

Practice Set 2

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

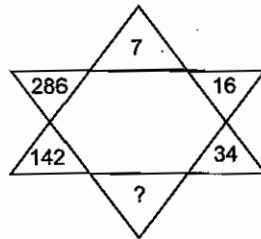
5. Now, turn to the next page and start answering the questions.



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 the missing term from the alternatives.

- MAD : JXA :: RUN : ?
 a. OSQ b. PRJ c. UXQ d. ORK
- NOTE : RSXI :: RISK : ?
 a. VMXP b. VMWO c. VJMP d. VMWP
- TAME : OVHZ :: LUDO : ?
 a. QZIT b. GQAM c. GPYJ d. GOYJ
- LOVE : KMSA :: HATE : ?
 a. GXQA b. DRXD c. ICWI d. GYQA
- Look at the following figure. Find the pattern for writing a number in the small triangles and find the missing number?



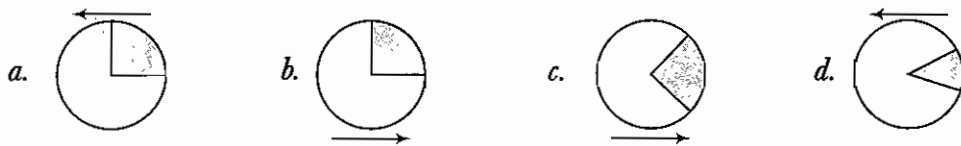
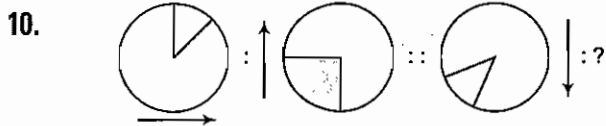
- 38
 - 66
 - 68
 - 70
- Find from the alternatives, the number which will replace the question mark?

1	2	3
11	7	5
120	45	?

- 15
- 16
- 17
- 18

Directions (Q. Nos. 7-10) In the following questions, find out the correct alternative which bears the same relationship given along with it.

- SANJU : SNU : NIVEDITA : NVDT : SNEHAL : ?
 a. SNH b. SEA c. SHA d. SEH
- 42 : 56 :: 110 : ?
 a. 132 b. 136 c. 140 d. 18
- 5 : 100, 4 : 64 :: 4 : 80, 3 : ?
 a. 26 b. 48 c. 60 d. 54

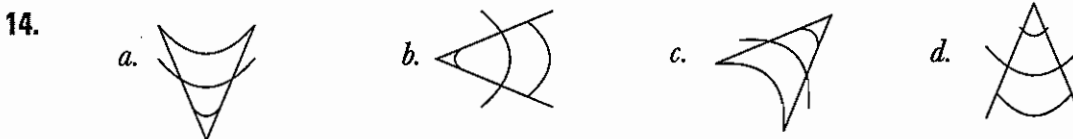
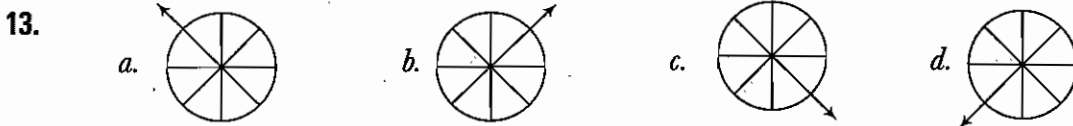


11. A postman was returning to the post-office which was in front of him to the North. When the post-office was 100 m away from him, he turned to the left and moved 50 m to deliver the last letter at the Shanti Villa. He then moved in the same direction for 40 m, turned to his right and moved 100 m.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

a. 40 m b. 150 m c. 90 m d. 100 m

Directions (Q. Nos. 12-14) *In the following questions, find the odd one out from the given alternatives.*

12. a. 3 : 8 b. 6 : 35 c. 7 : 50 d. 9 : 80



15. In the following number series, how many times an odd number is followed by two consecutive even numbers?

4 2 3 2 5 4 2 5 3 2 6 4 3 5 7 2 8 6 7 9 4 5 4 2 9 6 1 3 2

a. 4 b. More than 4 c. 2 d. 3

16. If the following alphabets are arranged in the reverse order, which letter will be 8th letter to the left of 7th letter counting from the right end?

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

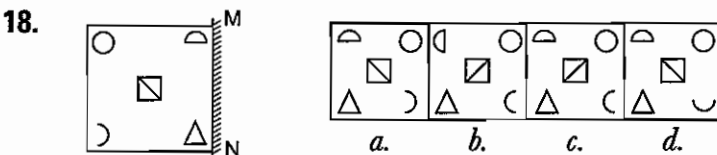
a. P b. O c. N d. Q

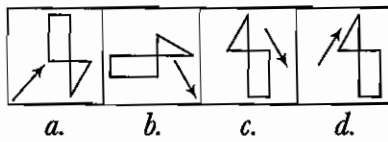
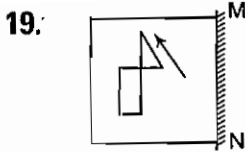
17. How many 6's in the series are preceded by 5 but not followed by 9?

5 6 8 6 7 6 5 6 5 6 8 5 9 6 5 6 9 6 8 6 5 5 6 8 6 5 9 5 6 9 5 6 8

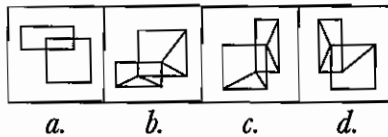
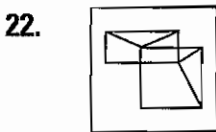
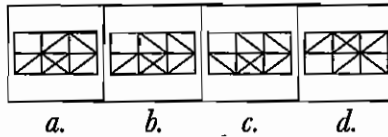
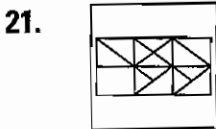
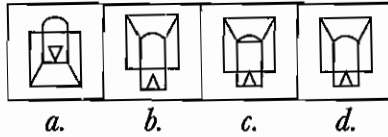
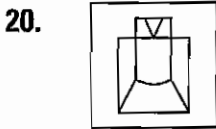
a. 4 b. 6 c. 7 d. 5

Directions (Q. Nos. 18-19) *In the following questions, choose the correct mirror image from amongst the four alternatives a, b, c and given along with it.*





Directions (Q. Nos. 20-22) *In the following questions, choose the correct water image from amongst the four alternatives a, b, c and d given along with it.*



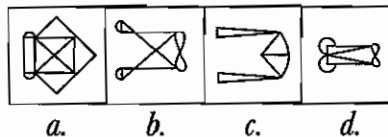
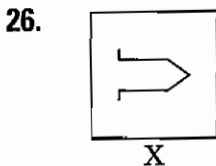
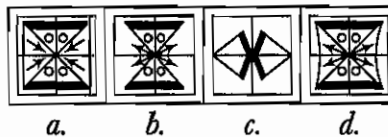
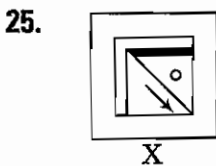
23. Priti scored more than Rahul. Yamuna scored as much as Divya. Lokita scored less than Manju. Rahul scored more than Yamuna. Manju scored less than Divya. Who scored the lowest?

- a. Manju b. Yamuna c. Lokita d. Rahul

24. A walks 10 m towards East and then 10 m to his right. Then, everytime turning to his left, he walks 5, 15 and 15 m, respectively. How far is he now from his starting point?

- a. 5 m b. 10 m c. 15 m d. 20 m

Directions (Q. Nos. 25-26) *In the following questions, trace out the correct alternative in which figure (X) is embedded.*



27. In a row of boys, Rajan is 10th from the right and Suraj is 10th from the left. When Rajan and Suraj interchange their positions. Suraj will be 27th from the left. Which of the following will be Rajan's position from the right?

- a. 10th b. 26th c. 29th d. 27th

28. Poonam said to her friend, 'Yesterday I attended the birthday party of the son of the only son-in-law of my mother's mother.' How is Poonam related to the man, whose birthday party she attended?

- a. Niece b. Daughter c. Sister d. Mother

Directions (Q. Nos. 40–44) A table of words and their codes is given below. Analyse the pattern of transformation of code into words and answer question based on them.

Column I	Column II
1. DESIGN	A. uklbjz
2. INFORM	B. cbxkfy
3. MOTHER	C. ygzwxc
4. RIGHTS	D. bjuogw
5. TAILOR	E. wcpybv
6. GARDEN	F. vzcjlk

40. What is the code for the letter N?
a. u *b.* k *c.* c *d.* g
41. What is the code for the letter F?
a. l *b.* b *c.* f *d.* g
42. What is the code for the letter O?
a. y *b.* k *c.* v *d.* c
43. What is the code for the letter S?
a. z *b.* w *c.* u *d.* x
44. What is the code for the letter G?
a. l *b.* p *c.* b *d.* j
45. If ACNE is coded as 3, 7, 29, 11, then BOIL will be coded as
a. 5, 31, 21, 25 *b.* 5, 31, 19, 25 *c.* 5, 29, 19, 25 *d.* 5, 29, 19, 27
46. If FRIEND is coded as HUMJTK, how is CANDLE written in that code?
a. EDRIRL *b.* DCQHQV *c.* ESJFME *d.* FYOBOC
47. If ROSE is coded as 6821, CHAIR is coded as 73456 and PREAGN is coded as 961473, what will be the code for SEARCH?
a. 246173 *b.* 214673 *c.* 214763 *d.* 216473
48. If CLOTHES is EXHAUST and THRICE is STABLE, then SHIRT is
a. BLUSH *b.* STAUL *c.* THULE *d.* BLASH

Directions (Q. Nos. 49–51) Study the following information carefully and answer the questions given below it.

