

NTSE

National Talent Search Examination

MAT + SAT

[Stage I]

Time : 180 Min

Max. Marks : 180

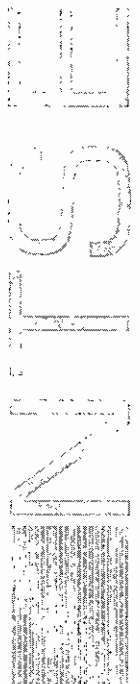
Read the following instructions carefully.

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

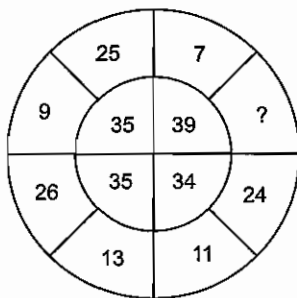
5. Now, turn to the next page and start answering the questions.



Paper I : Mental Ability Test

Directions (Q. Nos. 1-4) In the following questions, there is a relationship between the numbers/letters/figures on the left of the sign (:). The same relationship exists to the right of the sign (:), of which one is missing. Find out the missing term from the following alternatives.

- EGIMP : FILQU :: FHJL : ?
 a. GJMP b. GMJP c. JGPM d. HKNQ
- Dda : aDD :: Rrb : ?
 a. BBR b. bRR c. RRD d. DDR
- PALE : LEAP :: POSH : ?
 a. HSOP b. POHS c. SHOP d. HOPS
- RTVX : EGIK :: MOQS : ?
 a. TUVW b. NJKL c. IKMO d. ABCD
- Look at the following figure. Find the pattern for writing a number in the place of missing character.



- a. 28 b. 36 c. 81 d. 49
- Find the missing term from the following alternatives in the following question.

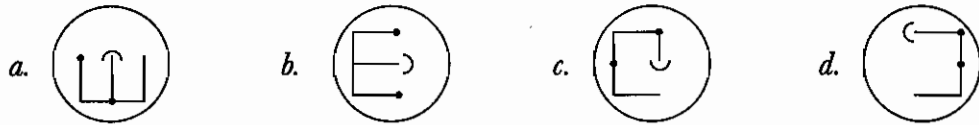
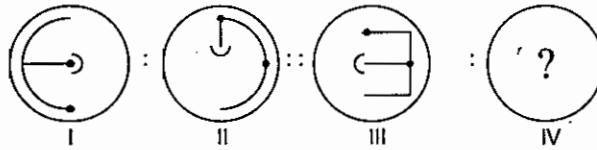
8	128	2
4	1	64
?	32	256

- a. 14 b. 15 c. 16 d. 17
- In the following question which is the most similar to the set given in the question.
 Given set : (6, 15, 28)
 a. (50, 59, 71) b. (46, 56, 66) c. (60, 69, 72) d. (60, 69, 82)

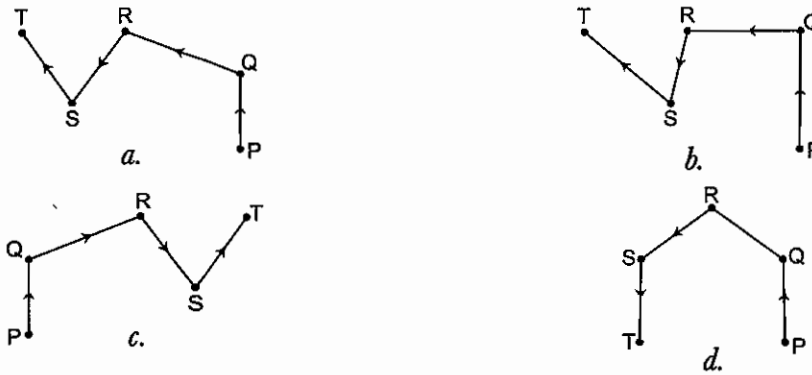
Directions (Q. Nos. 8-9) In the following questions, select the best option to replace the question mark.

- 68 : 130 :: ? : 350
 a. 210 b. 216 c. 222 d. 240
- 42 : 56 :: 110 : ?
 a. 18 b. 132 c. 136 d. 140

10. In the following question, select the correct alternative that represents the similar relationship between figure I and II and in the same manner between figure (iii) and (iv).



11. Raju starts from a place P towards North and reaches place Q. From there he turns towards North-West and reaches place R. He, then turns towards South-West and walks to a place S. From there he turns towards North-West and finally reaches place T. Which of the following figures shows the movement of Raju?



Directions (Q. Nos. 12-14) In the following questions, four alternatives are given, out of these, three are alike in a certain way but the one is different. Choose the one which is different from the rest three?

12. a. 144 b. 169 c. 256 d. 288

13. a. Camel b. Horse c. Bullock d. Cat

14. a. b. c. d.

15. How many 5's are there in the following number sequence which are immediately preceded by 7 and immediately followed by 6?

7 5 5 9 4 5 7 6 4 5 9 8 7 5 6 7 6 4 3 2 5 6 7 8

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

16. Count each 1 in the following sequence of numbers that is immediately followed by 2, if 2 is not followed by 3. How many such numbers are there?

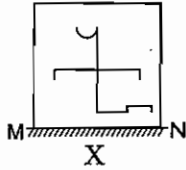
1 2 1 3 4 5 1 2 3 5 2 1 2 6 1 4 5 1 1 2 4 1 2 3 2 1 7 5 2 1 2 5

- a. 2 b. 4 c. 5 d. 7

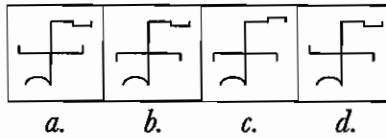
17. How many number from 11 to 50 are there which are exactly divisible by 7 but not by 3?
 a. Two b. Four c. Five d. Six
18. A number is greater than 3 but less than 8. Also, it is greater than 6 but less than 10. The number is
 a. 5 b. 6 c. 7 d. 8

Directions (Q. Nos. 19-21) In the following questions, find out which of the answer figures is the mirror image of the given figure when mirror is hold at the MN.

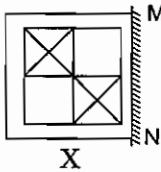
19. **Problem Figure**



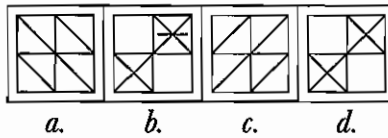
Answer Figures



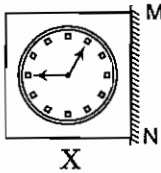
20. **Problem Figure**



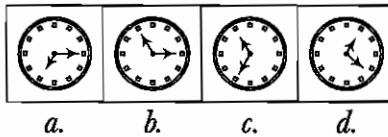
Answer Figures



21. **Problem Figure**

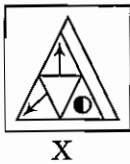


Answer Figures

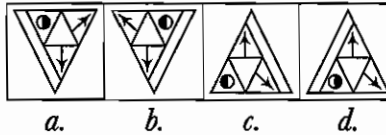


Directions (Q. Nos. 22-24) In the following questions, find out when of the answer figures is the water image of the given figure when water is below the item?

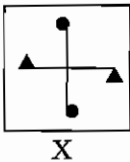
22. **Problem Figure**



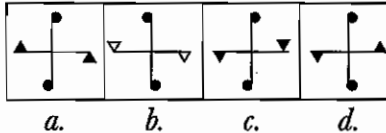
Answer Figures



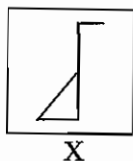
23. **Problem Figure**



Answer Figures

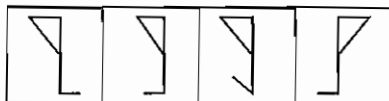


24. Problem Figure



X

Answer Figures



a.

b.

c.

d.

25. Five girls are sitting in a row. S is sitting next to P but not T. K is sitting next to R, who is sitting on the extreme left and T is not sitting next to K. Who are sitting adjacent to S?

a. K and P

b. R and P

c. Only P

d. P and T

26. If the letters in the word POWERFUL are rearranged as they appear in the English alphabet, the position of how many letters will remain unchanged after the rearrangement?

a. None

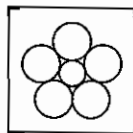
b. One

c. Two

d. Three

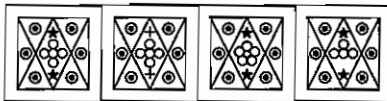
Directions (Q. Nos. 27-28) In each of the following questions, choose the alternatives in which the problem figure is embedded?

27. Problem Figure



X

Answer Figures



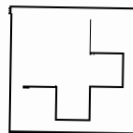
a.

b.

c.

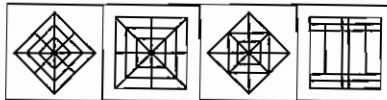
d.

28. Problem Figure



X

Answer Figures



a.

b.

c.

d.

29. A woman introduces a man as the son of the brother of her mother. How is the man related to the woman?

a. Nephew

b. Son

c. Cousin

d. Uncle

30. Arun said, 'This girl is the wife of the grandson of my mother.' Who is girl to the Arun?

a. Father

b. Grandfather

c. Husband

d. Daughter-in-law

31. Daksh is taller than Manick but not as tall as Rohan. Somesh is shorter than Daksh but taller than farhan. Who among them is the shortest?

a. Daksh

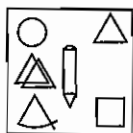
b. Manick

c. Farhan

d. Cannot be determined

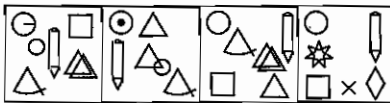
Directions (Q. Nos. 32-34) In each of the following questions, select the alternative in which the specified components of the problem figure are found?

