

NTSE

National Talent Search Examination

MAT + SAT

[Stage I]

Time : 180 Min

Max. Marks : 180

Read the following instructions carefully.

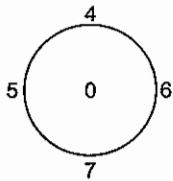
1. Answers are to be given on a separate answer sheet. Use only HB Pencil.
2. Write your Roll No. very clearly (only one digit in one block) on this booklet and on the answer sheet.
3. This test consists of 180 questions of one mark each. All the questions are compulsory.
4. Answer to each question by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

Example

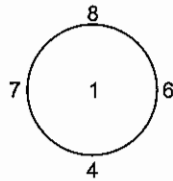
Q. No.	Alternatives
Correct way 1	① ② ● ④
Q. No.	Alternatives
Wrong way 1	⊗ ② ③ ④

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

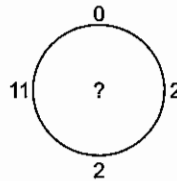
16.



a. 0



b. 2



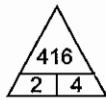
c. 11

d. 12

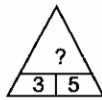
17.



a. 140



b. 280



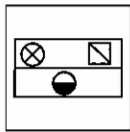
c. 875

d. 925

Directions (Q. Nos. 18-20) In each of the following questions, choose the correct water image for the figure 'X'.

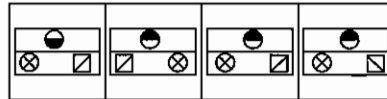
18.

Problem Figure



X

Answer Figures



a.

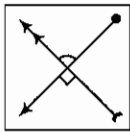
b.

c.

d.

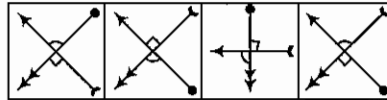
19.

Problem Figure



X

Answer Figures



a.

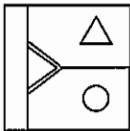
b.

c.

d.

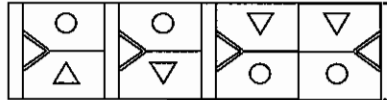
20.

Problem Figure



X

Answer Figures



a.

b.

c.

d.

Directions (Q. Nos. 21-23) In each of the following questions, choose the correct mirror image for the figure 'X'.

21.

Problem Figure



X

Answer Figures



a.

b.

c.

d.

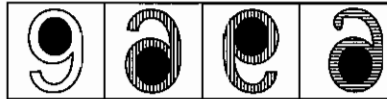
22.

Problem Figure



X

Answer Figures



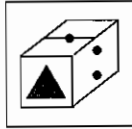
a.

b.

c.

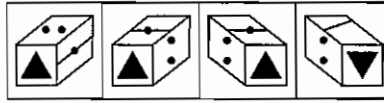
d.

23. Problem Figure



X

Answer Figures



a.

b.

c.

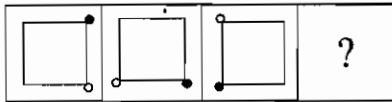
d.

Directions (Q. Nos. 24-26) Arrange the words in a meaningful sequence and choose the most appropriate sequence from the given options.

24. 1. Village 2. State 3. World 4. Country 5. District
 a. (1), (5), (3), (4), (2) b. (1), (5), (2), (4), (3) c. (1), (5), (3), (2), (4) d. (1), (2), (5), (4), (3)
25. 1. Post-box 2. Delivery 3. Letter 4. Envelope 5. Clearance
 a. (4), (3), (1), (5), (2) b. (4), (1), (3), (2), (5) c. (4), (2), (3), (5), (1) d. (4), (3), (5), (2), (1)
26. 1. Child 2. Play way 3. College 4. School 5. Job
 a. (2), (1), (3), (4), (5) b. (1), (5), (3), (2), (4) c. (1), (2), (4), (5), (3) d. (1), (2), (4), (3), (5)

Directions (Q. Nos. 27-28) Select the figure from option figures which will continue the same series as given in the problem figures.

27. Problem Figures



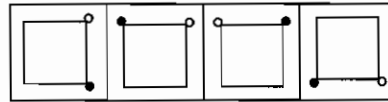
(A)

(B)

(C)

(D)

Answer Figures



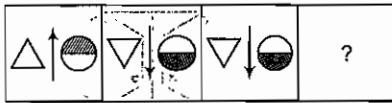
a.

b.

c.

d.

28. Problem Figures



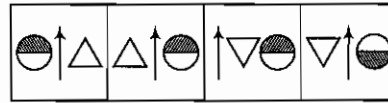
(A)

(B)

(C)

(D)

Answer Figures



a.

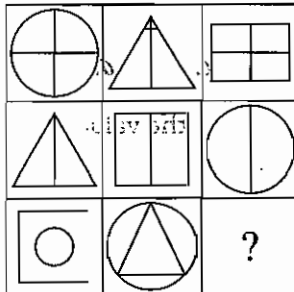
b.

c.

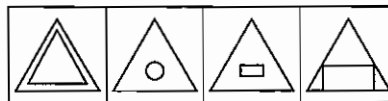
d.

Directions (Q. Nos. 29-31) In each of the following questions, find out which of the answer figure is complete the figure matrix?

29. Problem Figures



Answer Figures



a.

b.

c.

d.

30. Problem Figures

XXXX	XX	X
OOOO	OOO	OO
		?

Answer Figures

a.	b.	c.	d.

31. Problem Figures

AA	BB	CC
Aa	Bb	Cc
aa	bb	?

Answer Figures

C	CC	cc	c
a.	b.	c.	d.

Directions (Q. Nos. 32-33) As per given relationship between figure (A) and (B), find the figure which establish a similar relationship between (C) and (D).