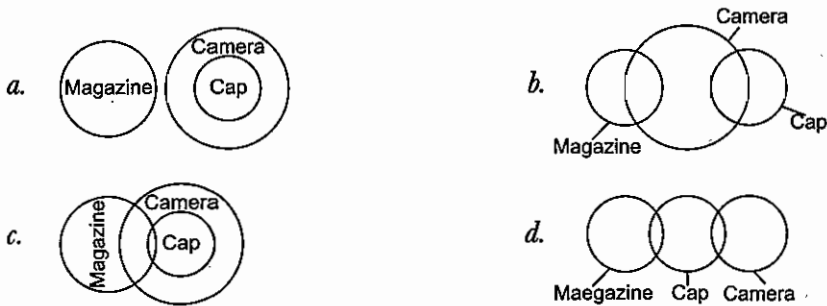
In a certain code 'il be pee' means 'roses are blue', 'sik hee' means 'red flowers' and 'pee nut hee' means 'flowers are vegetables'.

49. How is 'red' written in that code?
a. hee *b.* sik
c. be *d.* Cannot be determined
50. How is 'roses' written in that code?
a. il *b.* pee
c. be *d.* Cannot be determined
51. How is 'vegetables are red flowers' written in that code?
a. sik pee hee be
b. il sik nut hee
c. pee sik nut hee
d. Cannot be determined

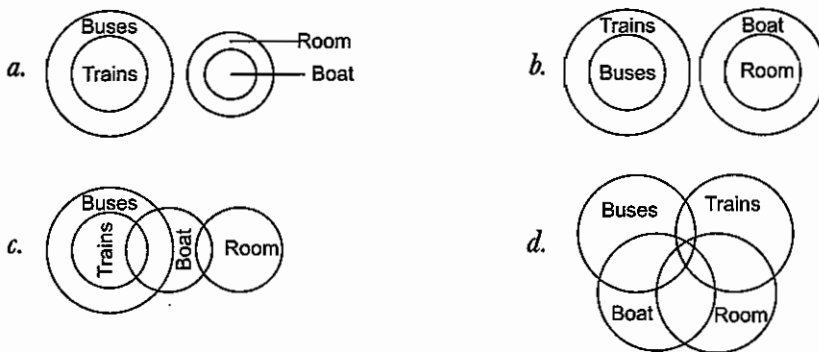
52. In a certain code 'TREAD' is written as '7%#94' and 'PREY' is written as '\$%#8'. How is 'ARTERY' written in that code?
 a. 9#7%#8 b. 9#%7#8 c. 9%7#%8 d. 9%#7%8
53. If O = 16 and FOR = 42, then what is FRONT equal to?
 a. 61 b. 65 c. 73 d. 78
54. If B is coded as 8, F is coded as 6, Q is coded as 4, D is coded as 7, T is coded as 2, M is coded as 3 and K is coded as 5, then what is the coded form of QKTBFM?
 a. 425783 b. 452683 c. 452783 d. 452863
55. If POND is coded as RSTL, how is HEAR written in that code?
 a. GHIJ b. GHIZ c. JIGZ d. JCLZ
56. In a certain code language, 24685 is written as 33776, how is 35791 written in that code?
 a. 44826 b. 44882 c. 46682 d. 44682

Directions (Q. Nos. 57-58) Read the statement given below. Find out the diagram(s) from the given alternatives representing the statement correctly.

57. **Statements** No magazine is cap. All caps are cameras.



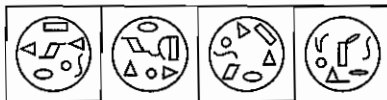
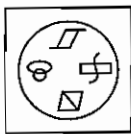
58. **Statements** All trains are buses. No room is bus. All boats are rooms.



Directions (Q. Nos. 59-60) In the following questions, which answer figure all the specified components of the key figure are found?



60.



a.

b.

c.

d.

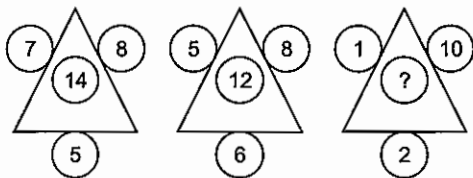
61. Ravi travelled 4 km straight towards South. He turned left and travelled 6 km straight, then turned right and travelled 4 km straight. How far is he from the starting point?
 a. 8 km b. 10 km c. 12 km d. 18 km
62. A watch reads 4 : 30. If the minute hand points East, in which direction will the hour hand point?
 a. South-East b. North-East c. North d. North-West
63. Six persons are sitting in a circle facing the centre. Parikh is between Babita and Narendra. Asha is between Chitra and Pankaj. Chitra is to the immediate left of Babita. Who is to the immediate right of Babita?
 a. Parikh b. Pankaj c. Narendra d. Chitra
64. Jaya's position from the left in a row of students is 12th and Rekha's position from the right is 20th. After interchanging their positions Jaya becomes 22nd from the left. How many students are there in the row?
 a. 30 b. 31 c. 41 d. 34
65. Neelam, who is Rohit's daughter says to Indu, 'Your mother Reeta is the younger sister of my father, who is the third child of Sohan.' How is Sohan related to Indu?
 a. Maternal uncle b. Father c. Grandfather d. Father-in-law
66. Ranu is 48 yr old. Robin is 6 yr junior to Ranu and 14 yr senior to Rohit. Ranu has two children Neetu and Vinu. Youngest sister of Rohit is Krishna and she is 15 yr junior to him. What is the age of Krishna?
 a. 13 yr b. 15 yr c. 14 yr d. 12 yr

Directions (Q. Nos. 67-69) *Take the given statement as true the decide which of the conclusions logically follows from the statement.*

67. **Statements** All dolls are windows. All bottles are windows. All cars are bottles.
Conclusions
 I. All cars are windows.
 II. Some cars are dolls.
 III. Some windows are cars.
 a. I and II follow b. II and III follow c. I and III follow d. All follow
68. **Statements** All fruits are vegetables. All pens are vegetables. All vegetables are rains.
Conclusions
 I. All fruits are rains.
 II. All pens are rains.
 III. Some rains are vegetables.
 a. I and II follow b. II and III follow c. I and III follow d. All follow
69. **Statements** Some saints are balls. All balls are bats. Some tigers are balls.
Conclusions
 I. Some bats are tigers.
 II. Some saints are bats.
 III. All bats are balls.
 a. I and II follow b. Only II follows c. I and III follow d. Only III follows

Directions (Q. Nos. 70-72) *In the following questions, find out the wrong number in the following series?*

70. 864, 420, 200, 96, 40, 16, 6
 a. 420 b. 200 c. 96 d. 40
71. 1, 2, 6, 21, 84, 445, 2676
 a. 2 b. 6 c. 21 d. 84
72. 88, 54, 28, 13, 5, 2, 2
 a. 28 b. 54 c. 13 d. 2
73. Find the missing term in the following series. 2, 9, 28, 65, ?
 a. 121 b. 195 c. 126 d. 103
74. Find out the correct value in place of question mark (?) in the problem figures.

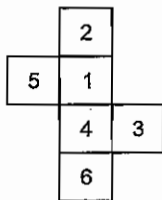


- a. 1 b. 0 c. 2 d. 7
75. If a meaningful word, beginning with H, can be formed using the letters SUHRO, the fourth letter of that word is your answer. If more than one such words can be formed then 'B' is your answer. If no such word is formed, then 'C' is your answer.
 a. B b. C c. U d. R

Directions (Q. Nos. 76-80) *Study the following information carefully and answer the questions that follow.*

A cuboid of dimensions (4 cm × 3 cm × 3 cm). The block is painted yellow on the pair of opposite surface of dimensions (4 cm × 3 cm). Remaining two opposite surfaces of dimensions (4 cm × 3 cm) are painted red and two surfaces of dimensions (3 cm × 3 cm) are painted with green colour. Now, the blocks is divided into smaller cubes of dimensions (1 cm × 1 cm × 1 cm).

76. How many smaller cubes will have one surface painted?
 a. 10 b. 12 c. 14 d. 18
77. How many cubes will have no surface painted?
 a. 1 b. 2 c. 4 d. 8
78. In how many cubes all the three colours appear?
 a. 24 b. 20 c. 16 d. 8
79. How many cubes will have only two surfaces painted?
 a. 32 b. 24 c. 16 d. 12
80. How many cubes will have atleast one surface painted?
 a. 32 b. 24 c. 18 d. None of these
81. Which of the following dices is identical to the unfolded figure as shown here?



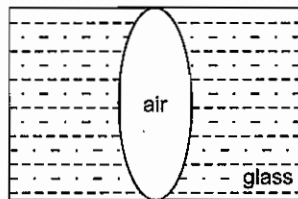
88. AKJO : IOHN :: ? : CLBK
a. LDME *b.* EMGH *c.* GNFM *d.* EMDL
89. BPM : GNJ :: ? : AKD
a. FPO *b.* FPM *c.* HPB *d.* LPH
90. AOE : ? :: GMA : NKM
a. KLM *b.* KLF *c.* KLO *d.* KMN

Paper II : Scholastic Aptitude Test

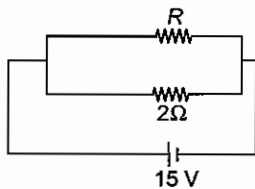
91. A particle starts from rest, accelerates at 2 m/s^2 for 10 s and then goes for constant speed for 30 s and then decelerates at 4 m/s^2 till it stops. What is the distance travelled by it?
a. 750 m *b.* 800 m *c.* 700 m *d.* 850 m
92. Your image in a bathroom mirror results from
a. diffuse reflection *b.* specular reflection
c. specular reflection *d.* diffuse refraction
93. The wavelength the radiation emitted by a body depends upon
a. the nature of the surface *b.* the area of the surface
c. the temperature of the surface *d.* All of these factors
94. **Assertion (A)** Radio waves are bend in a magnetic field.
Reason (R) Radio waves are electromagnetic in nature.