32. Problem Figure



X

Answer Figures



a.

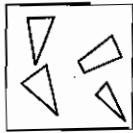
b.

c.

d.

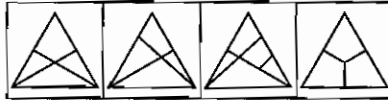
33. In which answer all the specified components of the figure are found?

Problem Figure



X

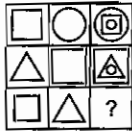
Answer Figures



a. b. c. d.

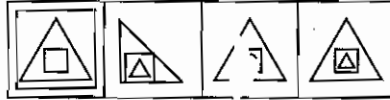
34. Which of the given answer figure completes the matrix?

Problem Figure



X

Answer Figures



a. b. c. d.

35. The doors of Aditya's house faces the East. From the back side of his house, he walks straight 50 m, then turns to the right and walks 50 m again. Finally, he turns towards left and stops after walking 25 m. Now, Aditya is in which direction from the starting point?

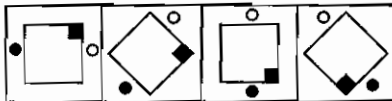
a. South-East b. North-East c. South-West d. North-West

36. It is 3 O'clock in a watch. If the minute hand points towards the North-East, then the hour hand will point towards the

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

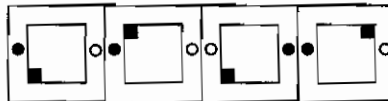
37. Find out how the fifth figure will look like?

Problem Figure



(I) (II) (III) (IV)

Answer Figures



a. b. c. d.

Directions (Q. Nos. 38-40) Read the following information carefully and answer the questions given below.

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

38. Who is the husband of P?

a. R b. U c. Q d. S

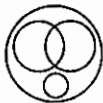
39. Who is the sister of T?

a. R b. U c. T d. Data insufficient

40. What is the profession of P?

a. Doctor b. Nurse c. Doctor or Nurse d. Housewife

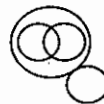
41. In a dinner party both fish and meat were served. Some took fish only and some only meat. There are some vegetarians who did not accept either. The rest accepted both fish and meat. Which of the following logic diagrams correctly reflects this situation?



a.



b.

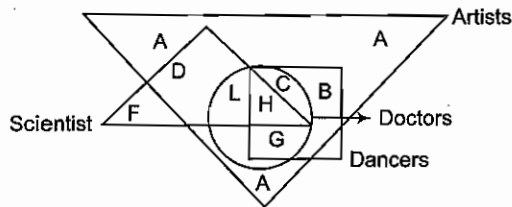


c.



d.

Directions (Q. Nos. 42-46) Study the figure carefully and answer the questions given below.



42. Which letter represents the artists who are doctors and dancers only?
 a. A b. D c. G d. H
43. Which letter represent the artists who are neither scientists nor doctors?
 a. A and B b. A and L c. B and G d. L and H
44. Which letters represent the artists who are dancers as well as doctors?
 a. A and D b. C and G c. C and D d. G and H
45. Which letter represents the artists who are neither doctor nor scientists nor dancers?
 a. A b. D c. F d. G
46. Which letter represents the scientists only?
 a. B b. D c. F d. L

Directions (Q. Nos. 47-52) According to a certain code language, words in column I are written in capital letters and in column II their codes are given. The codes in column II are jumbled up. Decode the language and choose the correct code for the word given in each of the questions that follow.

Column I	Column II
1. CHAIN	A. acmvq
2. FRAIL	B. pngal
3. TEAM	C. wjqd
4. DESTINY	D. xwtjzsc
5. TOIL	E. ajgl
6. VARY	F. qbzn
7. NAUGHTY	G. igcfvzj

47. DAILY
 a. aqzla b. alzqi c. lzqat d. aqtzc
48. TEAR
 a. nqjw b. qwmc c. jwqc d. fjcw
49. REACH
 a. nrxqm b. nxwwt c. wxnmv d. mqwn
50. AIRY
 a. naqz b. qamz c. amqv d. tamq
51. SUSTAIN
 a. xqfjamc b. fafjeqc c. xxqfjac d. xqfjaac
52. ENVOY
 a. cwbgz b. bgzww c. tcwbz d. wbbgz
53. If 'FISH' is written as 'EHRG' in a certain code, how will 'JUNGLE' be written in that code?
 a. ITMFKD b. ITNFKD c. KVOHMF d. TIMFKD

54. In a certain code, MOTHER is written as 'ONHURF'. How will 'ANSWER' be written in that code?
 a. NBXSSE b. NBWRRF c. MAVSPE d. NBWTRF
55. In a certain code, 'DEAF' is written as 3587 and 'FILE' is written as 7465. How is 'IDEAL' written in that code?
 a. 43568 b. 43586 c. 63548 d. 48536
56. If O = 16, FOR = 42, then what is FRONT equal to?
 a. 61 b. 65 c. 73 d. 78
57. If 'light' is called 'stick', 'stick' is called 'nib', 'nib' is called needle, 'needle' is called 'rope' and 'rope' is called 'thread'. What will be fit in a pen to write with it?
 a. Stick b. Lead c. Needle d. Nib
58. If 'DELHI' can be coded as 'CCIDD', how would you code 'BOMBAY'?
 a. AJMTVT b. AMJXVS c. MJXVSU d. WXYZAX

Directions (Q. Nos. 59-60) *In a certain code language.*

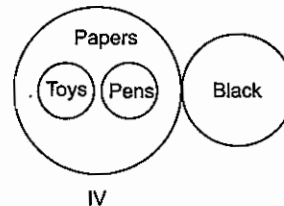
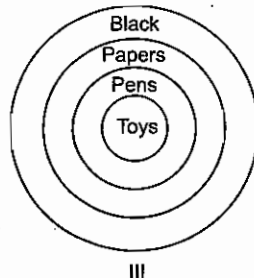
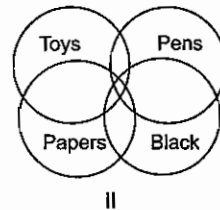
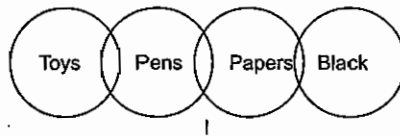
- I. 'mxy das zci' means 'good little frock'
 II. 'jmx cos zci' means 'girl behaves good'
 III. 'nvg drs cos' means 'girl makes mischief'
 IV. 'das ajp cos' means 'little girl fell'
59. Which word in that language stands for 'frock'?
 a. zci b. das c. nvg d. mxy
60. Which of the given statements is superfluous and can be dispersed with while answering the above question?
 a. I b. II c. III d. IV
61. Which one of the four interchanges in signs and numbers would make the given equation correct?

$$3 + 5 - 2 = 4$$

- a. + and -, 2 and 3 b. + and -, 2 and 5 c. + and -, 3 and 5 d. None of these

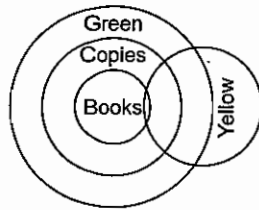
Directions (Q. Nos. 62-65) *Read the statement given below. Find out the diagrams from the given alternatives representing the statement correctly.*

62. Some toys are pens. Some pens are papers.
 Some papers are black.

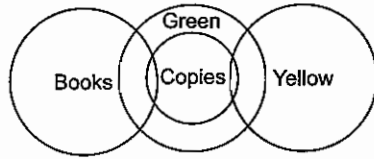


- a. I and II b. I and III c. II and III d. III and IV

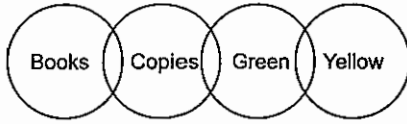
63. Some books are copies. All copies are green. Some green are yellow.



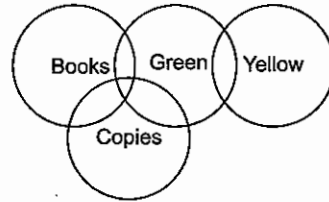
I



II



III



IV

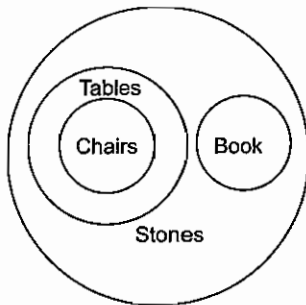
a. I and IV

b. II and III

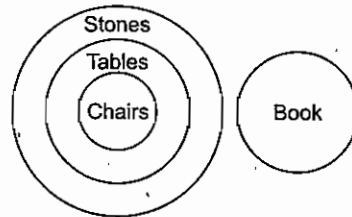
c. Only II

d. I and III

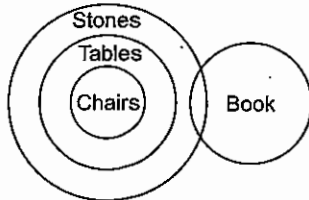
64. All chairs are tables. No table is a book. All tables are stones.



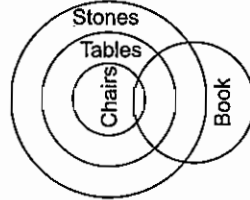
I



II



III



IV

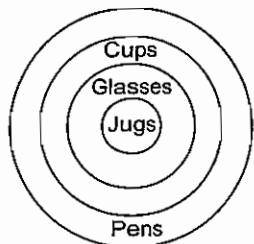
a. I and IV follow

b. II and III follow

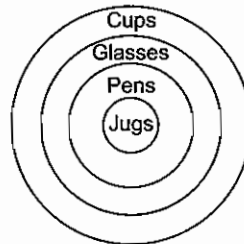
c. III and IV follow

d. I and II follow

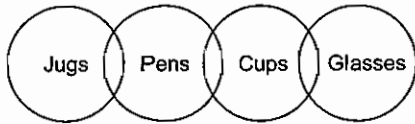
65. All jugs are glasses. All glasses are cups. All jugs are pens.