32. Problem Figures

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

Answer Figures

a.	b.	c.	d.

33. Problem Figures

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

Answer Figures

a.	b.	c.	d.

34. If $(a * b)$ stands for $(a + b)^2$ and $(a \oplus b)$ stands for $(a - b)^2$, then the value of $(a * b) + (a \oplus b)$, is
 a. $2(a^2 + b^2)$ b. $a^2 + 2b^2$ c. $2a^2 + b^2$ d. None of these

35. If $9 * 4 = 169$, then what is the value of $14 * 1$?
 a. 144 b. 169 c. 125 d. 225

36. If 'A' denotes '+', 'B' denotes ' \times ', 'C' denotes ' \div ' and 'D' denotes ' \times ', then
 $5 A 14 B 2 D 2 C 2$
 a. 20 b. 17 c. 19 d. 16

37. The length of a rectangle is 10 cm more than its breadth. If its perimeter is 84 cm, then what is the length of the rectangle?
 a. 28 cm b. 26 cm c. 20 cm d. 21 cm

38. Divide ₹ 640 among A, B and C, so that A may have 30%, B may have 45% and C have the remaining amount. How much among C may have?
a. ₹160 *b.* ₹ 232 *c.* ₹ 212 *d.* ₹ 200
39. Mona wants to go home. At present she is facing North. If she moves 90° clockwise and 135° anti-clockwise, find out in which direction her home is, if she goes in that particular direction after the last turn?
a. East *b.* South-East *c.* North-West *d.* South-West
40. Akansha walks 4 km East turns South-West and walks another 4 km. She again takes a turn towards North-West and walks another 4 km. In which direction she is from her starting point.
a. West *b.* East *c.* South-West *d.* North

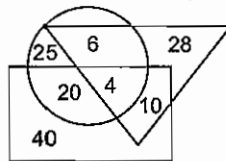
Directions (Q. Nos. 41-46) Study the following information and answer the questions given below.

- There are 8 members in a family A, B, C, D, E, G, H and I.
- C and A are brothers.
- H and I are cousins and both are males.
- C is the son of E and D.
- G is the wife of C.
- B is the wife of A.
- D is the grandmother of H and I.

41. How is A related to G?
a. Brother *b.* Sister-in-law *c.* Sister *d.* Brother-in-law
42. How is C related to D?
a. Sister *b.* Son *c.* Husband *d.* Brother
43. What is the relationship between E and D?
a. Brother-Sister *b.* Son-Mother *c.* Husband-Wife *d.* Daughter-Father
44. How is C related to I?
a. Uncle *b.* Nephew *c.* Niece *d.* Son
45. How is H related to A?
a. Nephew *b.* Son *c.* Brother *d.* Father-in-law
46. How many male candidates are there in the family?
a. 4 *b.* 2 *c.* 5 *d.* 3

Directions (Q. Nos. 47-48) On the basis of the following Venn- diagram, answer the questions given below.

The rectangle represents artists, the circle represents players and the triangle represents doctors.

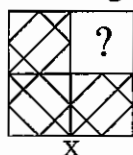


47. How many artists are players but not doctors?
a. 25 *b.* 20 *c.* 10 *d.* 30
48. How many artists are neither players nor doctors?
a. 40 *b.* 10 *c.* 30 *d.* 25

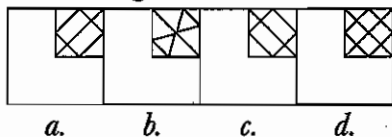
49. If 19th April of a year was Friday, what will be the day on 28th September of the same year.
 a. Tuesday b. Wednesday c. Thursday d. Saturday
50. If day before yesterday was Tuesday, what day will fall on day after tomorrow?
 a. Saturday b. Thursday c. Friday d. Sunday

Directions (Q. Nos. 51-53) From the given alternatives, complete the problem figure.

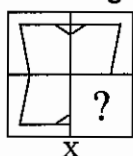
51. **Problem Figure**



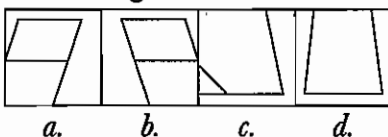
Answer Figures



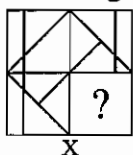
52. **Problem Figure**



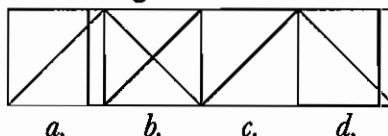
Answer Figures



53. **Problem Figure**

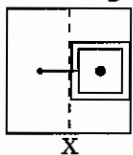


Answer Figures

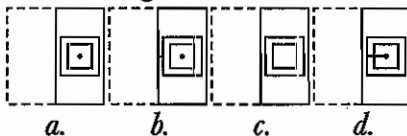


Directions (Q. Nos. 54-56) Find which of the alternative from the answer figures will follow, if the problem figure is folded in a certain defined pattern along the dotted line?

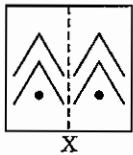
54. **Problem Figure**



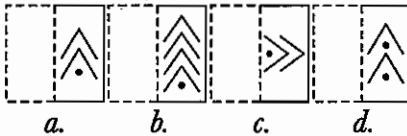
Answer Figures



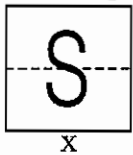
55. **Problem Figure**



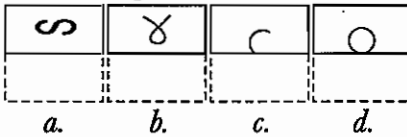
Answer Figures



56. **Problem Figure**



Answer Figures

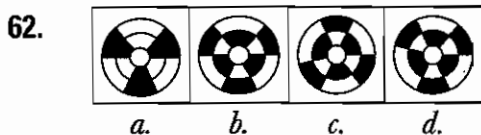
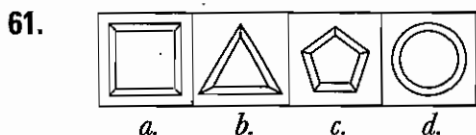


57. How many 8's are there in the following number sequence, which are immediate preceding 7 but not immediately followed by 4?