Codes

- a.* A and R are individually true and R is the correct explanation of A
b. A and R are individually true, but R is not the correct explanation of A
c. A is true, but R is false
d. A is false, but R is true
95. In the figure, an air lens is cut in a cylinder of glass of refractive index 1.5. The nature of the lens is



- a.* diverging *b.* converging
c. neither diverging nor converging *d.* None of these
96. If in the circuit, power dissipation is 150 W, then R is



- a.* 2Ω *b.* 6Ω *c.* 5Ω *d.* 4Ω

- 108.** On adding dilute HCl to granulated zinc placed in a test tube, the observation made is
- the reaction mixture turns milky.
 - odour of chlorine is observed.
 - a colourless and odourless gas evolves with bubbles.
 - the surface of the metal turns shining.
- 109.** On adding ethanoic acid to NaHCO_3 , what will happen?
- CO_2 gas is evolved
 - SO_2 gas is evolved
 - NO_2 gas is evolved
 - O_2 gas is evolved
- 110.** Convert the temperature of 50°C to Kelvin scale.
- 323 K
 - 313 K
 - 303 K
 - 333 K
- 111.** Identify the wrong statements.
- Rate of evaporation increase with temperature increase
 - Rate of evaporation increase with surface area increase
 - Rate of evaporation increase with wind speed increase
 - When humidity is high, rate of evaporation is high
- 112.** An element X forms an oxide X_2O_3 . In which group of Mendeleef's periodic table is this element located?
- Group III
 - Group II
 - Group VIII
 - Group V
- 113.** What are isotopes?
- Elements having same atomic masses but different atomic numbers
 - Elements having different atomic masses but same atomic numbers
 - Elements having same atomic numbers but number of protons is different
 - Elements having same atomic numbers as well as atomic masses
- 114.** Calculate the mass of 1 mole of NaCl. (Given atomic mass of Na-23, Cl- 35.5)
- 11.2 gms
 - 11.8 gms
 - 58.5 gms
 - 56 gms
- 115.** Totipotent cell is
- undifferentiated cells capable of development into complete embryo
 - cells that lack the capability of differentiating into an organ or system
 - an undifferentiated cell capable of developing into a system or entire plant
 - an undifferentiated cell capable of developing into an organ
- 116.** What happened when green tomatoes turn red?
- Chromoplasts changed into chloroplasts
 - New chloroplasts are made
 - Chloroplasts are disintegrated and get converted into chromoplasts
 - All of the above
- 117.** In mammals, the part of the brain that has reached highest level of development and that has enabled humans to grow their own crop, invent machines, develop language and art is
- cerebrum
 - cerebellum
 - medulla oblongata
 - None of these
- 118.** Which of the following enzymes secreted by pancreas helps predatory mammals to digest blood they drink from their prey?
- Pepsin
 - Fibrin
 - Trypsin
 - Ptyalin

119. Why do migratory birds go back to their earlier habitat in spring? Because of
a. weather becoming too hot in the regions
b. scarcity of food in the regions to which they have migrated
c. breeding instinct with change in climate and they breed only in their original habitat
d. hunting season commencing in spring
120. What will happen to the body of an adult human being if spleen is removed?
a. RBCs production will be reduced
b. Antibody production will less
c. WBCs production lowered
d. Filtration of dead RBCs will not be possible
121. The silviculture is that branch of Botany under which the following is studied
a. culturing of algae
b. development of the forest
c. silicified plants
d. culturing of the fungi
122. The bacteria which performs the work of nitrogen fixation in the legumeneous plant is
a. *Azotobacter*
b. *Nitrobacter*
c. *Rhizobium*
d. *Pseudomonas*
123. The fishes are assumed to be healthy and more nourishable with comparison to the another animals flesh because in the fish
a. there exists multi-unsaturated acid
b. there exists saturated fatty acid
c. there exists necessary vitamins
d. there exists more carbohydrate and protein
124. Roughage, a necessary constituent of the diet consists largely of indigestible
a. carbohydrate and unsaturated fatty acid
b. carbohydrate such as cellulose and lignin
c. carbohydrate and semi-cooked meat
d. All of these

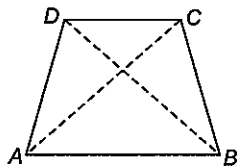
125. **Assertion (A)** Yeast such as *Saccharomyces cerevisiae* are used in baking industry.
Reason (R) Carbon dioxide produced during fermentation causes bread dough to rise by thermal expansion.

Codes

- a.* If A and R are true and R is the correct explanation of A
b. If A and R are true, but R is not the correct explanation of A
c. A is true, but R is false
d. A is false, but R is true
126. AB and CD are two parallel lines. PQ cuts AB and CD at E and F, respectively. EL is the bisector of $\angle FEB$. If $\angle LEB = 35^\circ$, then $\angle CFQ$ will be
a. 110°
b. 85°
c. 70°
d. 95°
127. For what value of k, the following system of equations $3x + 4y = 6$ and $6x + 8y = k$ represent coincident lines?
a. 12
b. 11
c. 13
d. 10
128. The equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, if
a. $a^2 = c^2(1 - m^2)$
b. $c^2 = a^2(1 - m^2)$
c. $a^2 = c^2(1 + m^2)$
d. $c^2 = a^2(1 + m^2)$
129. The internal and external diameters of a hollow hemispherical vessel are 24 cm and 25 cm, respectively. The total area to be painted is
a. $\frac{13211}{7} \text{ cm}^2$
b. $\frac{26961}{14} \text{ cm}^2$
c. $\frac{6961}{14} \text{ cm}^2$
d. $\frac{16951}{14} \text{ cm}^2$

130. If ABCD is a rhombus, then $AB^2 + BC^2 + CD^2 + AD^2$ is equal to
 a. $AD^2 + BC^2$ b. $AO^2 + OC^2$ c. $AC^2 + BD^2$ d. $2(AO^2 + OB^2)$

131. In the figure given below, ABCD is a quadrilateral in which AB is the longest side and CD is the shortest side, then



- a. $\angle C > \angle A$ and $\angle D > \angle B$ b. $\angle C > \angle A$ and $\angle B > \angle D$
 c. $\angle C < \angle A$ and $\angle D < \angle B$ d. $\angle C < \angle A$ and $\angle D = \angle B$
132. In a circle of radius 17 cm, two parallel chords are drawn on opposite side of a diameter. The distance between the chords is 23 cm. If the length of one chord is 16 cm, then the length of the other is
 a. 34 cm b. 15 cm c. 23 cm d. 30 cm
133. If the mean of five observations $x, x + 2, x + 4, x + 6$ and $x + 8$ is 11, then the mean of first three observations is
 a. 9 b. 11 c. 13 d. None of these
134. Arjun bought two buffaloes for ₹ 30000, by selling one at a loss of 15% and other at a gain of 19%, he found the selling price of both buffaloes is the same. The cost price of each buffalo is
 a. ₹ 17500 and ₹ 12500 b. ₹ 17000 and ₹ 13000
 c. ₹ 18000 and ₹ 12000 d. ₹ 16000 and ₹ 14000
135. The length and the breadth of a rectangular park are in the ratio of 8 : 5. A path, 1.5 m wide running all around the out side of the park has an area of 594 m^2 . The dimensions of the park are
 a. 120 m, 75 m b. 110 m, 85 m c. 100 m, 95 m d. None of these
136. In a bag containing 5 red, 4 black and 6 orange balls, a ball is selected at random, what is the probability of getting a non-red ball?
 a. $\frac{1}{3}$ b. $\frac{4}{15}$ c. $\frac{1}{5}$ d. $\frac{2}{3}$
137. For what value of m the points $(-3, -5), (-5, -6)$ and $(m, -4)$ are collinear?
 a. 1 b. 2 c. -1 d. None of these
138. A rise of 25% in the price of grapes compels a person to buy 1.5 kg of grapes less for ₹ 240. Then, the original price of grapes per kg is
 a. ₹ 40 b. ₹ 32 c. ₹ 30 d. ₹ 28
139. The mean proportional between $(2 + \sqrt{3})$ and $(8 - \sqrt{48})$ is
 a. 2 b. 2 : 3 c. 3 d. 3 : 1
140. If $x + \frac{1}{x} = \sqrt{5}$, then the value of $x^3 + \frac{1}{x^3}$ is
 a. $8\sqrt{5}$ b. $2\sqrt{5}$ c. $5\sqrt{5}$ d. $7\sqrt{5}$
141. Consider the following statements.
 I. The product of any three consecutive integers is divisible by 6.
 II. Any integer can be expressed in one of the three forms $3k, 3k + 1, 3k + 2$, where k is an integer.

Which of the above statements is/are correct?