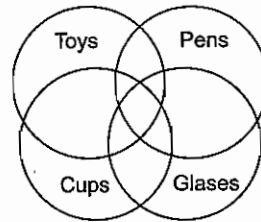
I



II



III



IV

- a.* I and II follow *b.* II and III follow *c.* III and IV follow *d.* I and IV follow
66. A policeman left his police post and proceeded South 4 km on hearing a loud sound from point A. On reaching the place, he heard another sound and proceeded 4 km to his left to the point B. From B he proceeded left to reach another place C 4 km away. In which direction, he has to go to reach his police post?
- a.* North *b.* South *c.* East *d.* West
67. A man walks 30 m towards South. Then, turning to his right he walks 30 m. Then, turning to his left he walks 20 m. Again turning to his left he walks 30 m. How far is he from his starting position?
- a.* 30 m *b.* 20 m *c.* 80 m *d.* 50 m
68. Five girls are sitting in a row. Kalpita is to the left of Maridula. Megha is to the right of Arpana. Sangeeta is in the middle of Megha and Kalpita who among the following is to the extreme right of the row?
- a.* Maridula *b.* Arpana *c.* Kalpita *d.* Cannot be determined
69. A woman walking with a dog meets another woman and on being asked about her relationship with the boy. She says, 'My maternal uncle and his maternal uncle are brothers'. How is the boy related to the woman?
- a.* Nephew *b.* Brother *c.* Brother-in-law *d.* Grandson
70. In a class, the names of boys are arranged alphabetically. Gaurav and Saurabh have 14 boys between them. In Gaurav is 37th from the bottom. Saurabh would be at what position from the top?
- a.* 25th *b.* 28th *c.* 27th *d.* Cannot be determined

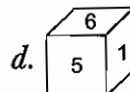
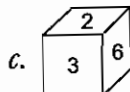
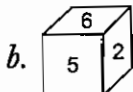
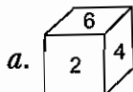
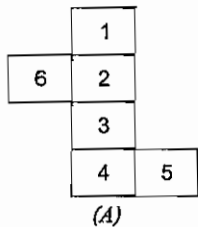
Directions (Q. Nos. 71- 73) In the following questions take the given statement as true and decide which of the conclusions logically follows from the statement.

71. **Statements** None but the rich can afford air travel.
Some of those who travel by air become sick.
Some of those, who become sick require treatment.

Conclusions

- a.* All the rich persons travel by air *b.* Those who travel by air become sick
c. All the rich persons become sick *d.* All those who travel by air are rich

82. How many smaller cubes will have no surface painted?
 a. 0 b. 4 c. 8 d. 16
83. How many smaller cubes have less than three surfaces painted?
 a. 8 b. 24 c. 28 d. 48
84. Select the figure which is identical to the figure (A).



Directions (Q. Nos. 85–90) Given below are two matrix containing two classes of letters. The rows and columns of matrix I are numbered from 0 to 4 and that of matrix II from 5 to 9. A letter from these matrix can be represented first by its row number and next by its column number.

Matrix I

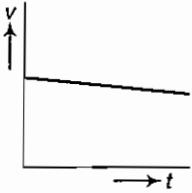
	0	1	2	3	4
0	C	U	C	L	G
1	A	R	R	A	G
2	L	C	U	P	L
3	P	L	O	O	C
4	O	A	P	U	R

Matrix II

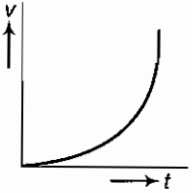
	5	6	7	8	9
5	B	I	M	N	E
6	S	B	I	M	N
7	E	S	B	E	M
8	N	I	S	B	E
9	M	N	I	S	B

85. SOUR
 a. 76, 40, 22, 44 b. 98, 32, 11, 32 c. 95, 32, 50, 55 d. 65, 10, 22, 43
86. NEAR
 a. 58, 98, 14, 10 b. 68, 34, 41, 57 c. 85, 89, 41, 14 d. 58, 59, 10, 12
87. BONE
 a. 67, 23, 54, 30 b. 34, 32, 22, 31 c. 88, 33, 14, 21 d. 77, 32, 85, 89
88. MOON
 a. 68, 32, 40, 86 b. 68, 34, 56, 32 c. 57, 32, 33, 58 d. 43, 31, 24, 99
89. GOLES
 a. 14, 40, 24, 78, 98 b. 14, 04, 23, 87, 24 c. 04, 32, 24, 78, 8 d. 40, 04, 03, 75, 98
90. BANE
 a. 88, 41, 58, 89 b. 87, 14, 58, 59 c. 68, 14, 85, 32 d. 11, 14, 56, 66

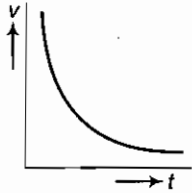
Paper II : Scholastic Aptitude Test

91. A current of 0.5 A is drawn by a filament of an electric bulb for half an hour. What is the amount of electric charge that flows through the circuit?
a. 900°C *b.* 600°C *c.* 5°C *d.* 9°C
92. A water heater marked 2 kW, 220 V is connected to a 220 V supply. How long will it take to heat 20 kg of water from 10°C to 30°C? Assume that all the heat is taken up by the water. (specific heat of water = $4200 \text{ J kg}^{-2}\text{C}^{-2}$)
a. 14 min *b.* 20 min *c.* 41 min *d.* 28 min
93. An iron ball and a wooden ball of the same radius are released from the same height in vacuum. They take the same time to reach the ground. The reason for this is
a. acceleration due to gravity in vacuum is same irrespective of the size and mass of the body
b. acceleration due to gravity in vacuum depends upon the mass of the body
c. there is no acceleration due to gravity in vacuum
d. in vacuum, there is a resistance offered to the motion of the body and this resistance depends upon the mass of the body
94. Which of the following velocity-time graphs represent uniform motion?
- 

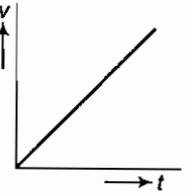
a.



b.



c.



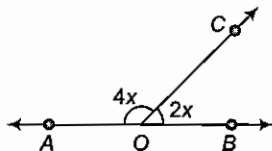
d.
95. A particle is moving on a circular path with constant speed, then its acceleration will be
a. zero *b.* external radial acceleration
c. internal radial acceleration *d.* constant acceleration
96. When a body moves with a constant speed along a circle
a. no work is done on it *b.* no acceleration is produced in the body
c. no force acts on the body *d.* its velocity remains constant
97. In uniform circular motion
a. both the angular velocity and the angular momentum vary
b. the angular velocity varies but the angular momentum remains constant
c. both the angular velocity and the angular momentum stay constant
d. the angular momentum varies but the angular velocity remains constant
98. In case of uniform circular motion, which of the following physical quantity does not remain constant?
a. Speed *b.* Momentum *c.* Kinetic energy *d.* Mass
99. Inertia is that property of a body by virtue of which the body is
a. unable to change by itself the state, the rest
b. unable to change by itself the state of uniform motion
c. unable to change by itself the direction of motion
d. unable to change by itself the state of rest and of uniform linear motion

100. A rider on horse back falls when horse starts running all of a sudden because
- rider is taken back
 - rider is suddenly afraid of falling
 - inertia of rest keeps the upper part of body at rest whereas lower part of the body moves forward with the horse
 - None of the above
101. A person is standing in a elevator. In which situation, he finds his weight less than actual when
- the elevator moves upward with constant acceleration
 - the elevator moves downward with constant acceleration
 - the elevator moves upward with uniform velocity
 - the elevator moves downward with uniform velocity
102. When the speed of a moving body is doubled
- its acceleration is doubled
 - its momentum is doubled
 - its kinetic energy is doubled
 - its potential energy is doubled
103. Which of the following is not a chemical reaction?
- Souring of milk
 - Rusting of iron
 - Dissolution of sugar in water
 - Digestion of food in our body
104. The physical state of water at 100°C is
- Solid
 - Liquid
 - Gas
 - Plasma
105. Which of the following characteristics are associated with gaseous state?
- Definite shape, compressible, fixed volume
 - Incompressible, fixed shape and size
 - No fixed shape and size, highly compressible
 - Fixed shape, incompressible, closely packed
106. A gas can be liquified by
- lowering the temperature
 - increasing the temperature
 - increasing the pressure
 - increasing the pressure and lowering the temperature
107. The latent heat of vaporisation of water is
- 2.2×10^5 J/kg
 - 22.5×10^5 J/kg
 - 3.34×10^5 J/kg
 - None of these
108. The correct formula of rust is
- Fe_2O_3
 - Fe_3O_4
 - $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
 - $\text{Fe}_3\text{O}_4 \cdot x\text{H}_2\text{O}$
109. Which of the following reaction is a redox reaction as well as displacement reaction?
- $2\text{HgCl}_2 + \text{SnCl}_2 \rightarrow \text{Hg}_2\text{Cl}_2 + \text{SnCl}_4$
 - $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
 - $2\text{Al} + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2$
 - $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow 2\text{HCl} + \text{S}$
110. The term 'rancidity' represents
- acid rain
 - oxidation of fatty food
 - rottening of fruit
 - fading of coloured clothes in the Sun
111. $a\text{Mg}_3\text{N}_2 + b\text{H}_2\text{O} \rightarrow c\text{Mg}(\text{OH})_2 + d\text{NH}_3$. When the equation is balanced, the coefficients a , b , c and d respectively, are
- 1, 3, 3, 2
 - 1, 6, 3, 2
 - 1, 2, 3, 2
 - 2, 3, 6, 2