7 8 4 3 8 7 8 6 5 8 4 7 8 5 3 7 8 4 8 7 8 5 8

- a. One b. Three c. Two d. Four
58. Rajeev was counting down from 34. Sangeeta was counting upwards the numbers starting from 1 and she was calling out the odd digits/numbers. What common number will they call out at the same time, if they were calling out at the same speed?
- a. 16 b. 17
c. 18 d. They will not call out the same number
59. How many numbers are amongst the number 12 to 156 which are exactly divisible by 12 but not by 9 and 10?
- a. Twelve b. Five c. Nine d. Seven
60. If a clock shows 1:30 in a mirror, then what will the actual time in normal clock?
- a. 11:30 b. 1:30 c. 10:30 d. 8:30

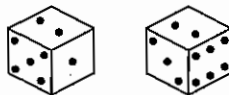
Directions (Q. Nos. 61-62) Find the odd one from the given alternatives.



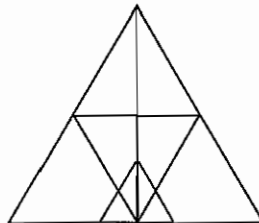
63. Which number is opposite to face 4?



- a. 1 b. 2 c. 5 d. 6
64. If 2 dots are marked on the bottom, then how many dots will appear on the top?

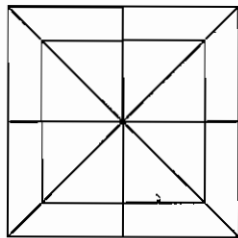


- a. 3 b. 4 c. 6 d. 5
65. How many triangles are there in the following figure?



- a. 17 b. 18 c. 19 d. 20

66. How many squares does the following figure contain?



a. 15

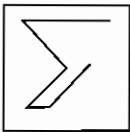
b. 10

c. 21

d. 12

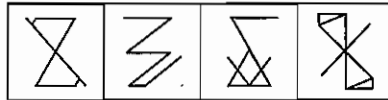
Directions (Q. Nos. 67-70) Find out the figure (X) is embedded in which option figures.

67. **Problem Figure**



X

Answer Figures



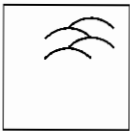
a.

b.

c.

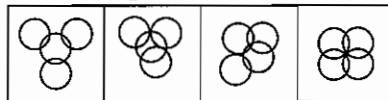
d.

68. **Problem Figure**



X

Answer Figures



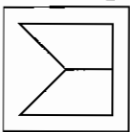
a.

b.

c.

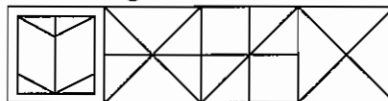
d.

69. **Problem Figure**



X

Answer Figures



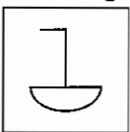
a.

b.

c.

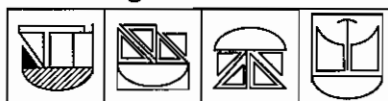
d.

70. **Problem Figure**



X

Answer Figures



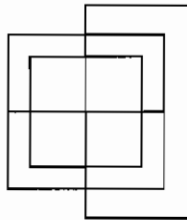
a.

b.

c.

d.

71. What is the number of straight lines in the following figure?



a. 13

b. 15

c. 17

d. 19

Directions (Q. Nos. 72-76) Complete the given series as per the related pattern follows.

72. bbca_bcca_cc_a_cb

a. abcba

b. acbab

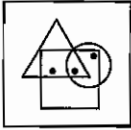
c. bacab

d. bcaab

73. _bcc_ac_aabb_ab_cc
 a. aabca b. abaca c. bacab d. bcaca
74. a_bccb_ca_cca_baab_c
 a. ababc b. abcaa c. accab d. bacaa
75. ab_aa_caab_c_abb_c
 a. bbcaa b. bcbca c. cabac d. cbbac
76. baa_aca_cacab_acac_bca
 a. bccba b. cbbaa c. acbaa d. cbaac

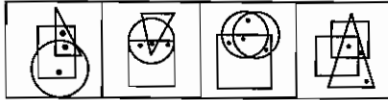
Directions (Q. Nos. 77-80) In each of the following questions, there is a diagram (X) in which one or more points have been placed in certain positions. Examine the placement of these points carefully. From the four choices, select the one in which the placement of points is similar to that in the diagram.

77. **Problem Figure**



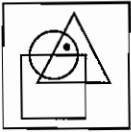
X

Answer Figures



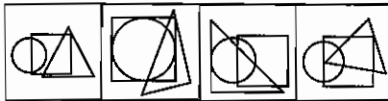
a. b. c. d.

78. **Problem Figure**



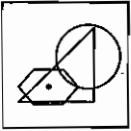
X

Answer Figures



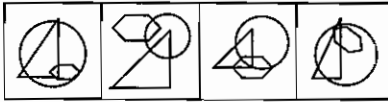
a. b. c. d.

79. **Problem Figure**



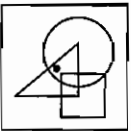
X

Answer Figures



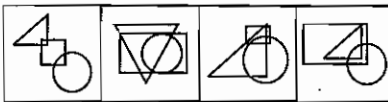
a. b. c. d.

80. **Problem Figure**



X

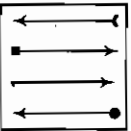
Answer Figures



a. b. c. d.

