transporting goods are crude petroleum and refined petroleum product including fuels, oil natural gas and biofuels.

173. (*b*) Norwegian lawyer and politician Trygve Lie was the United Nation's first Secretary General from 1946 to 1953.

174. (*b*) Services defended their Santosh trophy title after they defeated Kerala 4-3 in penalty shootout in the summit clash of 67th edition of the National Football Championship.

175. (*c*) Swami Dayanand Saraswati had a strong faith in India's glorious past. He derived his principles from the ancient scriptures. He wanted to shape society on the model of the Vedas. He was the first to declare 'India for Indians'.

176. (*b*) Gopuram, a prominent feature of the Hindu temple architecture of South India, is the rising tower at the entrance of a temple.

177. (*d*) The most common script used in Ashokan inscription was Brahmi. In addition Kharosthi, Greek and Aramaic alphabets were used.

178. (*a*) Nanda Dynasty or Nanda Empire was established in the territory of Magadha and is one of the famous ancient Indian dynasties.

179. (*b*) August offer, 1940, Individual Satyagraha, 1940-41, Cripps mission, March 1942, Quit India Movement, August 1942.

180. (*c*) The partition of Bengal in 1905, during the British rule in India is structured by Lord Curzon.