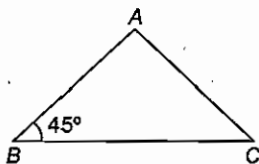
112. In the reaction, $2\text{H}_2\text{S} + \text{SO}_2 \rightarrow 3\text{S} + 2\text{H}_2\text{O}$
- a.* H_2S has been oxidised
b. H_2S has been oxidized
c. H_2S is the oxidising agent
d. SO_2 is the reducing agent
113. Evaporation of liquid occur at
- a.* boiling point
b. fixed temperature lower than the boiling point
c. all temperature
d. None of these
114. An element is determined by the number of
- a.* electrons
b. atoms
c. protons
d. neutrons
115. The basic unit of a vertebrate kidney is the
- a.* ureter
b. nephron
c. malpighian tubule
d. islets of langerhans
116. Which part of human brain is more developed in comparison to others?
- a.* Cerebrum
b. Cerebellum
c. Optic lobes
d. Medulla oblongata
117. Hearing is controlled by
- a.* temporal lobes
b. cerebrum
c. hypothalamus
d. parietal lobe
118. The two kidneys lie
- a.* at the level of ovaries
b. at the same level
c. left kidney at a higher level than the right one
d. right kidney at a higher level than the left one
119. Example of analogy is
- a.* wings of bird and butterfly
b. limbs of horse and man
c. wings of bat and limbs of man
d. None of these
120. Which one of the following crop doesn't required more nitrogen fertilisers?
- a.* Maize
b. Paddy
c. Berseem Clover
d. Sugarcane
121. Autosomes in humans are paired in
- a.* 21 pairs
b. 24 pairs
c. 22 pairs
d. 16 pairs
122. The theory of inheritance of acquired characters was given by
- a.* Lamarck
b. Wallace
c. Mendel
d. Darwin
123. The process of respiration is concerned with
- a.* liberation of oxygen
b. liberation of carbon dioxide
c. liberation of energy
d. intake of oxygen
124. Protozoa in which asexual reproduction takes place by multiple fission is
- a.* entamoeba
b. giardia
c. euglena
d. plasmodium
125. Which of the following is not an endocrine gland?
- a.* Salivary gland
b. Pituitary gland
c. Thyroid gland
d. Adrenal gland
126. If $\frac{P}{Q} = \frac{1}{3}$, then $\frac{27P - 34Q}{36P - 3Q}$ is equal to
- a.* $-\frac{14}{3}$
b. $-\frac{25}{9}$
c. $\frac{15}{4}$
d. None of these
127. If $\left(y + \frac{1}{y}\right) = 12$, then $\left(y^3 + \frac{1}{y^3}\right)$ is equal to
- a.* 1680
b. 1686
c. 1692
d. 1698

128. A train running at the speed of 54 km/h takes 12 s to pass a certain point. Then, the length of the train is
a. 160 m *b.* 170 m *c.* 180 m *d.* 190 m
129. Mohan gets ₹ 5000. He spend 15% on study, 28% on house rent, 10% as his personal expenses. At the end of month, his saving will be
a. ₹ 2350 *b.* ₹ 2400 *c.* ₹ 2500 *d.* ₹ 2600
130. The angles of a triangle are x , y and z and such that $y - x = z - y = 15$, then value of y will be
a. 60° *b.* 70° *c.* 75° *d.* 50°
131. If sum of circumference and radius of a circle is 51 cm, then area of the circle is
a. 150 cm^2 *b.* 154 cm^2
c. 156 cm^2 *d.* 152 cm^2
132. The mean of first eight odd numbers are
a. 6 *b.* 7 *c.* 8 *d.* 8.5
133. Two coins are tossed simultaneously. The probability of getting one head is
a. $\frac{1}{3}$ *b.* $\frac{1}{4}$ *c.* $\frac{1}{2}$ *d.* $\frac{3}{4}$
134. The solution of the equations $2x + 5y = 11$ and $3x + 4y = 13$ are
a. (4, 2) *b.* (3, 1)
c. (5, 2) *d.* (1, 1)
135. If one root of $3x^2 = 8x + (2k + 1)$ is seven times the other, then the value of k is
a. $\frac{5}{3}$ *b.* $-\frac{5}{3}$ *c.* $\frac{2}{3}$ *d.* $-\frac{2}{3}$

136. In figure, $\angle AOC$ and $\angle BOC$ form a linear pair. Then, the value of x is



- a.* 15° *b.* 25° *c.* 40° *d.* 30°
137. $\angle ABC$ is equal to 45° as shown in the adjoining figure. If $\frac{AC}{AB} = \sqrt{2}$, then $\angle BAC$ is equal to



- a.* 95° *b.* 100° *c.* 105° *d.* 110°
138. In a parallelogram ABCD, the bisectors of $\angle A$ and $\angle B$ meet at O. Then, the value of $\angle AOB$ is
a. 55° *b.* 75° *c.* 95° *d.* 90°
139. In a circle with centre O and radius 5 cm, AB is a chord of length 8 cm. If $OM \perp AB$, then what is the length of OM?
a. 3 cm *b.* 4 cm *c.* 5 cm *d.* None of these

140. The length of the longest rod that can be placed in a room 12 m long, 9 m broad and 8 m high is
a. 15 m *b.* 16 m *c.* 17 m *d.* 18 m
141. If $\cot A = \frac{1}{(\sqrt{2} - 1)}$, then the value of $\sin A \cdot \cos A$ is
a. $\frac{1}{4}$ *b.* $\frac{1}{2}$ *c.* $\frac{1}{\sqrt{2}}$ *d.* $\frac{\sqrt{2}}{4}$
142. The string of a kite is 150 m long and it makes an angle of 60° with the horizontal. The height of the kite from the ground is
a. $\frac{75}{\sqrt{3}}$ m *b.* $75\sqrt{3}$ m *c.* $150\sqrt{3}$ m *d.* None of these
143. The perimeter of an equilateral triangle whose area is $4\sqrt{3}$ cm² is
a. 4 cm *b.* 3 cm *c.* 12 cm *d.* 8 cm
144. How many 6 m of edges cubes can be cut from a cuboid measuring $36 \text{ m} \times 15 \text{ m} \times 8 \text{ m}$?
a. 10 *b.* 15 *c.* 18 *d.* 20
145. If $\sin B = \frac{1}{2}$, then $3 \cos B - 4 \cos^3 B$ is equal to
a. 1 *b.* $\frac{3}{4}$ *c.* 0 *d.* $\frac{5}{2}$
146. Which of the following is an components of political party?
a. The leaders *b.* The active members *c.* The followers *d.* All of these
147. Democracies have successfully eliminated
a. conflicts among people
b. economic inequalities among people
c. the idea of political inequality
d. differences of opinion about how marganalised sections are to be treated

148. Match the following

List I	List II
A. Seven Party Alliance	1. India
B. Republican/Democratic	2. England
C. Labour/Conservative	3. USA
D. United Progressive Alliance	4. Nepal

Codes

A B C D

a. 4 3 2 1

A B C D

b. 3 4 2 1

A B C D

c. 1 2 3 4

A B C D

d. 1 2 4 3

149. The non-permanent members of United Nation's Security Council is elected for the term of
a. 5 yr *b.* 2 yr *c.* 3 yr *d.* None of these
150. Which of the following does not lead to the spread of democracy?
a. Struggle by the people *b.* Invasion by foreign countries
c. End of colonialism *d.* Peoples desire for freedom
151. Which can be the maximum interval between the two sessions of parliament?
a. Three months *b.* Four months *c.* Six months *d.* Nine months
152. A money bill passed by Lok Sabha is deemed to have been passed by the Rajya Sabha, also when no action is taken by the upper house within
a. 10 days *b.* 14 days *c.* 20 days *d.* 30 days

153. The judges of the Supreme Court hold office till the age of
a. 62 yr *b.* 65 yr *c.* 68 yr *d.* 60 yr
154. Which one of the following is not a Galilean satellite of Jupiter?
a. Europa *b.* Ganymede *c.* Callisto *d.* Deimos
155. The framers of the Indian Constitution borrowed the idea of judicial review from the Constitution of
a. France *b.* USA *c.* United Kingdom *d.* All of these
156. Which estate of the French society paid all the taxes?
a. The first estate *b.* The second estate *c.* The third estate *d.* None of these
157. When did the Russian Czar Nicholas II resign?
a. On March 2, 1918 *b.* On March 2, 1917 *c.* On April 4, 1919 *d.* On July 8, 1917
158. What is the reason of enclosures in England in 16th century?
a. Rising demand for wool *b.* New demands for grain
c. The rapid rise of population *d.* Greed of the landowners
159. Why did Gandhiji withdraw the Non-Cooperation Movement?
a. Gandhiji felt that the movement was turning violent in many places
b. Gandhiji realised that people were losing interest in the movement
c. Some congress leaders wanted to participate in election to provincial councils
d. Some congress leaders wanted more radical mass agitation

160. Match the following

List I	List II
A. Formation of Arya Samaj	1. 1885
B. Formation of Indian National Congress	2. 1905
C. Division of Bengal	3. 1906
D. Muslim League formed in Dhaka	4. 1875