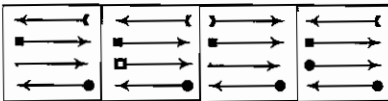
Directions (Q. Nos. 81-85) Find out the answer figure which exactly similar to problem figure.

81. **Problem Figure**



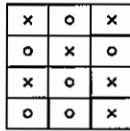
X

Answer Figures



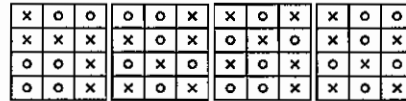
a. b. c. d.

82. Problem Figure



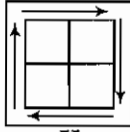
X

Answer Figures



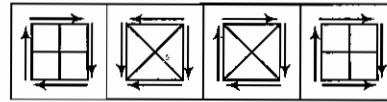
a. b. c. d.

83. Problem Figure



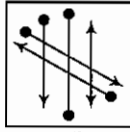
X

Answer Figures



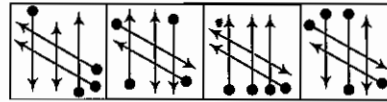
a. b. c. d.

84. Problem Figure



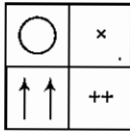
X

Answer Figures



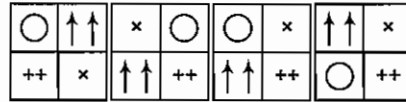
a. b. c. d.

85. Problem Figure



X

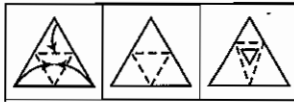
Answer Figures



a. b. c. d.

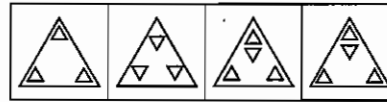
Directions (Q. Nos. 86-90) Select the answer from the alternatives, which would most closely resemble the third figure, when it is unfolded.

86. Problem Figures



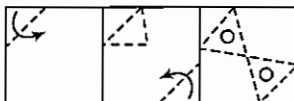
(x) (y) (z)

Answer Figures



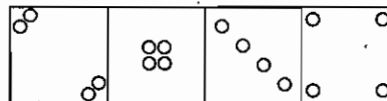
a. b. c. d.

87. Problem Figures



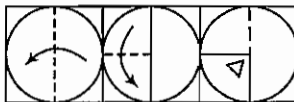
(x) (y) (z)

Answer Figures



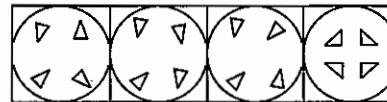
a. b. c. d.

88. Problem Figures



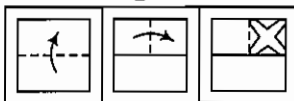
(x) (y) (z)

Answer Figures



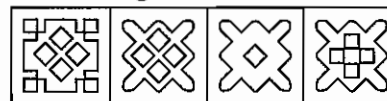
a. b. c. d.

89. Problem Figures



(x) (y) (z)

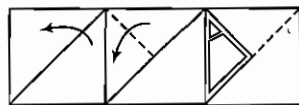
Answer Figures



a. b. c. d.

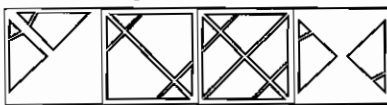
90.

Problem Figures



(x) (y) (z)

Answer Figures

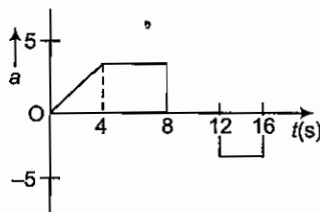


a. b. c. d.

Paper II : Scholastic Aptitude Test

91.

The acceleration of a train between two stations is shown in the figure. The maximum speed of the train is



a. 60 m/s

b. 30 m/s

c. 120 m/s

d. 90 m/s

92.

The orbital speed of Jupiter is

a. greater than the orbital speed of the Earth

b. less than the orbital speed of the Earth

c. equal to the orbital speed of the Earth

d. zero

93.

An instrument used to measure humidity is

a. Anémometer

b. Hygrometer

c. Thermometer

d. Pyrheliometer

94.

The lines of force of uniform magnetic field

a. must be convergent

b. must be divergent

c. must be parallel to each other

d. intersect

95.

Two thin lenses of focal lengths f_1 and f_2 are placed in contact. The focal length of the composite lens will be

a. $\frac{f_1 + f_2}{2}$ b. $\frac{f_1 + f_2}{f_1 f_2}$ c. $\sqrt{f_1 f_2}$ d. $\frac{f_1 f_2}{f_1 + f_2}$

96.

Given three equal resistors, how many different combinations of all three resistors can be made?

a. Six

b. Five

c. Four

d. Three

97.

A current flows in a conductor from East to West. The direction of the magnetic field at a point above the conductor is

a. towards North

b. towards South

c. towards East

d. towards West

98.

Which of the following is the most suitable material for making permanent magnet?

a. Steel

b. Soft iron

c. Copper

d. Nickel

99.