- a.* Only I *b.* Only II *c.* Both I and II *d.* Neither I nor II
- 142.** If $\tan \theta = \frac{x \sin \phi}{1 - x \cos \phi}$ and $\tan \phi = \frac{y \sin \theta}{1 - y \cos \theta}$, then $\frac{x}{y}$ is equal to
a. $\frac{\sin \phi}{\sin \theta}$ *b.* $\frac{\sin \phi}{\cos \theta}$ *c.* $\frac{\sin \theta}{\sin \phi}$ *d.* $\frac{\sin \theta}{1 - \cos \phi}$
- 143.** There is a small Island in the middle of a 100 m wide river. There is tall tree on the Island. Points P and Q are directly opposite to each other on the two banks and in line with the tree. If the angles of elevation of the top of the tree at P and Q are 30° and 45° . Then, the height of tree is
a. $50(\sqrt{3} - 1)$ m *b.* $50\sqrt{3}$ m *c.* $50(\sqrt{3} + 1)$ m *d.* $\frac{100}{\sqrt{3} - 1}$ m
- 144.** A person can run around a circular path of radius 21 m in 44 s. In what time will the same person run a distance of 3 km?
a. 18 min 40 s *b.* 16 min 30 s *c.* 18 min 30 s *d.* 16 min 40 s
- 145.** A lends a sum of money for 10 yr at 5% simple interest, B lends double that amount for 5 yr at the same rate of interest. Which of the following statement is true in this regard?
a. A will get twice the amount of interest that B would get
b. B will get twice the amount of interest that A would get
c. A and B will get the same amount as an interest
d. B will get four times the amount of interest that A would get
- 146.** James Mill, a Scottish economist and political philosopher, divided the Indian history into three periods.
a. Hindu, Muslim and British *b.* Ancient, medieval and modern
c. Hindu, medieval and British *d.* Ancient, medieval and British
- 147.** The subjugation of one country by another leads to political, economic, social and cultural changes refers to as
a. capitalism *b.* imperialism
c. colonialism *d.* socialism
- 148.** Consider the following statements
 I. The practice of surveying became common under the colonial administration.
 II. A country had to be properly known before it could be effectively administered.
 III. By the early 19th century detailed surveys were being carried out to map the entire country.
 IV. The surveys were conducted to know the topography, the soil quality, the flora and the fauna.
 Which of the above statements is/are correct?
a. Only I *b.* II and IV *c.* I, II and III *d.* All of these

- 149.** Match the following

List I	List II
A. Diwani	1. Criminal Court
B. Tiger of Mysore	2. Led Anti British Movement in Kittor
C. Rani Channamma	3. Tipu Sultan
D. Faujdari Adalat	4. Right to collect land revenue

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. 2 1 3 4

150. Match the following

List I	List II
A. A 13 years old child is working in a factory manufacturing carpets	1. Right to equality
B. One state decides to not allow, labour from other states to work in his state	2. Cultural and educational rights
C. Group of people not given permission to open a Punjabi medium school	3. Right to freedom
D. Government decides not to promote an officer of armed forces for being a women	4. Rights against exploitation.

Codes

A B C D

a. 3 4 2 1

A B C D

b. 4 3 2 1

A B C D

c. 1 2 3 4

A B C D

d. 2 1 3 4

151. Our Parliamentary System is based on

a. universal adult franchise

b. male franchise

c. proportional representation

d. None of these

152. Which one of the following is not a feature of the Indian judiciary?

a. It is free and independent

b. It is the final interpreter of the Constitution

c. It is the highest law-making body

d. It is a single integrated system

153. Choose the correct sequence to indicate the following statements as true (T) or false (F)

I. The Mughal Empire became stronger in the 18th century.

II. The English East India Company was the only European company that traded with India.

III. Maharaja Ranjit Singh was the ruler of Punjab.

IV. The British introduce administrative changes in the territories they conquered.

Select the correct answer using the codes given below

a. T, F, T, F

b. T, T, F, F

c. F, F, T, T

d. F, T, T, T

154. Match the following

List I	List II
A. Ryot	1. Cultivation of ryot's land
B. Mahal	2. Cultivation on planter's own land
C. Nij	3. Village
D. Ryoti	4. Peasant

Codes

A B C D

a. 1 2 3 4

A B C D

b. 2 1 3 4

A B C D

c. 4 3 2 1

A B C D

d. 3 4 2 1

155. Match the following

List I	List II
A. Kumaon himalayas	1. Between sutlej and Kali
B. Nepal himalayas	2. Between Teesta and Brahmaputra
C. Punjab himalayas	3. Between Kali and Teesta
D. Asom himalayas	4. Between Indus and Sutlej

Codes

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

- 156.** 'October Heat' is caused due to
a. the absence of rain
b. combination of high temperature and excessive humidity
c. dry hot weather
d. None of the above
- 157.** Which of the following does not have influence the climate in India.
a. Nearness to equator *b.* Presence of Indian ocean
c. Monsoons *d.* Ocean currents
- 158.** Reserved Forests are forests
a. reserved for hunting
b. reserved for commercial exploitation and prohibited for grazing
c. reserved for local use
d. reserved for growing medicinal herbs
- 159.** The Indo-gangetic plains of India are fertile due to
a. the heavy and timech rains and forests
b. alluvial soil brought by the rivers from the mountains
c. hard labour of the farmers over the generation
d. better irrigation facilities
- 160.** The most devastating famine that occurred in India was the
a. Famine of Bengal, 1943 *b.* Famine of Bengal, 1905
c. Famine of Bengal, 1927 *d.* None of these
- 161.** Which of the following organisations procured food grains for the Government of India.
a. Union Agriculture Ministry *b.* Ministry of Social Welfare
c. Food Corporation of India *d.* None of these

162. Match the following

List I	List II
A. Kalahandi and Kashipur	1. Paschim Banga
B. Baran	2. Jharkhand
C. Palamau	3. Rajasthan
D. Chitta gong	4. Odisha

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

163. Match the following

List I	List II
A. Unirrigated land	1. Procurement of food grains by government
B. Low prices for crops	2. Setting of agro-based mills
C. No jobs in the off season	3. Construction of canals by the government
D. Compelled to sell their grains to the local traders	4. Co-operative marketing societies

Codes

A B C D

a. 3 4 2 1

A B C D

b. 4 3 2 1

A B C D

c. 1 2 3 4

A B C D

d. 2 1 3 4

- 164.** The British conquest of Bengal began with the battle of
a. Wandiwash *b.* Plassey *c.* Buxar *d.* None of these
- 165.** Consider the following statements
I. The Lord Dalhousie who was the Governor General from 1848 to 1856, devised a policy known as Doctrine of lapse.
II. The Doctrine declared if an Indian ruler died without a male heir his kingdom would 'lapse' i.e., became a part of company territory.
III. Satara, Sambalpur, Udaipur, Nagpur and Jhansi were annexed under Doctrine of Lapse Policy.
IV. Finally in 1856, the award was also annexed under the Doctrine of Lapse Policy.
Which of the above statements is/are correct in relation to Doctrine of Lapse Policy.
a. I, II and III *b.* II and III *c.* I, III and IV *d.* All of these
- 166.** Consider the following statements
I. Warren Hastings played a significant role in the expansion of company's power.
II. British territories were broadly divided into administrative units called presidencies i.e. Mumbai, Chennai and Bengal.
III. The supreme head of the administration was Governor General.
IV. The Warren Hastings was the first Governor General, who introduced several administrative reforms.
Which of the above statements is/are correct?
a. I, II and IV *b.* III and IV *c.* II, III and IV *d.* All of these
- 167.** Which of the following Fundamental Rights describes by Dr BR Ambedkar as heart and soul of the Indian Constitution?
a. Right to equality *b.* Right of liberty
c. Right to religion. *d.* Right to constitutional remedies
- 168.** The Constituents of Indian Parliament are Lok Sabha, Rajya Sabha and
a. the Prime Minister *b.* the President
c. the Council of Minister *d.* None of these
- 169.** When the President refers a question of law or fact to the Supreme Court for its opinion.
a. The court should do as directed by the President
b. The court may decline to consider the matter
c. The court has to express its opinion
d. The court may report its opinion to the President
- 170.** Consider the following statements about power sharing arrangements in Belgium and Sri Lanka.
I. In Belgium, the Dutch speaking majority people tried to impose their domination on the minority French speaking community.
II. In Sri Lanka, the policies of the government sought to ensure the dominance of Sinhala speaking majority.
III. The Tamils in Sri Lanka demanded a federal arrangement of power sharing to protect their culture, language and equality of opportunity in education and jobs.
Which of the statements given above are correct?
a. II and III *b.* I and III *c.* I and II *d.* All of these

- 171.** Which of the following is matched wrongly
 I. 23 1/2° N Latitude-Tropic of cancer
 III. 23 1/2° S Latitude-Arctic circle
 II. 66 1/2° S Latitude-Tropic of capricorn
 IV. 66 1/2° N Latitude-Antarctic circle

Which of the statements given above is/are correct?

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

- 172.** Which of the following factors affect the origin and movement of currents.
 I. Gravitational force
 III. Salinity and density of water
 II. Atmospheric pressure and Isolation
 IV. Direction and shape of coast

Which of the statements given above are correct?

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

- 173.** Suez Canal links

- a.* Mediterranean Sea and Caribbean Sea *b.* Black Sea and Baltic Sea
c. Red Sea and Mediterranean Sea *d.* Arabian Sea and Red Sea

- 174.** Match the following

List I	List II
A. Emerald isle	1. Tibet
B. Forbidden city	2. Cuba
C. Sugar bowl of the world	3. Australia
D. Land of the golden flecce	4. Ireland

Codes

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

- 175.** By depositing the money of those people, who have surplus funds and lends to those people who are in need of funds, banks acts as

- a.* co-ordinator *b.* helper *c.* intermediater *d.* None of these

- 176.** Consider the following statements.

- I. Unemployment tends to increase economic overload.
 II. The dependence of the unemployed on the working population increases.
 III. The quality of life of an individual as well as of society is adversely affected.
 IV. It leads to general decline in health status and rising withdrawal from the social system.

Which of the above statements is/are correct about the effects of unenployment?

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

- 177.** The World's AIDS Day is celebrated on

- a.* December 1st *b.* January 1st *c.* November 11th *d.* August 7th

- 178.** The year 2012 was celebrated in India as national year of which of the following.