Codes

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

161. Who among the following developed the first known printing press in the 1430s?
a. James Watt *b.* William Kolff *c.* G Marconi *d.* Johann Gutenberg
162. What is the earliest novel in Marathi and who is the author?
a. Yamuna Paryatan is written by Baba Padmanji
b. Muktamala is written by Lakshman Moreshwar Halbe
c. Dastan written by Naro Sadashiv Risbud
d. None of the above
163. Consider the following statements
 I. The dalits were ignored by the Congress for fear of offending the Sanatanis.
 II. The dalits were ignored by the Congress for fear of socialism.
 III. The dalits were ignored by the Congress because of Dr BR Ambedkar.
 IV. The dalits were ignored by the Congress because they were the most poor section of our society.
 Which of the above statement(s) is/are correct?
a. I, II and III *b.* Only I *c.* I and III *d.* I, III and IV

- 164.** Which of the following acts was passed in 1871?
a. The Forest Act *b.* The Criminal Tribes Act
c. Wasteland Rules *d.* Grazing Tax
- 165.** Rearrange the following into chronological order.
 I. Paris Commune
 II. French Revolution
 III. Unification of German States
 IV. American Civil War
 The proper chronological order should be
a. I, III, IV, II *b.* II, III, I, IV *c.* II, IV, III, I *d.* IV, III, II, I
- 166.** Apart from agricultural activities the people of rural areas engaged in non-farm activities such as
a. dairy *b.* shopkeeping *c.* small manufacturing *d.* All of these
- 167.** Disguised unemployment is an feature of
a. primary sector *b.* secondary sector *c.* tertiary sector *d.* urban economy
- 168.** The accepted average calorie requirement in India per person per day in rural areas is
a. 2100 cal *b.* 2400 cal *c.* No such criteria *d.* \$1 per day
- 169.** The price declared by the government every year before the sowing season to provide incentives to the farmers for raising the production of these crops is known as
a. fair price *b.* market price *c.* minimum support price *d.* subsidy
- 170.** Human development report published by United Nations development programme compares the development level of countries entirely based on their
a. per capita income *b.* educational levels of the people
c. health status *d.* All of these

- 171.** Match the following

List I	List II
A. Primary sector	1. Service sector
B. Secondary sector	2. Control of the Government
C. Tertiary sector	3. Agricultural activities
D. Public sector	4. Industry

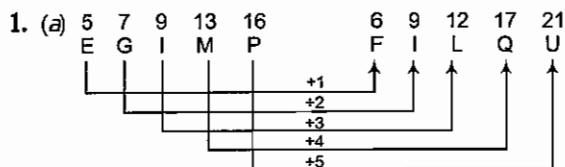
Codes

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| A B C D | A B C D | A B C D | A B C D |
| <i>a.</i> 3 4 1 2 | <i>b.</i> 4 3 1 2 | <i>c.</i> 3 4 2 1 | <i>d.</i> 1 2 3 4 |

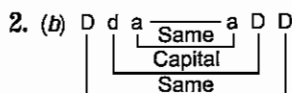
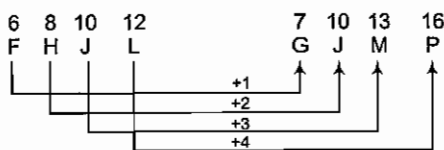
- 172.** Unemployment occurs when people
a. do not want to work
b. are working in a lazy manner
c. are working less than what they are capable of doing
d. are not paid for their work
- 173.** Which of the following statement (s) is/are true about deposits with banks?
a. People deposit the money in bank as money is safe with the banks and it earns an amount as interest
b. People have the provision to withdraw the money as and when they require
c. These deposits are called demand deposits
d. All of the above
- 174.** The most common route for investments by MNCs in countries around the world is
a. set-up new factories *b.* buy existing local companies
c. partnerships with local companies *d.* All of these

- 175.** The World Consumer Day is being observed on
a. 20th December *b.* 15th March *c.* 28th March *d.* 31st December
- 176.** In the Indian union 'India point' got submerged under the sea water in 2004 during the Tsunami is
a. Eastern most point of Indian union *b.* Western most point of Indian union
c. Northern most point of Indian union *d.* Southern most point of Indian union
- 177.** Mount K2 is the highest mountain peak of
a. Nepal *b.* China *c.* India *d.* Sri Lanka
- 178.** Brahmaputra enters into China with the name of
a. Guiyang *b.* Gansu *c.* Tsangpo *d.* None of these
- 179.** Which of the following rivers get flooded causing havoc and also termed Sorrow of Bengal?
a. Ganga *b.* Brahmaputra *c.* Godavari *d.* Damodar
- 180.** The soil which is a mixture of sand, clay and silt is known as
a. loamy soil *b.* sandy soil *c.* clay soil *d.* desert soil

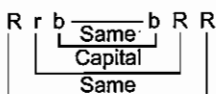
Paper I : Mental Ability Test



Similarly,



Therefore,



3. (c) PALE → LEAP

1 2 3 4 → 3 4 2 1

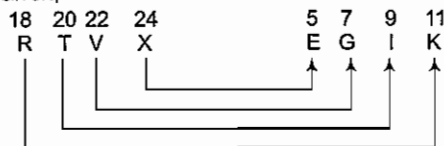
Similarly,

POSH SHOP

1 2 3 4 3 4 2 1

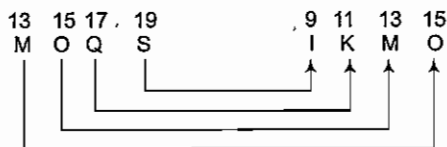
Therefore, POSH → SHOP

4. (c) Given,



Here, $18 + 11 = 29$ $20 + 9 = 29$

Similarly $22 + 7 = 29$ $24 + 5 = 29$



Here, total of letter is equal to the 28.

∴ MOQS → IKMO

5. (a) $26 + 13 = 39$, $11 + 24 = 35$

$25 + 9 = 34$, $7 + 28 = 35$

Total of the number are on the opposite side.

Here, sum of position of letter = 28

6. (c) The numbers follow certain pattern i.e., $x \times 2$

$$1 \times 2 = 2$$

$$2 \times 2 = 4$$

$$4 \times 2 = 8$$

$$8 \times 2 = 16 \text{ and so on}$$

7. (d) The difference between first and second is 9 and between second and third is 13.

8. (c) Clearly, $68 = 4^3 + 4$, $130 = 5^3 + 5$, $350 = 7^3 + 7$

So, the missing number

$$= 6^3 + 6 = 216 + 6 = 222$$

9. (b) Clearly, $42 = 7 \times 6$ and $56 = 7 \times (6 + 2)$

Similarly, $110 = 11 \times 10$

So, required number

$$= 11 \times (10 + 2) = 11 \times 12 = 132$$

10. (c) The larger are is reversed and the dot on it moves half length the smaller are rotates through 90° clockwise and the pin rotates through 90° anti-clockwise.

11. (a) Clearly, diagram (a) shows the correct movement of Raju.

12. (d) Except 288 all other numbers are squares of natural numbers.

13. (d) Except cat all other animals are used for carriage goods.

14. (c) In all other figures, inner figure has less number of sides than the outer figure.

15. (a) Clearly, there is only one 5 which fulfil all the condition.

16. (b) $\boxed{1}2134512352$ $\boxed{1}26145$ $\boxed{1}2412321752$ $\boxed{1}25$

17. (b) The numbers from 11 to 50, which are divisible by 7 are 14, 21, 28, 35, 42, 49. But out of these, 21 and 42 are divisible by 3.

∴ Required numbers are 14, 28, 35 and 49 clearly, there are four such numbers.

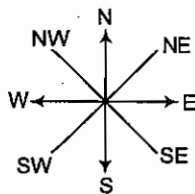
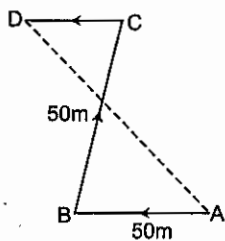
18. (c) According to first condition, the number is greater than 3 but less than 8. Such numbers are 4, 5, 6, 8.

According to the second condition, the number is greater than 6 but less than 10. Such numbers are 7, 8, 9 clearly, the required numbers is the number satisfying both the above conditions i.e., 7.

19. (a) Clearly, figure (a) is the correct mirror image of the given figure.

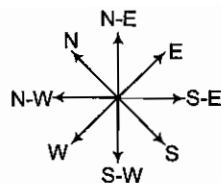
20. (d) Clearly, figure (d) is the correct mirror image of the given figure.

21. (b) Clearly, figure (b) is the correct mirror image of the given figure.
22. (b) Clearly, figure (b) is the correct water image of the given figure.
23. (c) Clearly, figure (c) is the correct water image of the given figure.
24. (a) Clearly, figure (a) is the correct water image of the given figure.
25. (d) S is sitting next to P. So, the order S, P or P, S is followed. K is sitting next to R. So, the order R, K is followed because R is at the extreme left. T is not next to P or K. So, the arrangement will be R, K, P, S, T. Clearly, P and T are sitting adjacent to S.
26. (b) Sequence in the word : POWERFUL
Sequence in English alphabet : EFLOPRUW
Clearly, the position of letter U remains unchanged.
27. (c) Clearly, the problem figure is embedded in answer figure (c).
28. (b) Clearly, the problem figure is embedded in answer figure (b).
29. (c) Brother of mother-uncle, uncle's son-cousin.
30. (d) Mother's grandson-son; son's wife-daughter-in-law.
31. (d) In terms of height, we have
Rohan > Daksh > Manick, Daksh > Somesh > Farhan
The whole sequence may be
(i) Rohan > Daksh > Manick > Somesh > Farhan
(ii) Rohan > Daksh > Somesh > Manick > Farhan
(iii) Rohan > Daksh > Somesh > Farhan > Manick
Thus, either Manick or Farhan may be the shortest. So, the given information is insufficient.
32. (c) Clearly, all the figures are found in answer figure (c).
33. (b) Clearly, all the figures are found in answer figure (b).
34. (c) In the given matrix, second figure becomes the outer figure and the square is placed at the second position followed by second figure at the innermost position.
35. (d) Since, Aditya's house faces towards East and he walks from backside of his house, it means that he starts walking towards West. Thus, the movements of Aditya are shown as (A to B, B to C, C to D).
Clearly, Aditya's final position is D which is to the North-West of starting point.