Above the Curie temperature, the susceptibility of a ferromagnetic substance varies

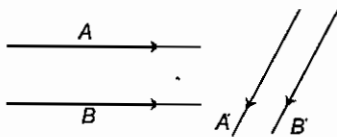
a. directly as the absolute temperature

b. inversely as the absolute temperature

c. inversely as the square of absolute temperature

d. directly as the square of absolute temperature

100. In a transformer, number of turns in the primary are 140 and that in secondary are 280. If current in primary is 4 A, then current in secondary is
a. 4 A *b.* 2 A *c.* 6 A *d.* 10 A
101. Image is formed for the short sighted person at
a. retina *b.* before retina
c. behind the retina *d.* image is not formed at all
102. Figure shows when the as shown two rays A and B being reflected by a mirror and going as A' and B'. The mirror is plane mirror



- a.* is plane *b.* is convex
c. is concave *d.* may be any spherical mirror
103. The chemical name of $Mg_3(PO_4)_2$ and oxidation number of Mg is.
a. magnesium phosphite and three *b.* magnesium phosphate and two
c. magnesium phosphide and two *d.* magnesium phosphotite and three
104. Boyle suggested some properties of acid, choose the correct set of them.
a. Sour taste, corrosive change litmus from red to blue
b. Sour taste, corrosive change litmus from blue to red
c. Sour taste, slippery change litmus from blue to red
d. Sweet taste, slippery change litmus from blue to red
105. When a nuclear change occurs, what happens to the energy?
a. It is destroyed *b.* It is released *c.* It remains unchanged *d.* None of these
106. Which of the following substances is essential solute in saline water?
a. Salicylic acid *b.* Acetic acid *c.* Sodium chloride *d.* Ammonium chloride
107. Complete the following reaction $2_1^1H + 2_1^1H \longrightarrow$
a. $4_2^{10}Be$ *b.* 3_2^3He *c.* 4_2^4He *d.* 4_2^8Be
108. Consider the following statements
I. Group 3 elements are called pnicogens. II. Group 16 elements are called halogens.
Which of the above statement (s) is /are correct?
a. Only I *b.* Only II *c.* I and II *d.* Neither I nor II
109. The kinetic energy of the particle increases on increasing the
a. pressure *b.* humidity *c.* temperature *d.* None of these
110. An electron dot structure for an element shows that element's symbol and an arrangement of dots that indicates the
a. atomic number *b.* atomic mass
c. total number of electrons *d.* number of electrons in the outer energy level
111. When you are finished using a bunsen burner you should
a. leave it on for the next person to use. It's the only considerate choice
b. pull off the hose connecting the burner to the gas. The burner won't have gas so it won't be on fire
c. cover the burner with an inverted beaker to suffocate the flame
d. turn off the gas

123. Match the following

List I	List II
A. Green Revolution	1. Cereal
B. Yellow Revolution	2. Oil seeds
C. Blue Revolution	3. Milk
D. White Revolution	4. Fish

Codes

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

124. What will happen if, one kidney is removed from the body of a human being?
a. Death due to poisoning
b. Uraemia and death
c. Stoppage of urination
d. Nothing, the person will survive and remain normal
125. Carbohydrates are stored in plants and animals in the form of
a. cellulose and glucose, respectively *b.* starch and glycogen, respectively
c. starch and glucose, respectively *d.* cellulose and glycogen, respectively
126. AB and CD are parallel straight lines of lengths 5 cm and 4 cm, respectively. AD and BC intersect at a point O such that AO = 10 cm, then OD equals to
a. 7 cm *b.* 8 cm *c.* 5 cm *d.* 6 cm
127. The average score of boys in an examination of a school is 71 and that of the girls is 73. The average score of the school in the examination is 71.8. Then, the ratio of the number of boys to the number of girls appeared in the examination is
a. $\frac{4}{3}$ *b.* $\frac{3}{4}$ *c.* $\frac{3}{2}$ *d.* $\frac{2}{3}$
128. If α and β are the roots of the quadratic equation $2x^2 - 4x + 1 = 0$. Then, the value of $\frac{1}{\alpha + 2\beta} + \frac{1}{\beta + 2\alpha}$ is equal to
a. $\frac{12}{17}$ *b.* $\frac{17}{12}$ *c.* $\frac{11}{17}$ *d.* $\frac{13}{17}$
129. A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm. The uniform thickness of the cylinder is
a. 1.5 cm *b.* 3 cm *c.* 1.2 cm *d.* 1 cm
130. Let D and E be the points on sides AB and AC, respectively of a ΔABC such that DE is parallel to BC. Let AD = 2 cm, DB = 1 cm, AE = 3 cm and area of $\Delta ADE = 3 \text{ cm}^2$. What is the value of EC?
a. 1.5 cm *b.* 1.6 cm *c.* 1.8 cm *d.* 2.1 cm
131. If one of the interior angles of a regular polygon is found to be $\frac{9}{8}$ times of one of the interior angles of a regular hexagon, then the number of sides of the polygon is
a. 8 *b.* 14 *c.* 12 *d.* 10
132. ACB is a tangent to a circle at C. CD and CE are chords such that $\angle ACE > \angle ACD$. If $\angle ACD = \angle BCE = 50^\circ$, then
a. $CD = CE$ *b.* ED is not parallel to AB
c. ED passes through the centre of the circle *d.* ΔCDE is a right angled triangle

154. Population density is the number of people living in a unit area of Earth's surface. It is normally expressed as
a. per square km *b.* per thousand *c.* per square metre *d.* None of these
155. The difference between the export and import of a country is known as
a. trade value *b.* bilateral trade *c.* foreign trade deficit *d.* balance of trade
156. Which one of the following ports is the deepest land-locked and well protected port along the East coast?
a. Chennai *b.* Tuticorin *c.* Paradeep *d.* Visakhapatnam
157. Consider the following statements.
 I. Cheque is a paper instructing the bank to pay a specific amount from the persons account to the person whose name the cheque has been issued.
 II. The facility of cheque makes it possible to directly settle payments without the use of cash.
 III. They constitute money in the modern economy.
 Which of the above statements is/are true about the cheque?
a. Only I *b.* Only II *c.* I and III *d.* All of these
158. The banks use the major portion of the deposits to
a. increase their capital wealth
b. to extend loans
c. to help the government by giving it to the government
d. All of the above
159. Which one of the following is not the feature of unorganised sector?
a. Rules and regulations are not followed
b. There is no provision of paid holidays
c. Employment is secure
d. Employment is depends on the whims of the employer
160. Per capita income is calculated in which of the following currency?
a. Dollars *b.* Euro
c. Pond *d.* Currency of respective country
161. People of which of the following places live in famine like conditions even today?
a. Kalahandi *b.* Kashipur *c.* Palamau *d.* All of these
162. The Provincial Governors of Delhi Sultanate were known as
a. Shiqdar *b.* Walis or Muqtas *c.* Jagirdars *d.* Sultan-I- Kaffar
163. Consider the following statements Bhakti teachers imphasised that the
 I. Relationship between man and man should be based on brotherhood.
 II. Relationship between man and God should be based on love.
 III. They called for the equality of gender.
 Which of the above statement(s) is/are correct?
a. Only I *b.* I and II *c.* I and III *d.* All of these
164. **Assertion (A)** The Quit India Movement (1942) was perhaps the most powerful mass movement faced by the British in India.
Reason (R) The mass upsurge in the Quit India Movement made the British realise the inevitability of Indian independence.
a. Both are true and R is the correct explanation of A
b. Both are true and R is not the correct explanation of A
c. A is true, but R is false
d. A is false, but R is true