- a.* AIDS *b.* Leprosay *c.* Polio *d.* Mathematics

- 179.** The headquarters of international labour organisation is situated at

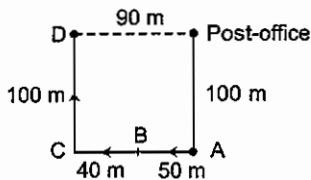
- a.* Geneva *b.* Berne *c.* Austria *d.* Rome

- 180.** Which of the following persons was the first recipient of the Rajiv Gandhi Khel Ratna Award and the first sports person to receive the Padma Vibhushan.

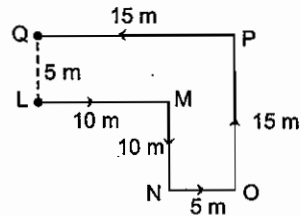
- a.* Sachin Tendulkar *b.* Viswanathan Anand
c. Sushil Kumar *d.* Sunil Gavaskar

Paper I : Mental Ability Test

1. (d) As, $\begin{matrix} M & A & D \\ -3 \downarrow & -3 \downarrow & -3 \downarrow \\ J & X & A \end{matrix}$ Similarly, $\begin{matrix} R & U & N \\ -3 \downarrow & -3 \downarrow & -3 \downarrow \\ O & R & K \end{matrix}$
2. (b) As, $\begin{matrix} N & O & T & E \\ +4 \downarrow & +4 \downarrow & +4 \downarrow & +4 \downarrow \\ R & S & X & I \end{matrix}$ Similarly, $\begin{matrix} R & I & S & K \\ +4 \downarrow & +4 \downarrow & +4 \downarrow & +4 \downarrow \\ V & M & W & O \end{matrix}$
3. (c) As, $\begin{matrix} T & A & M & E \\ -5 \downarrow & -5 \downarrow & -5 \downarrow & -5 \downarrow \\ O & V & H & Z \end{matrix}$ Similarly, $\begin{matrix} L & U & D & O \\ -5 \downarrow & -5 \downarrow & -5 \downarrow & -5 \downarrow \\ G & P & Y & J \end{matrix}$
4. (d) As, $\begin{matrix} L & O & V & E \\ -1 \downarrow & -2 \downarrow & -3 \downarrow & -4 \downarrow \\ K & M & S & A \end{matrix}$ Similarly, $\begin{matrix} H & A & T & E \\ -1 \downarrow & -2 \downarrow & -3 \downarrow & -4 \downarrow \\ G & Y & Q & A \end{matrix}$
5. (d) $7 \times 2 + 2 = 16$, $16 \times 2 + 2 = 34$, $34 \times 2 + 2 = \boxed{70}$
 $70 \times 2 + 2 = 142$, $142 \times 2 + 2 = 286$
6. (b) Number in 3rd row = (Number of 2nd row)² - (Number of 1st row)²
 Hence, the missing number is 16.
7. (b) Every alternative letter is selected, so from the word SNEHAL = SEA.
8. (a) $42 = (7)^2 - 7$, $56 = (8)^2 - 8$
 Similarly, $110 = (11)^2 - 11$ and $(12)^2 - 12 = 132$
9. (b) $5 \times 20 = 100$, $4 \times 16 = 64$
 Similarly, $4 \times 20 = 80$ and $3 \times 16 = 48$
10. (c) From problem figure (1) to (2), arrow rotates 90° anti-clockwise and moves one side clockwise. The shaded portion rotates 135° and is doubled i.e., 1/8th shaded portion becomes 1/4th. Hence, answer figure (c) will replace '?'.
11. (c) Required distance is $PD = (40 + 50) = 90$ m

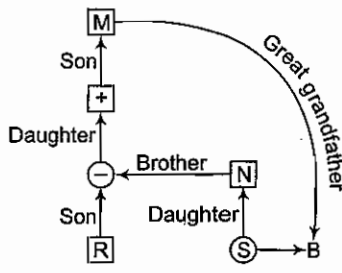


14. (b) In all other figures, except figure (b), all the curved lines have curves in the same direction. In figure (b), the upper line has curve in opposite direction and hence does not belong to this group and is the required answer.
15. (a) Clearly, there are 4 such numbers.
 $4232 \boxed{542} 5 \boxed{326} 435 \boxed{728} 6794 \boxed{542} 96132$
16. (b) If the alphabets are arranged in reverse order, then 7th letter from the right will be G and 8th to the left of G will be O.
17. (d) There are five 6's which are preceded by 5 but not followed by 9.
18. (c) Figure (c) is the correct mirror image of the given figure.
19. (d) Figure (d) is the correct mirror image of the given figure.
20. (d) Figure (d) is the correct water image of the given figure.
21. (b) Figure (b) is the correct water image of the given figure.
22. (b) Figure (b) is the correct water image of the given figure.
23. (c) As per the information given, the final ranking of the marks in the descending order is
 Priti > Rahul > Yamuna/Divya > Manju > Lokita
 from which, we find that Lokita scored the lowest marks.
24. (a) Q is the finishing point and is 5 m away from the point 'L'.

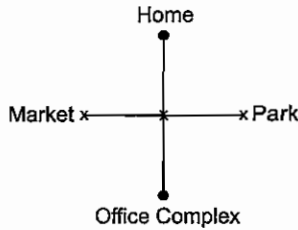


25. (a) Problem figure is embedded in the answer figure (a).
26. (a) Problem figure is embedded in the answer figure (a).
27. (d) Initially, Rajan is tenth from the right and his position is occupied by the Suraj after interchange takes place and this position becomes twenty-seventh from the left.
 Therefore, total number of students = $10 + 27 - 1 = 36$
 and Rajan's position from the right = Total number of students - His position from the left + 1.
 Therefore, Rajan's position from the right = $36 - 10 + 1 = 27$ th
28. (c) Only son-in-law of mother of Poonam's mother is the father of Poonam and his son is the brother of Poonam. Therefore, Poonam attended the birthday party of her brother.

29. (d) From the information given in the question, 'M' is the great grandfather of 'B'. Hence, none option is the definite answer.

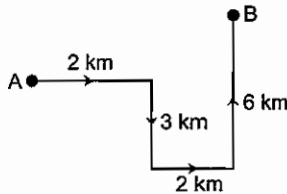


30. (b)



∴ Market is in the West direction to the crossing.

31. (c) Final position of B is at a distance of 6 km to the North from her last turn.



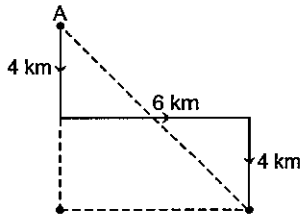
Solutions (Q. Nos. 32-35) The information given can be presented in the table as given below.

Name	Gulab Jamun	Burfi	Laddu	Peda
Shalu	✓	✓	×	×
Charu	×	×	✓	×
Lata	✓	✓	×	✓
Tom	✓	×	×	✓
Sandy	✓	✓	×	×

32. (d) Tom took a peda and gulab jamun.
 33. (d) Lata took gulab jamun, burfi and peda.
 34. (c) Shalu and Sandy took gulab jamun and burfi.
 35. (d) In total 10 sweets were taken.
 36. (d) The region 5 is common to triangle, circle and rectangle and hence represents doctors who are players as well as artists.
 37. (a) The region 6 is common to circle and rectangle only.
 38. (a) The region 1 is not common to any other figure.
 39. (d) The regions 7 and 8 are not common to any other figure.

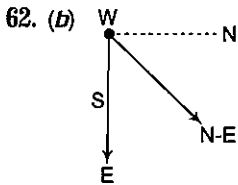
40. (b) In Statements (1) and (2), common letters are I and N and common codes are b and k. Therefore, it is clear that IN stand for bk but not respectively. From Statement (6), it is clear that code for N is K.
 41. (c) In the Statement (2), it is clear that the word has letter F in it, which is not contained by any other word. Similarly, its code has letter of which is not contained by any other code. Hence, F stands for f.
 42. (a) From Statements (3) and (4), it is clear that TOR = ywc. From Statement (2), OR = yc. From Statement (6), R = c. Hence, O = y.
 43. (c) From Statements (1) and (4), it is clear that STG = ubj. From question (41), we have already find that I = b. Therefore, SG = uj. Now, from Statement (6), G = j, therefore S = u.
 44. (d) Same as in question number 43.
 45. (b) $(2n + 1)$ is the coding pattern used, where n = Position of alphabets in alphabetical order.
 46. (a) Letters of the word are coded with a gap of 1, 2, 3, 4, 5 and 6 letters respectively as their positions in the alphabetical order.
 47. (b) From the coding pattern, it is clear that codes for S, E, A, R, C and H are 2, 1, 4, 6, 7 and 3 respectively as letters of the word are directly substituted.
 48. (d) Using the above coding procedure as in the previous question, we find that the codes for letter R and I will be B and L and thus coding for SHIRT will be BLASH.
 49. (b) From the second and third sentences, it is clear that 'hee' stands for 'flowers'. Hence, from second sentence 'red' stands for 'sik'.
 50. (d) Code for 'roses' cannot be determined because anyone of the words roses or blue is not common in any pair of the sentences.
 51. (c) We know that, 'red' stands for 'sik'. If we add this word and its code in the third sentence, then we get that 'vegetables are red flowers' means 'pee sik nut hee'.
 52. (c) Codes $A \rightarrow 9$, $R \rightarrow \%$, $T \rightarrow 7$, $E \rightarrow \#$ and $Y \rightarrow S$.
 So, ARTERY would be coded as $9\%7\#\%8$.
 53. (d) We have, $A = 2, B = 3, \dots, Z = 27$, then
 $FOR = F + O + R = 7 + 16 + 19 = 42$
 $FRONT = F + R + O + N + T$
 $= 7 + 19 + 16 + 15 + 21 = 78$
 54. (d) The code for QKTBFM is 452863.
 55. (c) The first, second, third and fourth letters of the word are moved two, four, six and eight letters forward respectively to obtain the code.
 56. (b) Clearly, in the code, the numbers at odd places are one more and those at even places are one less than the corresponding numbers in the given numeral. So, in 35791, 3 is written as 4, 5 as 4, 7 and 8, 9 as 8 and 1 as 2 i.e., 44882.