∴ So disectis North west.

36. (d)

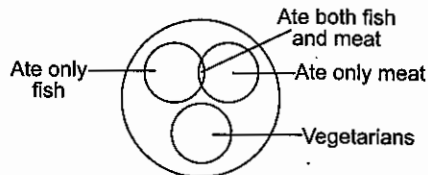


Clearly, the hour hand points towards South-East.

37. (c) In each successive problem figure, the square rotates through 45° in clockwise and black dot and while dot rotates 45° in anti-clockwise direction.

Solutions (Q. Nos. 38-40) Q the doctor is the father of T. S, the housewife is the grandmother of T and hence the mother of Q. Since, there are only two married couples, one being that of Q. The grandfather of R i.e., U must be married to S. Thus, R and T will be the children of Q and these must be the students. So, P who remains is the wife of Q and she alone can be the nurse. U is a contractor.

38. (c) Q is husband of P.
39. (a) Clearly, R and T are children of same parents. So, R will be the sister of T.
40. (b) P is the nurse.
41. (a)



42. (c) The required region is the one which is common to the bigger triangle, circle and rectangle only i.e., G.
43. (a) The required region is the one which lies inside the bigger triangle but outside the smaller triangle and the circle i.e., A and B.
44. (b) The required region is the one which is common to the bigger triangle, circle and rectangle i.e., G and C.
45. (a) The required region is the one which lies inside the bigger triangle only i.e., A.
46. (c) The required region is the one which lies inside the smaller triangle but outside the bigger triangle i.e., F.
47. (c) For finding the code of word DAILY, we know the codes for the letter A, I, L, Y are of q, a, l, z, respectively. But code for D is not known. So, the coding of DAILY will have all the four letters q, a, l, z being the codes for AILY. Now, option (a) is not our answer because a has been repeated twice. Option (b) is not our answer because l cannot be the code for D because l is not available in coding of DESTINY being the code for i. Hence, option (c) is our answer and code for D is also as t, which is also present in the coding of DESTINY.

48. (a) The codes for the letter T, E, A, R and j, w, q, n, respectively. Hence, code for TEAR is nqjw.

49. (d) From the table, the codes of each of the letters of the word REACH are known. Hence, code for REACH is mqwn.
50. (a) From the table, the codes of each of the letters of the word AIRY are known. Hence, code for AIRY is naqz.
51. (c) In the word SUSTAIN, letters S appears twice, hence its code will also have two letters being the code for S. Option (a) is not the correct code because no letter is repeated twice. Option (b) is not the correct code because two letters cannot be repeated twice. Option (d) is also not the correct code as 'a' cannot be the code. Hence, option (c) represents the correct code and code for S is known as x.

52. (a) From the table the codes of each of the letters of the word ENVOY are known. Hence, code for ENVOY is wcbgz.

53. (a) Each letter in the word is moved one step backward to obtain the corresponding letter of the code.

54. (d) Divide the word into three groups of two letters each and write the letters of each group in the reverse order. In the group of letters so obtained, the second, fourth and sixth letters are each moved one step forward to get the code. Thus, we have

ANSWER \Rightarrow NA WS RE \rightarrow NBWTRF

55. (b) Letter D E A F I L

Code 3 5 8 7 4 6

The code for IDEAL is 43586.

56. (d) We have, A = 2, B = 3, ..., Z = 27. Then,

$$\text{FOR} = F + O + R$$

$$= 7 + 16 + 19 = 42$$

$$\text{FRONT} = F + R + O + N + T$$

$$= 7 + 19 + 16 + 15 + 21$$

$$= 78$$

57. (c) Clearly, a 'nib' is fitted in the pen to write with it. But 'nib' is called 'needle'. So, a 'needle' will be fitted in the pen.

58. (b) The first, second, third, fourth, letter of the word are moved one, two, three, four, steps backward respectively to obtain the corresponding letter of the code.

59. (d) In statements (a) and (b), the common code word is 'zci' and common word is 'good'. So, 'zci' stands for 'good'. In statements (a) and (d) the common code word is 'das' and the common word is 'little'. So, 'das' stands for 'little'.

So, in (a) mxy stands for 'frock'.

60. (c) Clearly, statement (c) is not required.

61. (c) By making the interchanges given in (c), we get the equation as $5 - 3 + 2 = 4$ or $4 = 4$ which is true.

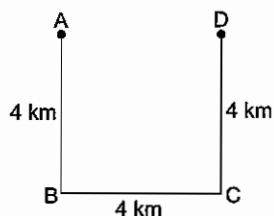
62. (a) Clearly, figure I and II represents the given statements correctly.

63. (c) Clearly, figure II represents the given statements correctly.

64. (d) Clearly, figure I and II represent the given statement.

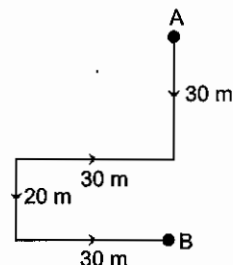
65. (a) Clearly, figure I and II represent the given statement.

66. (d)



From C to reach A (starting point) policeman will have to move in the West direction.

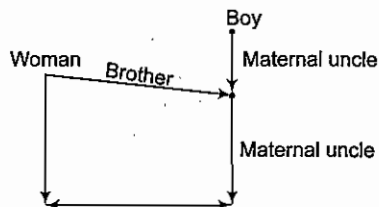
67. (d)



So, point B is the finishing point and is located at a distance of 50 m from point A.

68. (a) Arpana : Megha : Sangeeta : Kalpita : Maridula.
Maridula is at the extreme right of the row.

69. (b)



The boy is the brother of the woman.

70. (d) Since, it is not given that how many boys are before Gaurav, the position of Saurav from the top cannot be determined.

71. (d) From the statement 1, it is clear that all those who travel by all are rich.

72. (b) It is given in the statement that quality is directly proportional to the price. Hence, Conclusion II follows.

73. (d) II and IV are immediate inferences, hence follow from the rule of conversion from Statements 2 and 1, respectively.

74. (c) Series moves with a difference of 1, 2, 4, 8, 16. Hence, the missing number will be 37.

75. (b) There are two alternate series 5, 6, 7, 8 and 7, 9, 11, 13. Hence, the missing number will be 6.

76. (a) Series proceeds with a difference of 4, 4, 12, 12, 36, 36. Hence, the missing number will be 108.

77. (c) Series moves with a difference of squares of odd natural numbers i.e., 1, 9, 25, 49, 81, 121. Hence, the number 166 should be replaced by number 167.

78. (b) Series follows the pattern $4 \times 2 + 1 = 9$, $9 \times 2 + 2 = 20$, $20 \times 2 + 3 = 43$, $43 \times 2 + 4 = 90$ and so on. Hence, the number 19 should be replaced by 20.

79. (c) Series moves from the end following the pattern $5 \times 2 + 4 = 14$, $14 \times 2 + 4 = 32$, $32 \times 2 + 4 = 68$ and so on. Hence, the number 72 should be replaced by 68.

80. (c) Numbers placed along the sides of the triangle are the squares of the digits of the numbers at the centre of the triangle.

$$(4)^2 = 16, (3)^2 = 9$$

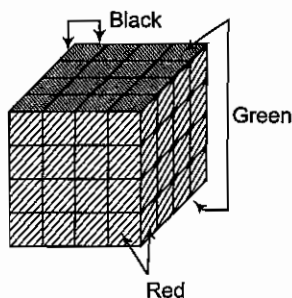
and $(9)^2 = 81$

Therefore, the number at the centre would be $64 = 8$, $100 = 10$, $49 = 7$, 8107.

81. (c) Since, the surface of the big cube are painted with some colours. Therefore, number of smaller cubes with only one surface painted.

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

$$= 2 \times 12 = 24$$



82. (c) Number of smaller cubes with no surface painted
 $= (n - 2)^3 = (2)^3 = 8$

83. (d) Number of smaller cubes with less than three surfaces painted = Number of cubes with two surfaces painted. Number of cubes with are surface painted.
 $= (n - 2) \times 12 + (n - 2)^2 \times 6$
 $= (4 - 2) \times 12 + (4 - 2)^2 \times 6$
 $= 24 + 24 = 48$

84. (c) From the figure (A), it is observed that 6 is opposite to 5, 2 is opposite to 4 and 1 is opposite to 3. Therefore, figure (a), (b) and (d) will not be identical to figure (A) because on these dices opposite pair of numbers can be seen on the adjacent surfaces which is not possible.