165. The demand for labour is called
a. Factory demand *b.* Market demand *c.* Direct demand *d.* Derived demand

166. Consider the following statements
 I. The drafting of the document called Constitution was done by an assembly of elected representatives called constituent assembly.
 II. The constituent assembly represented the people of India.
 III. The members of the Constituent Assembly elected mainly by the members of the existing provincial legislatures.
 IV. The drafting committee of the Constituent Assembly chaired by Dr BR Ambedkar prepared a draft Constitution for discussion.

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

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

167. Consider the following statement(s) is/are related to unfair elections.
 I. Inclusion of false names and exclusion of genuine names in the voters list.
 II. Misuse of government facilities and officials by the ruling party.
 III. Excessive use of money by rich candidates and big parties.
 IV. Intimidation of voters and rigging on polling day.

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

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

168. Consider the following statements
 I. President is the head of the state and is the highest formal authority in the country.
 II. The Prime Minister is the head of the government and actually exercises all governmental powers.
 III. The Parliament consists of two houses of the Parliament and the President.

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

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

169. Match the following

List I	List II
A. Kharaj	1. Paid by well to do muslims for helping needy
B. Khams	2. Tax levied on non-muslim for the protection of life and property
C. Jaziya	3. 1/5th of the spoils of war
D. Zakat	4. Land tax paid by the Hindus

Codes

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

170. The main cause of conflict between the Vijaynagar empire and the Bahmani kingdom was the control of

- a.* Krishna-Godavari Delta *b.* Tungabhadra Doab *c.* Konkan *d.* All of these

171. Match the following

List I	List II
A. Visistadvaita	1. Vallabhacharya
B. Dvaita	2. Nimbakacharya
C. Dvaitadvaita	3. Madhvacharya
D. Suddhadvaita	4. Ramanujacharya

Codes

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

- 172.** Which of the following is/are basic or key industries?
a. Iron or steel *b.* Copper smelting
c. Aluminium industry *d.* Agro based industries
- 173.** Which of the following industries uses bauxite as a raw material?
a. Aluminium *b.* Cement *c.* Jute *d.* Steel
- 174.** The fast growing industry has been a major foreign exchange earner in the last decade
a. Information and Technology *b.* Foreign Investment
c. Business Processes Outsourcing *d.* None of these
- 175.** The group of sedimentary minerals including, gypsum, potash salt and sodium salt are formed as a result of which process?
a. Decomposition *b.* Evaporation *c.* 'Distillation' *d.* Both 'a' and 'b'

176. Match the following

List I	List II
A. Nickel	1. Non-metallic
B. Copper	2. Energy resource
C. Natural gas	3. Non-ferrous
D. Mica	4. Ferrous

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

- 177.** The headquarters of the Asian Development Bank is situated at which of the following places?
a. Washington DC *b.* Geneva *c.* San Francisco *d.* Manila
- 178.** Which of the following became the India's first women cricket coach?
a. Sunita Sharma *b.* Kavita Sharma *c.* Sunita Aggarwal *d.* Arti Pradhan

179. Match the following

List I (Buddhist Councils)	List II (Kings)
A. 1st Buddhist Council (Rajgir)	1. Kaniska
B. 2nd Buddhist Council (Vaishali)	2. Ashoka
C. 3rd Buddhist Council (Patliputra)	3. Kalsoka
D. 4th Buddhist Council (Kundalavan)	4. Ajatshtru

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

180. Match the following

List I (Kingdoms)	List II (Capitals)
A. Cholas	1. Sakala
B. Cheras	2. Vanji or Karur
C. Pandyas	3. Puhar (Kaveripattnam)/Uraiyur
D. Indo-Greeks	4. Madurai

Codes

A B C D

A B C D

A B C D

A B C D

a. 3 2 4 1

b. 2 3 4 1

c. 1 2 3 4

d. 4 3 2 1

Paper I : Mental Ability Test

1. (d) $2 \xrightarrow{+3} 5 \xrightarrow{+4} 9 \xrightarrow{+5} 14 \xrightarrow{+6} 20 \xrightarrow{+7} 27$

2. (a) $1 \xrightarrow{+5} 6 \xrightarrow{+7} 13 \xrightarrow{+9} 22 \xrightarrow{+11} 33 \xrightarrow{+13} 46$

∴ Add only odd numbers.

3. (a) $1 \xrightarrow{+8} 9 \xrightarrow{+8} 17 \xrightarrow{+16} 33 \xrightarrow{+16} 49 \xrightarrow{+24} 73 \xrightarrow{+24} 97$

4. (d) $3 \xrightarrow{\times 3} 9 \xrightarrow{\times 3} 27 \xrightarrow{\times 3} 81 \xrightarrow{\times 3} 243$

5. (b) Given, $19, 2, 38, 3, 114, 4, 456$
Then, $19 \times 2 = 38 \Rightarrow 38 \times 3 = 114$
 $114 \times 4 = 456$

6. (c) Second is acquired from the first.