57. (a) Clearly, figure (a) represents the statement correctly.
 58. (a) Clearly, figure (a) represents the statement correctly.
 59. (b) Clearly, the specified components are found in figure (b).
 60. (a) Clearly, the specified components are found in figure (a).
 61. (b) B is the finishing point and is 10 km from the point A. The shortest distance from A to B is 10 km, calculated as below.



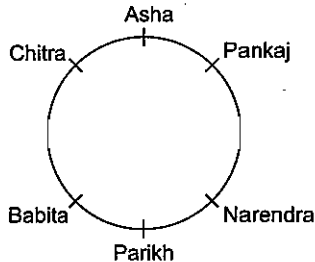
$$\begin{aligned}(AB)^2 &= (AD)^2 + (DB)^2 \\ &= (8)^2 + (6)^2 \\ &= (64) + (36) = 100\end{aligned}$$

$$\therefore AB = 10 \text{ km}$$



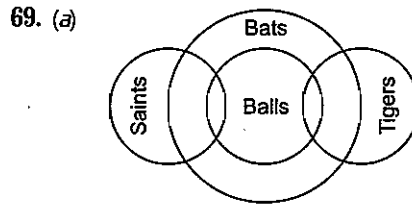
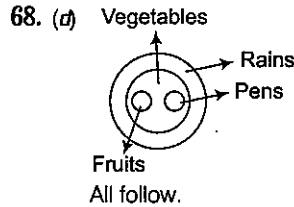
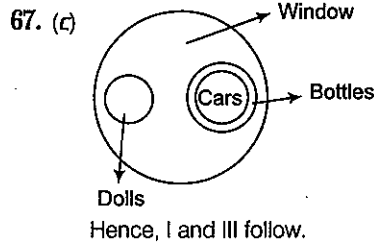
When the minute hand points in East, hour hand points in North-East direction.

63. (a) On the basis of given information, we get the following diagram.

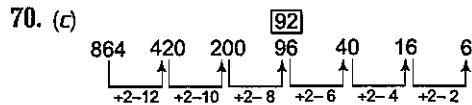


64. (c) Position of Rekha is 20th from the right which is occupied by Jaya after interchanging takes place and becomes 22nd from the left. Therefore, total number of students in the row are = $(22 + 20) - 1 = 41$.
 65. (c) From the information given in the question, it is concluded that Sohan is the father of Rohit and brother of Reeta, who is the mother of Indu. Therefore, Sohan is the grandfather of Indu.

66. (a) Ranu's age = 48 yr
 \therefore Robin's age = $48 - 6 = 42$ yr
 Rohit's age = $42 - 14 = 28$ yr
 and Krishna's age = $28 - 15 = 13$ yr



Hence, I and II follow.

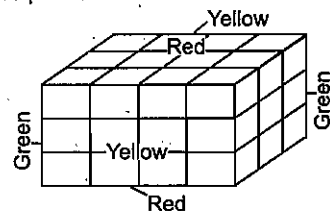


Therefore, number 96 should be replaced by 92.

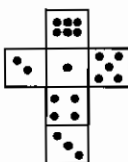
71. (d) Series follows the pattern $1 \times 1 + 1 = 2$,
 $2 \times 2 + 2 = 6$, $6 \times 3 + 3 = 21$, $21 \times 4 + 4 = 88$
 $88 \times 5 + 5 = 445$, $445 \times 6 + 6 = 2676$
 Therefore, number 84 should be replaced by 88.
 72. (b) Series moves from the right end with a difference of 0, 3, 8, 15, 24, 35 i.e., with difference of numbers, which are one less than the square of successive natural numbers. Therefore, number 54 should be replaced by 53.
 73. (c) Method used to form the series is
 $(1)^3 + 1, (2)^3 + 1, (3)^3 + 1, (4)^3 + 1, \dots$
 Therefore, the missing number is $(5)^3 + 1 = 126$.
 74. (d) Clearly, the number that would come in place of '?' is 7.

$$\frac{10 + 2}{2} + 1 = 7$$

75. (d) The word formed is HOURS. Clearly, the fourth letter is R.
 76. (a) Two cubes from four surfaces and one cube each from two surfaces i.e., a total of 10 cubes will have only one surface painted.



77. (b) Only two cubes from inside the block will have no colour on any of their surfaces.
78. (d) Eight cubes present on the corners will have all the three colours.
79. (c) Two cubes each on four edges and one cube each on eight edges will have only two surface painted i.e., total number of 16 such cubes will be obtained.
80. (d) Number of atleast one surface painted cubes = Number of three surfaces painted cubes + Number of two surfaces painted cubes + Number of one surface painted cubes = $8 + 16 + 10 = 34$.
81. (a) From the unfolded figure of dice, we find that number opposite to 2 is 4, for 5 it is 3 and for 1 it is 6. From this result, we can definitely say that figures (b), (c) and (d) cannot be the answer figure as number lying on the opposite pair of surfaces are present on the adjacent surfaces.
82. (d) The positions of numbers on the faces of dice can be shown as given in the figure. From this figure, we see that number 6



will appear on the opposite surfaces of the surface occupied by number 4.

83. (b) It is clear as by opposite symbols
 $\times \rightarrow \Delta$
 $= \rightarrow \square$
 So, '=' will come opposite to ' \square '.
84. (a) As, GHF is related to CDB. Similarly, EFD is related to ABJ.
85. (c) As, AKJ is related to GNH. Similarly, EMD is related to AKB.
86. (a) As, HNP is related to PDA. Similarly, DLP is related to PJG.
87. (b) As, AFHO is related to GBDM. Similarly, CHFM is related to GBJO.
88. (d) As, AKJO is related to IOHN. Similarly, CLBK is related to EMDL.
89. (a) As, BPM is related to GNJ. Similarly, FPO is related to AKD.
90. (d) As, AOE is related to KMN. Similarly, GMA is related to NKM.

Paper II : Scholastic Aptitude Test

91. (a) $A = S_1 + S_2 + S_3$
 $= \frac{1}{2} \times 2 \times (10)^2 + 2 \times 10 \times 30 + \frac{1}{2} \times 4 \times (5)^2$
 $= 100 + 600 + 50 = 750 \text{ m}$
92. (b) Light that reflects off a flat reflective surface is called specular reflection.
93. (c) Temperature and emissivity of the body.
94. (d) Radio wave are affected when passing by matter are slowed down, absorbed, distorted into other frequencies.
95. (a) A lense such that a parallel beam of light passing through it to diverge or spread out.
96. (b) $P = \frac{V^2}{I}$
 $\Rightarrow 150 = \frac{(15)^2}{\frac{2R}{2+R}} \Rightarrow 10 = \frac{15}{\frac{2R}{2+R}}$
 $\Rightarrow \frac{2}{3} = \frac{2+R}{2R} \Rightarrow R = 6 \Omega$
97. (b) Resistance of a wire is directly proportional to the length of the wire.
 So, the length increases n -fold also, since the volume of wire remains constant, so the area of the wire decreases n -fold. Thus the resistance increases to $n^2 R$.
98. (b) $F = qvB \sin \theta$
 $= 1.6 \times 10^{-19} \times 2 \times 10^7 \times 15 \times \sin 30^\circ = 2.4 \times 10^{-12} \text{ N}$
99. (a) A dip needle pivoted to rotate in the vertical plane of the magnetic meridian with its rotation axis through its centre of gravity.
100. (a) A magnetic domain is a region within a magnetic material which has uniform magnetisation.
101. (a) $\frac{1}{-30} + \frac{1}{-30} = \frac{1}{f} \Rightarrow f = -15 \text{ cm}$
102. (a) Sky appears blue due to scattering. Due to absence of atmosphere no scattering will occur.
103. (c) The general formula of plaster of Paris is $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$.
 It is obtained on heating gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$).
104. (a) Distilled water cannot conduct electricity because conductivity is proportional to the number of ions and distilled water do not have ions, so it does not conduct electricity.
105. (a) Ionic compounds are crystalline solids and not the amorphous ones.
106. (d) The formula for the carboxylic acid functional group is

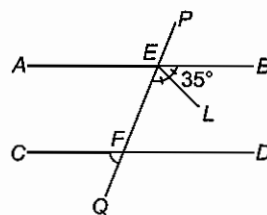
$$\begin{array}{c} \text{O} \\ || \\ \text{—C—OH} \end{array}$$