Directions (Q. Nos. 85-90)

C = 00, 02, 21, 34

U = 01, 22, 43

L = 03, 20, 31

G = 04, 14

A = 10, 13, 41

R = 11, 12, 44

O = 32, 33, 40

B = 55, 56, 77, 88, 99

I = 56, 67, 86, 97

M = 57, 68, 79, 95

N = 58, 69, 85, 96

E = 59, 75, 78, 89

S = 65, 76, 87, 98

85. (a) 86. (d) 87. (d) 88. (c)
 89. (a) 90. (a)

Paper II : Scholastic Aptitude Test

91. (a) $I = \frac{\text{Charge flowing (q)}}{\text{Time taken (t)}}$
 $\Rightarrow q = It = 0.5 \times 30 \times 60 = 900 \text{C}$

92. (a) Heat, $H = msT$
 $\Rightarrow H = m \times 4200 \times T$
 $H = 20 \times 4200 \times 20 = 168 \times 10^4 \text{ J}$

Electric energy consumed = Power \times Time
 $168 \times 10^4 = 2 \times 10^3 \times t$
 $t = \frac{168 \times 10^4}{2 \times 10^3} = 840 \text{ s} = 14 \text{ min}$

93. (a) 94. (a) 95. (c)

96. (a) 97. (c) 98. (b)

99. (d) 100. (c) 101. (b)

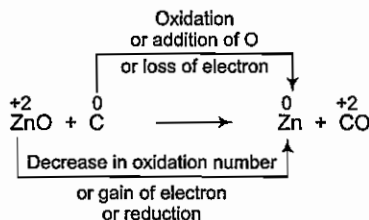
102. (b)

103. (c) When sugar is dissolved in water, its only physical state changes but the chemical composition remains unchanged. So, it is not a chemical reaction.

104. (c) At 100°C , water converts into vapours.

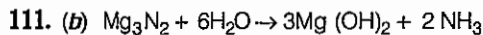
105. (c) 106. (d) 107. (b) 108. (c)

109. (b)



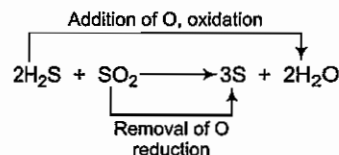
Since, it involves oxidation as well as reduction as its two half reactions, it is a redox reaction. Moreover, carbon displaces oxygen from ZnO, so it is a displacement reaction.

110. (b)



Thus a,b,c and d are respectively 1,6,3 and 2.

112. (a)



Thus, in this reaction H_2S is oxidised and SO_2 is reduced or H_2S behaves as reducing agent and SO_2 as oxidising agent.

113. (a)

114. (c) An element is determined by numbers of protons.

Number of proton = Atomic number of an element

115. (b) Nephron, is the basic and functional unit of a vertebrate kidney. The structure that actually produces urine in the process of removing waste and excess substances from the blood. There are about 1,000,000 nephrons in each human (vertebrate) kidney.

116. (a) The cerebrum, also known as the telencephalon, is the largest and most highly developed part of the human brain. It encompasses about two-thirds of the brain mass and lies over and around most of the structure of the brain.

117. (a) Hearing is controlled by temporal lobes. The temporal lobes play an important role in organising sensory input, auditory perception, language and speech production, as well as memory association and formation.

118. (c) The two kidneys lie to the sides of the upper abdomen (the ribs), behind the intestines, and either side of the spine.

119. (a) Examples of analogy is wings of bird and butterfly. Though they both enable the organism of fly, they are different on the inside. Bird wings have tiny bones in them, while butterfly wings are kept rigid by fluid pressure.

Therefore, they have a similar function but different structures and are analogous.

120. (c) Berseem clover doesn't require more nitrogen fertilizers. Because Berseem clover is an erect-growing, good nitrogen-fixing, annual legume with a long, slightly-hairy leaflets lacking a watermark.

121. (c) Humans have twenty-two autosomes. Autosomes look the same in both females and males. The twenty-third pairs of chromosomes is the sex-chromosomes. This pair is the one that determines the sex of the human.

122. (a) The theory of inheritance of acquired characters was given by Lamarck. In this hypothesis, physiological changes acquired over the life of an organism may be transmitted to offspring.

123. (d) The integrated system of organs involved in the intake and exchange of oxygen and carbon-dioxide between an organism and the environment.

124. (d) Protozoa in which asexual reproduction takes place by multiple fission is *plasmodium*.

125. (a) Salivary gland is not an endocrine gland. Because salivary glands are exocrine glands they secrete into a duct that carries the secretion to the body surface or to one of the body cavities.

126. (b) $\therefore \frac{P}{Q} = \frac{1}{3} \Rightarrow P = \frac{Q}{3}$

$$\begin{aligned}
 \therefore \frac{27P - 34Q}{36P - 3Q} &= \frac{27 \times \frac{Q}{3} - 34Q}{36 \times \frac{Q}{3} - 3Q} \\
 &= \frac{9Q - 34Q}{12Q - 3Q} = \frac{-25Q}{9Q} = \frac{-25}{9}
 \end{aligned}$$

127. (c) $\left(y + \frac{1}{y}\right)^3 = y^3 + \frac{1}{y^3} + 3\left(y + \frac{1}{y}\right)$

$$\Rightarrow \left(y^3 + \frac{1}{y^3}\right) = \left(y + \frac{1}{y}\right)^3 - 3\left(y + \frac{1}{y}\right)$$

$$= (12)^3 - 3(12) = 1728 - 36 = 1692$$

128. (c) Length of train = Distance covered in 12 s

$$\begin{aligned}
 &= \text{Speed} \times \text{Time} \\
 &= 54 \text{ km/h} \times 12 \text{ s} \\
 &= \frac{54 \times 1000}{60 \times 60} \times 12 \\
 &\quad (\because 1 \text{ km} = 1000 \text{ m and } 1 \text{ h} = 60 \times 60 \text{ s}) \\
 &= \frac{54 \times 5 \times 12}{18} = \frac{3240}{18} = 180 \text{ m}
 \end{aligned}$$

129. (a) Mohan's savings

$$\begin{aligned}
 &= 5000 - \left(\frac{15}{100} \times 5000 + \frac{28 \times 5000}{100} + \frac{10 \times 5000}{100} \right) \\
 &= 5000 - (750 + 1400 + 500) \\
 &= 5000 - 2650 = ₹ 2350
 \end{aligned}$$

130. (a) We know that, $x + y + z = 180^\circ$ and $(y - x) = 15^\circ$

$$\begin{aligned}
 \Rightarrow y - [180^\circ - (y + z)] &= 15^\circ \\
 \Rightarrow y - 180^\circ + y + z &= 15^\circ \\
 \Rightarrow 2y + z &= 15^\circ + 180^\circ = 195^\circ \\
 \Rightarrow 2y + z &= 195^\circ \quad \dots(i) \\
 \text{and } -y + z &= 15^\circ \quad \text{(given)} \dots(ii)
 \end{aligned}$$

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

$$y = 60^\circ$$

131. (b) Let the radius of circle be 'r'. According to the question,

$$2\pi r + r = 51$$

$$\Rightarrow r(2\pi + 1) = 51$$

$$\Rightarrow r = \frac{51}{(2\pi + 1)} = \frac{51}{2 \times \frac{22}{7} + 1} \quad \left(\because \pi = \frac{22}{7} \right)$$

$$\Rightarrow r = \frac{51}{\frac{51}{7}} = \frac{51 \times 7}{51} = 7$$

$$\Rightarrow r = 7 \text{ cm}$$

$$\text{So, area of circle} = \pi r^2 = \frac{22}{7} \times (7)^2 \\ = \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$

$$132. (c) \text{ Mean} = \frac{1+3+5+7+9+11+13+15}{8} = \frac{64}{8} = 8$$

$$\therefore \text{Mean} = 8$$

$$133. (c) S = \{HH, HT, TH, TT\}$$

$$\therefore P = \frac{2}{4} = \frac{1}{2}, P = \frac{1}{2}$$

$$134. (b) \text{ Given, } 2x + 5y = 11 \quad \dots(i)$$

$$3x + 4y = 13 \quad \dots(ii)$$

On multiplying Eq. (i) by 3 and Eq. (ii) by 2, we get

$$6x + 15y = 33 \quad \dots(iii)$$

$$6x + 8y = 26 \quad \dots(iv)$$

On subtracting Eq. (iv) from Eq. (iii), we get

$$(6x + 15y) - (6x + 8y) = 33 - 26$$

$$\Rightarrow 6x + 15y - 6x - 8y = 7$$

$$\Rightarrow 7y = 7$$

$$\therefore y = 1$$

On putting $y = 1$ in Eq. (i), we get

$$2x + 5 \times 1 = 11$$

$$\Rightarrow 2x + 5 = 11$$

$$\Rightarrow 2x = 11 - 5 = 6$$

$$\Rightarrow x = \frac{6}{2} = 3$$

$$\therefore x = 3$$

Hence, $x = 3$ and $y = 1$

$$135. (b) \text{ Here, } 3x^2 = 8x + (2k+1)$$

$$\text{or } 3x^2 - 8x - (2k+1) = 0$$

Let first root be α and second be 7α .

$$\therefore \text{Sum of roots} = \alpha + 7\alpha = \frac{8}{3}$$

$$\Rightarrow 8\alpha = \frac{8}{3}$$

$$\Rightarrow \alpha = \frac{1}{3}$$

So, roots of the equation are $\frac{1}{3}$ and $\frac{7}{3}$.