7. (b) In cricket, ball is hit by bat. Similarly, in hockey, ball is hit by 'stick'.

8. (b) As, tea is consumed through a cup, in the same way tobacco is consumed through a hookah.

9. (d) All except 'universe' form a part of universe.

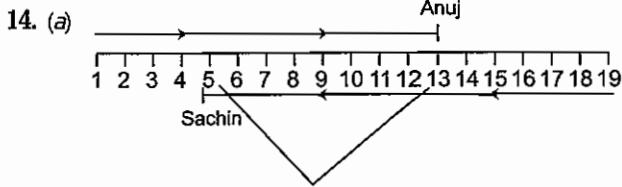
10. (b) All except 'school' are dwelling places.

11. (d) All except 'Geography' are Science subjects.

12. (d) All except 'brick' are suits for cards.

13. (b) Out of 30 students, 5 of them did not qualify the test. So, only 25 could qualify.

$$\begin{aligned} n &= 25, B_r = 13\text{th} \\ T_r &= n + 1 - B_r \\ &= (25 + 1) - 13 = 13\text{th} \end{aligned}$$



So, there are only 7 students between them (6, 7, 8, 9, 10, 11, 12).

15. (b) $09 \quad 03$
 ?
 ?

∴ ? = $(9 + 3) \times (9 - 3) = 72$

16. (c) Given, $(7 + 4) - (5 + 6) = 0$

$$(7 + 6) - (8 + 4) = 1$$

$$(11 + 2) - (0 + 2) = 11$$

17. (d) $2^2 = 4, 5^2 = 25 \Rightarrow 425$

$$2^2 = 4, 4^2 = 16 \Rightarrow 416$$

$$3^2 = 9, 5^2 = 25 \Rightarrow 925$$

18. (c) 19. (b) 20. (b)

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

24. (b) As per arrange in increasing order
Village → District → State → Country → World.

25. (a) Firstly, we took an envelope and put a letter in it, which is posted in a Post-box and after clearance it will be delivered, so the correct sequence is (4), (3), (1), (5), (2).

26. (d) Child firstly go the play way, then school, then college and finally as a result he/she will get a job.

27. (b) Figure is moving 90° in clockwise.

28. (b) Fig. (ii) = Fig. (iii) : Fig. (i) = Fig. (iv)

29. (c) Clearly, triangle figure is outermost part of the third figure and the first row figure form the inner part.

30. (a) The third figure in each row having one lesser figure than second figure.

31. (c) As per order in column, both will be small English alphabets.

32. (b) Dot (·) and cross (x) moves one place forward clockwise.

33. (d) Figures move 90° anti-clockwise, then 180° again.

34. (a) $(a * b) + (a \oplus b)$
 $\Rightarrow (a + b)^2 + (a - b)^2$
 $\Rightarrow a^2 + b^2 + 2ab + a^2 + b^2 - 2ab$
 $\Rightarrow 2(a^2 + b^2)$

35. (d) Given, $9 * 4 = 169$ means $9 + 4 = 13 \Rightarrow 13^2 = 169$

Then, $14 * 1$

Similarly, $14 + 1 = 15 \Rightarrow 15^2 = 225$

36. (b) $5 + 14 \div 2 \times 2 - 2$

$$\Rightarrow 5 + 7 \times 2 - 2 \Rightarrow 5 + 14 - 2$$

$$\therefore 19 - 2 = 17$$

37. (b) Let the width of rectangle be x and its length be $(x + 10)$.

$$\text{Perimeter} = 2(l + b)$$

$$\Rightarrow 2(x + 10 + x) = 84$$

$$\Rightarrow 2x + 20 + 2x = 84$$

$$\therefore x = 16$$

$$\therefore \text{Length of rectangle} = x + 10 = 16 + 10 = 26 \text{ cm}$$

38. (a) Share of A is 30%

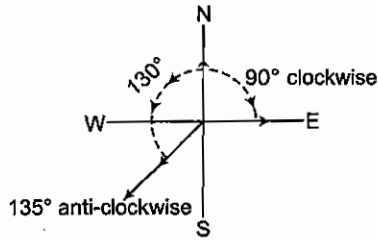
Share of B is 45%

Share of C is 25%

100 %

$$\text{Share of C will be} \Rightarrow \frac{640 \times 25}{100} = ₹ 160$$

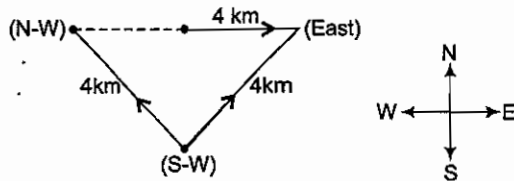
39. (d)



So, her home is in South-West direction.

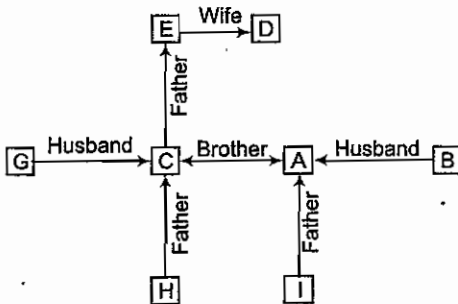
Note Clockwise means right and anti-clockwise means left.

40. (a)



So, she is towards West from the starting point.

Solutions (Q. Nos. 41-46)



41. (d) A is brother-in-law of G.

42. (b) C is the son of D.

43. (c) Husband (E) and wife (D).

44. (a) C is the uncle of I.

45. (a) H is the nephew of A.