107. (c) Newland compared the properties of elements with music notations and proposed the law of octaves.
108. (c) A colourless and odourless gas evolves with bubbles. This gas is hydrogen.
109. (a) CO_2 gas is evolved, it turns lime water milky.
110. (a) Temperature on kelvin scale = $(\text{Temp})^\circ\text{C} + 273$
 $= 50^\circ\text{C} + 273 = 323\text{ K}$
111. (d) When humidity is high, the rate of evaporation decreases and not increases.
112. (a) Group III Valency of X and O are interchanged while writing the formula so, valency of X is 3. Hence, it belongs to 3rd group.
113. (b) Elements having same atomic numbers but different atomic masses are called isotopes.
114. (c) Mass of 1 mole of NaCl = Mass of Na + Mass of Cl
 $= 23 + 35.5 = 58.5\text{ gms}$
115. (c) Totipotency is the ability of a single cells to divide and produce all the differentiated cells in an organism including extra embryonic tissues. Examples of tetipotent cells are spores and zygotes.
116. (c) Chromoplasts are formed either from chloroplast or from leucoplast for e.g., green tomatoes and chillies turn red on ripening due to the formation of the red pigment called lycopin replacing the chlorophyll.
117. (a) Cerebrum is the most highly developed part of human brain and is responsible for thinking, perceiving, producing and understanding language. Lycopene is an important intermediate in the biosynthesis of many carotenoids, including beta carotene, responsible for yellow, orange and red pigmentation.
118. (c) Trypsin is produced in the pancreas.
 The mosquito produces two proteins that are necessary to the digestion of their blood meals, namely trypsin. The first is what scientists decided to call 'early trypsin' and the later was named 'late trypsin'.
119. (c) Migratory birds go back to their earlier habitat in spring because of breeding instinct with change in climate and they breed only in their original habitat.
120. (d) The spleen helps your body fight germs and infections. It also helps filter our blood. So, if spleen is removed then filtration of dead RBCs will not be possible.
121. (b) Silviculture is the practice of controlling the establishments growth, composition, health and quality of forests vegetation for the full range of forest resources objectives.
122. (c) Rhizobia are soil bacteria that fix nitrogen after becoming established inside root nodules of legumes. Rhizobia require a plant host, they cannot independently fix nitrogen.
123. (a) Fish contain unsaturated fatty acids, which, when substituted for saturated fatty acids such as those in meat may lower your cholesterol.

124. (b) Roughages are high in fibrous carbohydrates such as hemicellulose and cellulose. Fibrous carbohydrates are primarily present in the cell wall of the plant cell. As fibrous carbohydrates are associated with the structural components of plants, fibrous carbohydrates are often referred to as structural carbohydrates. Roughages may also contain relatively high amounts of lignin. Lignin content increases with plant maturity.

125. (a) Selected strains of *Saccharomyces* (yeast) are used as baker's yeast. It is added to flour during kneading. Yeast secretes enzymes like an amylase (changes same starch to maltose), maltase (maltose to glucose) and zymase (glucose to ethyl alcohol and CO_2), leavened dough is baked and both alcohol and CO_2 evaporate. The bread becomes soft and porous.

126. (a) $\angle\text{LEB} = 35^\circ$



$$\begin{aligned} \angle\text{FEB} &= 2 \times \angle\text{LEB} = 70^\circ \\ \angle\text{AEB} &= \angle\text{AEF} + \angle\text{BEF} = 180^\circ \\ \Rightarrow \angle\text{AEF} &= 180^\circ - 70^\circ = 110^\circ \\ \angle\text{CFQ} &= \angle\text{AEQ} = 110^\circ \quad (\text{alternate angles}) \end{aligned}$$

127. (a) Given system of linear equations are

$$3x + 4y = 6$$

and $6x + 8y = k$

On comparing with $ax + by + c = 0$, we get

$$a_1 = 3, b_1 = 4, c_1 = -6$$

$$a_2 = 6, b_2 = 8, c_2 = -k$$

Since, the system of linear equations represents coincident lines.

$$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \Rightarrow \frac{3}{6} = \frac{4}{8} = \frac{-6}{-k} \Rightarrow \frac{1}{2} = \frac{6}{k}$$

$$\therefore k = 12$$

128. (d) Roots will be equal roots, if $D = 0$

$$b^2 - 4ac = 0$$

$$(2mc)^2 - 4(1 + m^2)(c^2 - a^2) = 0$$

$$4m^2c^2 - 4[c^2 + m^2c^2 - m^2a^2 - a^2] = 0$$

$$\text{As } 4 \neq 0 \Rightarrow c^2 - m^2a^2 - a^2 = 0 \Rightarrow c^2 = a^2(1 + m^2)$$

129. (b) Internal radius (r) = 12 cm, external radius (R) = $\frac{25}{2}$ cm

\therefore Area to be painted = Internal area + External area + Area of edge

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

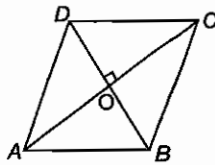
$$= 2 \times \frac{22}{7} \times 12 \times 12 + 2 \times \frac{22}{7} \times \frac{25}{2} \times \frac{25}{2}$$

$$+ \frac{22}{7} \left(\frac{25}{2} \times \frac{25}{2} - 12 \times 12 \right)$$

$$= \frac{6336}{7} + \frac{6875}{7} + \frac{539}{14} = \frac{26422}{14} + \frac{539}{14}$$

$$= \frac{26961}{14} \text{ cm}^2$$

130. (c) As diagonals of a rhombus bisect each other at right angles.



$$AO = OC \text{ and } BO = OD$$

Applying Pythagoras as theorem to $\triangle AOB$, $\triangle AOD$, $\triangle DOC$, $\triangle BOC$ and then adding

$$AB^2 + BC^2 + CD^2 + AD^2$$

$$= 2 [AO^2 + OC^2 + BO^2 + DO^2]$$

$$= 2 [2AO^2 + 2BO^2]$$

$$= 4 [AO^2 + BO^2] \left(\because AO = \frac{AC}{2} \text{ and } BO = \frac{BD}{2} \right)$$

$$= AC^2 + BD^2$$

131. (a) Clearly, $\square ABCD$ is a trapezium, we know that in a trapezium, angles made before smaller parallel side are smaller than the angles made before larger parallel side are larger.

$$\therefore \angle C > \angle A \text{ and } \angle D > \angle B$$

132. (d) Here, $BE = \frac{1}{2} AB = 8 \text{ cm}$

$$OB = OD = 17 \text{ cm}$$

$$OE = \sqrt{OB^2 - BE^2} = \sqrt{17^2 - 8^2}$$

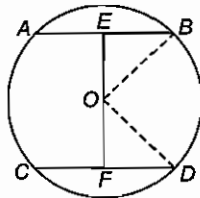
$$= \sqrt{225} = 15 \text{ cm}$$

$$\therefore OF = EF - OE$$

$$= (23 - 15) = 8 \text{ cm}$$

$$FD = \sqrt{OD^2 - OF^2} = \sqrt{17^2 - 8^2} = 15 \text{ cm}$$

$$\therefore CD = 2FD = 30 \text{ cm}$$



133. (a) Here, sum of 5 observations
- $$= x + (x + 2) + (x + 4) + (x + 6) + (x + 8) = 5x + 20$$
- $$\therefore \text{Mean of total observations} = \frac{5x + 20}{5} = 11$$

$$5x + 20 = 55 \Rightarrow x = 7$$

- \therefore Mean of first three observations

$$= \frac{x + (x + 2) + (x + 4)}{3}$$

$$= \frac{3x + 6}{3} = \frac{27}{3} = 9 \quad (\because x = 7)$$

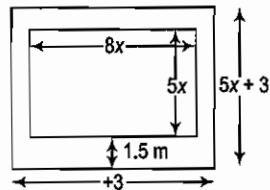
134. (a) Cost of buffaloes sold at loss
- $$= \frac{30000(100 + 19)}{(100 - 15) + (100 + 19)} = \frac{30000(119)}{85 + 119}$$
- $$= ₹ 17500$$

Cost of buffaloes sold at gain

$$= \frac{30000(100 - 15)}{(100 - 15) + (100 + 19)}$$

$$= \frac{30000 \times 85}{85 + 119} = ₹ 12500$$

135. (a) Let the length and breadth of the park be $8x \text{ m}$ and $5x \text{ m}$, respectively.



- \therefore Area of the park $= (8x \times 5x) \text{ m}^2 = 40x^2 \text{ m}^2$
- Length of park including the path $= (8x + 3) \text{ m}$
- Breadth of park including the path $= (5x + 3) \text{ m}$
- \therefore Area of the park including the path $= (8x + 3)(5x + 3) \text{ m}^2$
- \therefore Area of the path $= (8x + 3)(5x + 3) - 40x^2$
- $$= (39x + 9) \text{ m}^2$$
- $\therefore 39x + 9 = 594 \Rightarrow 39x = 585 \Rightarrow x = 15$
- \therefore Length $= (8 \times 15) = 120 \text{ m}$
- and breadth $= (5 \times 15) = 75 \text{ m}$

136. (d) P (non-red ball) $= P$ (black or orange ball)
- $$= 1 - P$$
- (red ball)
- $$= 1 - 5/15 = 1 - 1/3 = 2/3$$

137. (c) Points are collinear, if the area of the triangle formed by them is zero.