$$\therefore \text{Product of roots} = \frac{1}{3} \times \frac{7}{3} = \frac{7}{9}$$

$$\text{Also, product of roots} = -\frac{(2k+1)}{3}$$

$$\Rightarrow \frac{7}{9} = -\frac{(2k+1)}{3}$$

$$\Rightarrow \frac{7}{3} = -\frac{(2k+1)}{1}$$

$$\Rightarrow -6k - 3 = 7$$

$$\Rightarrow -6k = 7 + 3$$

$$\Rightarrow -6k = 10$$

$$\Rightarrow k = -\frac{10}{6} = -\frac{5}{3}$$

$$\therefore k = -\frac{5}{3}$$

$$136. (d) \text{ Here, } \angle AOC + \angle BOC = 180^\circ$$

$$\Rightarrow 4x + 2x = 180^\circ$$

$$\Rightarrow 6x = 180^\circ$$

$$\Rightarrow x = \frac{180^\circ}{6} = 30^\circ$$

$$\therefore x = 30^\circ$$

$$137. (c) \therefore \frac{AC}{AB} = \sqrt{2} \quad \dots(i)$$

By Sine formula,

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{AC}{\sin B} = \frac{AB}{\sin C}$$

$$\Rightarrow \frac{AC}{AB} = \frac{\sin B}{\sin C}$$

$$\Rightarrow \frac{\sin 45^\circ}{\sin C} = \frac{\sqrt{2}}{1} \quad \left(\because B = 45^\circ \text{ and } \frac{AC}{AB} = \sqrt{2} \right)$$

$$\Rightarrow \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{\sin C} \Rightarrow \sin C = \frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} = \frac{1}{2}$$

$$\Rightarrow \sin C = \frac{1}{2} = \sin 30^\circ \Rightarrow C = 30^\circ$$

$$\therefore \angle BAC = 180^\circ - (\angle B + \angle C) \\ = 180^\circ - (45^\circ + 30^\circ) \\ = 180^\circ - 75^\circ = 105^\circ$$

$$\Rightarrow \angle BAC = 105^\circ$$

$$138. (d) \text{ As, } ABCD \text{ is a parallelogram.}$$

$$\therefore \angle A + \angle B = 180^\circ$$

$$\Rightarrow \frac{1}{2} \angle A + \frac{1}{2} \angle B = 90^\circ$$

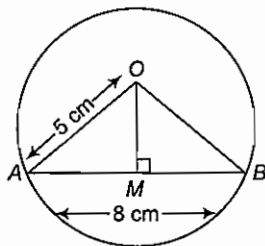
$$\Rightarrow \angle OAB + \angle OBA = 90^\circ$$

$$\therefore \angle AOB = 180^\circ - (\angle OAB + \angle OBA)$$

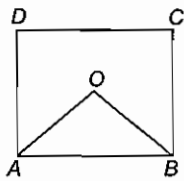
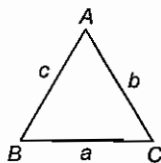
$$\angle AOB = 180^\circ - 90^\circ = 90^\circ$$

$$\therefore \angle AOB = 90^\circ$$

$$139. (a) OA = 5 \text{ cm,}$$



$$AM = \frac{1}{2} AB, AM = \frac{1}{2} \times 8 = 4 \text{ cm}$$



$$OM^2 = OA^2 - AM^2 = 5^2 - 4^2$$

$$OM^2 = 25 - 16 = 9$$

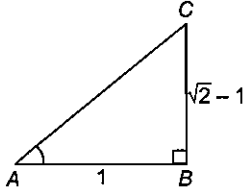
$$\Rightarrow OM = \sqrt{9} = 3$$

$$\Rightarrow OM = 3 \text{ cm}$$

140. (c) The length of longest rod is the

$$\begin{aligned} \text{diagonal of the room} &= \sqrt{l^2 + b^2 + h^2} \\ &= \sqrt{(12)^2 + (9)^2 + (8)^2} \\ &= \sqrt{144 + 81 + 64} \\ &= \sqrt{289} = 17 \text{ m} \end{aligned}$$

141. (d)



$$\therefore \cot A = \frac{1}{\sqrt{2} - 1}$$

$$\therefore \tan A = (\sqrt{2} - 1)$$

$$\therefore AC^2 = AB^2 + BC^2$$

$$AC = \sqrt{AB^2 + BC^2}$$

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

$$AC = \sqrt{1 + 2 + 1 - 2\sqrt{2}}$$

$$= \sqrt{4 - 2\sqrt{2}}$$

$$\therefore \sin A = \frac{BC}{AC} = \frac{\sqrt{2} - 1}{\sqrt{4 - 2\sqrt{2}}}$$

$$\text{and } \cos A = \frac{AB}{AC} = \frac{1}{\sqrt{4 - 2\sqrt{2}}}$$

$$\therefore \sin A \cdot \cos A = \frac{\sqrt{2} - 1}{\sqrt{4 - 2\sqrt{2}}} \times \frac{1}{\sqrt{4 - 2\sqrt{2}}}$$

$$= \frac{(\sqrt{2} - 1)}{(4 - 2\sqrt{2})} = \frac{(\sqrt{2} - 1)}{2\sqrt{2}(\sqrt{2} - 1)}$$

$$= \frac{1}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{4}$$

$$\therefore \sin A \cdot \cos A = \frac{\sqrt{2}}{4}$$

142. (b) Let 'h' be the height of the kite from the ground.

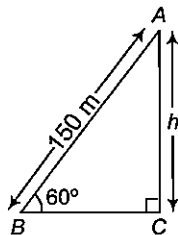
AB be the length of the string = 150 m

$$\therefore \text{In right angled } \triangle ABC, \sin 60^\circ = \frac{AC}{AB}$$

$$\Rightarrow \frac{\sqrt{3}}{2} = \frac{h}{150}$$

$$\Rightarrow h = \frac{150 \times \sqrt{3}}{2} = 75\sqrt{3} \text{ m}$$

$$\Rightarrow h = 75\sqrt{3} \text{ m}$$



$$143. (c) \therefore \text{Area} = \frac{\sqrt{3}}{4} (\text{Side})^2$$

$$\therefore \frac{\sqrt{3}}{4} (\text{Side})^2 = 4\sqrt{3}$$

$$\Rightarrow (\text{Side})^2 = 4 \times 4$$

$$\Rightarrow \text{Side} = 4 \text{ cm}$$

$$\therefore \text{Perimeter} = 3 \times \text{Side}$$

$$= 3 \times 4 = 12 \text{ cm}$$

144. (d) Volume of given cuboid = $36 \times 15 \times 8 \text{ m}^3$

Volume of cube to be cut = $6 \times 6 \times 6 \text{ m}^3$

\therefore Number of cubes that can be cut from the

cuboid = $\frac{\text{Volume of the cuboid}}{\text{Volume of the cube}}$

$$= \frac{36 \times 15 \times 8}{6 \times 6 \times 6} = 20$$

145. (c) $\sin B = \frac{1}{2}$, then $\cos B = \sqrt{1 - \sin^2 B} = \sqrt{1 - \left(\frac{1}{2}\right)^2}$

$$\cos B = \sqrt{1 - \frac{1}{4}} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$$

$$\therefore 3 \cos B - 4 \cos^3 B = 3 \times \frac{\sqrt{3}}{2} - 4 \times \left(\frac{\sqrt{3}}{2}\right)^3$$

$$= \frac{3\sqrt{3}}{2} - 4 \times \frac{3\sqrt{3}}{8}$$

$$= \frac{3\sqrt{3}}{2} - \frac{3\sqrt{3}}{2} = 0$$

146. (d) Political party contest elections and hold power in groups. The leaders active followers and members are essential for the survival of any political party.

147. (c) By providing the universal adult Franchise, the inequality between men and women, rich and poor are eliminated as every citizen has equal right to vote.

148. (a)

149. (b) The 10 non-permanent members of unsecurity council is elected among the general assembly on the rotation basis.

150. (b) Invasion by foreign country led to the creation or establishment of colonial rule i.e., very opposite of democracy.

151. (c) The maximum gap between the two sessions of the Parliament should not be more than six months.

152. (b)

153. (b) The tenure of Supreme Court judges is 5 yr or retire at the age of 65 yr, which ever is earlier.

154. (d) Deimos is a natural satellite of the planet Mars with an average radius of 6.2 km and on escape velocity of 5.6 m. Io, Europa, Ganymede and callisto are the four Galilean satellite of Jupiter.

- 155. (b)** The power of judiciary to declare any law or act of the government as unconstitutional, if it violates the provisions of the Constitution.
- 156. (c)** The members of the first two estates were exempted from paying taxes to the state. All members of the third estate had to pay taxes-a number of direct and indirect taxes, to the state.
- 157. (b)** **158. (a)**
- 159. (a)** In February 1922, Gandhiji decided to withdraw the Non-Cooperation Movement as the movement was turning violent in many places and Satyagrahis needed to be properly trained. After the incident in Chauri Chaura, Gandhiji called a halt to the Non-Cooperation Movement.
- 160. (b)** **161. (d)** **162. (a)**
- 163. (b)** The 'Dalit' class was the 'untouchables' of India. The Congress consisted of mainly the conservative high class Hindus, who were not in favour of Dalit class.

Thus, the Congress had ignored the Dalit class for fear of offending the Sanatanis or the high caste Hindus.

- 164. (b)** **165. (c)** **166. (d)**
- 167. (a)** **168. (b)** **169. (c)**
- 170. (d)** **171. (a)** **172. (c)**
- 173. (d)** **174. (b)** **175. (b)**
- 176. (d)** Southern most tip of India is Kanyakumari. Tsunami is a series of water waves caused by the displacement of a large volume of a body of water.
- 177. (c)** **178. (c)**
- 179. (d)** Damodar river flowing across the Indian States of Jharkhand and Paschim Banga. It originates Palamau district on Chota Nagpur plateau.
- 180. (a)** Loamy soil is ideal for gardening and agricultural uses because it retains nutrients and it is also a mixture of sand, clay and silt.