So, for points $(-3, -5)$, $(-5, -6)$ and $(m, -4)$, the area of triangle is to be zero.

$$\text{i.e., } \frac{1}{2} |-3(-6 + 4) - 5(-4 + 5) + m(-5 + 6)| = 0$$

$$\text{i.e., } |6 - 5 + m| = 0 \Rightarrow m = -1$$

138. (b) Let original price be ₹ x .

$$\therefore \text{Rise in price} = ₹ \frac{25}{100} x$$

$$\therefore \text{Increased price} = x + \frac{25}{100} x = ₹ \frac{125}{100} x \quad \dots(i)$$

$$\therefore \text{Increased price of 1.5 kg of grapes}$$

$$= \frac{25}{100} \times 240 = ₹ 60$$

$$\therefore \text{Increased price of 1 kg} = \frac{60}{1.5} = ₹ 40 \quad \dots(ii)$$

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

$$\frac{125}{100} x = 40$$

$$\Rightarrow x = \frac{40 \times 100}{125} = ₹ 32$$

139. (a) Mean proportional between $(2 + \sqrt{3})$ and $(8 - \sqrt{48})$

$$= \sqrt{(2 + \sqrt{3})(8 - \sqrt{48})} = \sqrt{(2 + \sqrt{3})4(2 - \sqrt{3})}$$

$$= 2 \sqrt{(2 + \sqrt{3})(2 - \sqrt{3})} = 2 \sqrt{(4 - 3)} = 2 \times 1 = 2$$

$$140.(b) \quad \left(x + \frac{1}{x}\right)^3 = x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right)$$

$$\Rightarrow (\sqrt{5})^3 = x^3 + \frac{1}{x^3} + 3(\sqrt{5}) \quad \left(\because x + \frac{1}{x} = \sqrt{5}\right)$$

$$\therefore x^3 + \frac{1}{x^3} = 5\sqrt{5} - 3\sqrt{5} = 2\sqrt{5}$$

141. (c) i. The product of any three consecutive integers is divisible by 3! i.e., 6.

ii. Here, $3k = \{\dots - 6, -3, 0, 3, 6, \dots\}$
 $3k + 1 = \{\dots - 5, -2, 1, 4, 7, \dots\}$
and $3k + 2 = \{\dots - 4, -1, 2, 5, 8, \dots\}$
 $\therefore \{3k, 3k + 1, 3k + 2\} = \{\dots - 6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \dots\}$

Hence, it is true.

$$142. (c) \tan \theta = \frac{x \sin \phi}{1 - x \cos \phi} \Rightarrow x \sin \phi = \tan \theta - x \cos \phi \tan \theta$$

$$\therefore x = \frac{\tan \theta}{\sin \phi + \cos \phi \tan \theta}$$

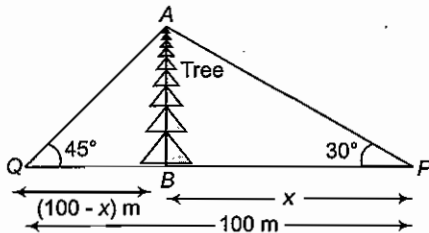
$$= \frac{\sin \theta}{\cos \theta \sin \phi + \cos \phi \sin \theta}$$

$$= \frac{\sin \theta}{\sin(\theta + \phi)}$$

Similarly, $y = \frac{\sin \phi}{\sin(\theta + \phi)}$

Here, $\frac{x}{y} = \frac{\sin \theta}{\sin \phi}$

143. (a) Here, height of tree = AB



In $\triangle APB$,

$$\tan 30^\circ = \frac{AB}{BP}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{AB}{x} \quad \dots(i)$$

In $\triangle AQB$, $\tan 45^\circ = \frac{AB}{BQ}$

$$\Rightarrow \frac{AB}{100 - x} = 1$$

$$\therefore x = 100 - AB \quad \dots(ii)$$

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

$$\sqrt{3} AB = 100 - AB$$

$$\Rightarrow AB = \frac{100}{\sqrt{3} + 1} \times \frac{\sqrt{3} - 1}{\sqrt{3} - 1} = 50(\sqrt{3} - 1)$$

$$\therefore \text{Height of tree} = 50(\sqrt{3} - 1) \text{ m}$$

144. (a) Distance travelled in 44 s = $2\pi r$
 $= 2 \times \frac{22}{7} \times 21 = 132 \text{ m}$

$$\therefore \text{Speed} = \frac{132}{44} = 3 \text{ m/s}$$

$$\text{Time taken to travel 3 km} = \frac{3000}{3} = 1000 \text{ s}$$

$$= 16 \text{ min } 40 \text{ s}$$

145. (c) For A, let the amount be ₹ x.

Rate of interest = 5%

Time = 10 yr

$$\therefore \text{Simple interest} = \frac{x \times 5 \times 10}{100} = \frac{x}{2}$$

For B, let the amount be ₹ 2x.

Rate of interest = 5%

Time = 5 yr

$$\therefore \text{Simple interest} = \frac{2x \times 5 \times 5}{100} = \frac{x}{5}$$

So, A and B both will get the same amount as an interest.

146. (a) James Mill, who in 1819 wrote, a history of British India divided Indian history into three periods, which he called Hindu civilisation, Muslim civilisation and British period. The first two of these periods were taken from the religion of the rulers, the Hindus from the earliest time, the Muslim from the time of Delhi Sultanate in about 1200 AD. The British period began when they came to govern parts of India in the 18th century.

147. (c) Colonialism is the establishment, exploitation, maintenance, acquisition and expansion of colonies in one territory by people from another territory. It is a set of unequal relationships between the colonial power and the colony and between the colonists and the indigenous population.

148. (d) The British rulers in India came to understand that they should conduct extensive surveys of various types over the territories which they acquired. It was essential for them to have a complete geographical knowledge of the country for their revenue and administrative purposes.

149. (a) 150. (b)

151. (a) Every adult citizen of the country, rich or poor, irrespective of their religion, caste, colour, race, ecological conditions is free to vote. Universal adult Franchise is based on the concept of equality. In our Parliamentary System power lies with the people.

152. (c) The Parliament of India at the centre and assemblies at the respective states is the highest law making bodies in our Parliamentary Democratic System.

153. (b) By the 18th century, at the start of the 18th century, the East India Company's presence in India was one of trade outposts, along with Portuguese, French etc. By the end of the century the company was militarily dominant over South India and rapidly extended Northward.

154. (c) 155. (a)

156. (b) During October/November with the apparent of the Sun towards the South, the monsoon through or the low pressure through over the Northern plains becomes weaker. The retreat of monsoon is marked by clear skies and rise in the temperature while day temperatures are high, nights are cool and pleasant the land is still moist and the weather becomes rather oppressive during the day.
157. (d) India's climate is strongly influenced by the Himalayas and the Thar desert. The Himalaya ensure that Northern India is warm or mildly cool during winter and hot during summer. Although the tropic of cancer passes almost through the middle of India, India as a whole is considered to be a tropical country.
158. (b) Reserved forests are regarded as the most valuable as far as the conservation of forest and wildlife. Resources are concerned and comes under the jurisdiction of the government reserved forests are also referred to as permanent forest estates maintained for the purpose of producing timber and other forest produce.
159. (b) The Indo-gangtic plain is also called Northern plain. It is fertile because of the alluvial soil present in this region and also the rivers Indus, Ganga, Brahmaputra and its tributaries flow through this region making the region very fertile.
160. (a) The Bengal Famine of 1943, struck the Bengal province of pre-partition British India following the Japanese occupation of Burma. Estimates are that between 1.5 and 4 million people died of starvation malnutrition and disease.
161. (c) The Food Corporation of India was set-up under Food Corporation Act 1964, to provide effective price support operations for safe guarding the interests of the farmers, distribution of food grains through out the country, maintaining satisfactory level of operational and buffer stocks of foodgrains to ensure national food security.
162. (a) 163. (a)
164. (b) The battle of Plassey was a decisive victory of the British East India Company over the Nawab of Bengal. The battle established the company rule in Bengal which expanded over much of India for the next hundred years.
165. (a) The Doctrine of Lapse was an annexation policy purportedly devised by lord dalhousie, according to Doctrine, any princely state, or territory under paramountly of the company, as a vassal state under the British subsidiary system, would automatically be annexed if the ruler was either incompetent or died without a heir.
166. (d) Warren Hastings made no new conquests but it was he, who pressured the nascent British State in India and gave it an organised government. He has been called the second founder of the British Empire in India.
167. (d) A person can move the Supreme Court or High Court in case of violation of their Fundamental Rights. The right to constitutional remedies make other rights effective.
168. (b) The Indian Parliament consists of Lok shabha, Rajya Sabha and the President. No bill can become an act unless assent given by the President.
169. (d) The President has the power to refer a question of law or fact of public importance, under Article 143 of the Constitution, for the opinion and report of the Supreme Court. But the Supreme Court is not bound to give advice. In case the advice or the opinion of the court is sent to the President, he may or may not accept it.
170. (a) 171.
171. (c) Tropic of cancer $- 23\frac{1}{2}^{\circ}$ N
Tropic of capricorn $- 23\frac{1}{2}^{\circ}$ S
Arctic circle $- 66\frac{1}{2}^{\circ}$ N
Antarctic circle $- 66\frac{1}{2}^{\circ}$ S
172. (d) The factors that cause origin and movement of ocean current are planet rotation/ wind/ density of water depends on temperature and salinity/ gravitation of the Moon and Earth. Direction and strength depends on the shape of the shoreline, depth and shape of the bottom and other currents.
173. (c) The Suez Canal is an artificial sea level waterway running North to South across the isthmus of Suez in Egypt. To connect the Red Sea and the Mediterranean Sea the canal separates the African continent from Asia.
174. (a)
175. (c) Banks act as middleman between suppliers of funds and users of funds substituting its own credit judgement for that of the ultimate suppliers of funds. Collecting those funds from checking accounts, savings and time deposits.
176. (d) Unemployment means being out of job or a situation where the individual is willing to work but has none unemployment brings with it despair, unhappiness and anguish. It forces people to live their life in a way they do not wish to. The government has to pay the unemployed some benefits and reduced the spending power of the employed.
177. (a) World's AIDS Day, observed on 1st December every year, is dedicated to raising awareness of the AIDS pandemic caused by spread of HIV infection.
178. (d) The 2012 was celebrated in India as national mathematical year as a tribute to great mathematician Srinivas Ramanujan.
179. (a) The ILO is a united nations agency dealing with labour issues particularly internal labour standards and decent work for all. The headquarters of the ILO is situated at Geneva.
180. (b) Vishwanathan Anand was the first recipient of Rajiv Gandhi Khel Ratna Award in 1991-92, and the first sports person to receive the Padma Vibhushan Award in 2007.