46. (c) There are 5 male persons among 8 members as E, C, A, H, and I.

47. (b) There are 20 artists who are players also.

48. (a) There are 40 artists who are not players and not doctors.

49. (d) Number of days in April = $30 - 19 = 11$ days

Number of days in May to August

$$= 31 + 30 + 31 + 31 = 123 \text{ days}$$

Number of days in September = 28 days

Total number of odd days = $11 + 123 + 28 = 162$

$$\text{Number of weeks in 162 days} = \frac{162}{7}$$

$$= 23 \text{ weeks and 1 odd day}$$

So, the day will be Friday + 1 = Saturday

50. (a) Day before yesterday = Tuesday

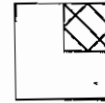
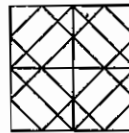
Yesterday = Wednesday

Today = Thursday

Tomorrow = Friday

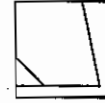
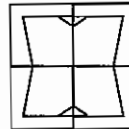
Day after tomorrow = Saturday

51. (c)



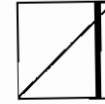
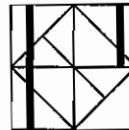
c.

52. (c)



c.

53. (a)



a.

54. (d)

55. (a)

56. (d)

57. (b) 78438 786 584 785 37848 785 8

So, there are only three 8's.

58. (d)

Rajeev	34	32	30	28	26	24	22	20	18	16	14
Sangeeta	1	3	5	7	9	11	13	15	17	19	21

So, they will not call out the same number.

59. (d) 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156

The number 36, 72, 108 and 144 are divisible by 9 and 60 and 120 are divisible by 10. So in total, 7 such numbers which are only divisible by 12.

60. (c)

Mirror clock

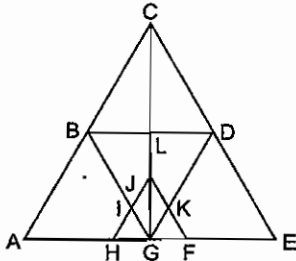
Natural clock



So, it means the actual time will be 10 : 30.

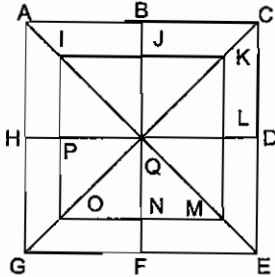
61. (d) In figure (d), inner and outer figure is not connected by small lines.
62. (a) In figure (a), inner and outer shaded parts coincide to one other part.
63. (a) It is clear from the figure that the numbers
 $1 \leftrightarrow 4 \Rightarrow 2 \leftrightarrow 5 \Rightarrow 3 \leftrightarrow 6$
 are opposite to each other.
64. (b) It is clear from the figure that five, one, three and six dots cannot appear opposite to 2 dots. So, the remaining (four dots) dots will be the answer.

65. (d)



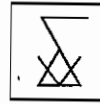
So, triangles are $\triangle ACE, \triangle BDG, \triangle HJF, \triangle ABG, \triangle HIG, \triangle HJG, \triangle IJG, \triangle ACG, \triangle BGC, \triangle BCL, \triangle BCD, \triangle BLG, \triangle CLD, \triangle CDG, \triangle LDG, \triangle JKG, \triangle GJE, \triangle GKF, \triangle GDE$ and $\triangle CGE$.
i.e., 20.

66. (b)

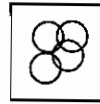


So, squares are IJPQ, JKLO, PQNO, NQLM, IKMO, ABQH, BCDQ, HQFG, QDEF and ACEG. *i.e., 10.*

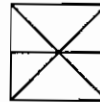
67. (c)



68. (c)



69. (b)



70. (b)



71. (a)

72. (b) $\underline{a} \text{ } \underline{bbc/ac/bcca/bc/caab/cb}$

73. (c) $\underline{b} \underline{bccaa/c} \underline{caabb/a} \underline{abbcc}$

74. (a) $\underline{aabcc/bb} \underline{cag/ccabb/aabcc}$

75. (d) $\underline{abc/aab} \underline{c/aab} \underline{c/aab} \underline{c/aab} \underline{c}$

76. (c) $\underline{ab/aa/c} \underline{acab/cacab/aa/cacab/aa}$

77. (a)

78. (c)

79. (c)

80. (c)

81. (a)

82. (c)

83. (a)

84. (d)

85. (c)

86. (d)

87. (c)

88. (d)

89. (b)

90. (c)

Paper II : Scholastic Aptitude Test

91. (b) V_{\max} = Maximum positive area of a-t graph
 = Area between 0 and 8 s
 = 30 m/s

92. (b) The orbital speed is expressed as

$$V = \frac{1}{\sqrt{R}}$$

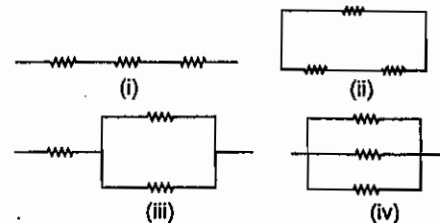
where, R is radius of planet.

93. (b) Hygrometer is used to measure humidity.
94. (d) In a uniform magnetic field, the magnitude as well as direction of the strength of magnetic field remains the same throughout the region, Uniform magnetic field is represented by an equidistant set of parallel lines.

95. (d) $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} = \frac{f_1 + f_2}{f_1 f_2}$

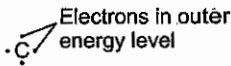
$$\Rightarrow f = \frac{f_1 f_2}{f_1 + f_2}$$

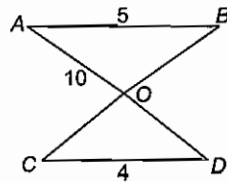
96. (c) There are four combinations of three resistors such as



97. (a) According to Fleming's left-hand rule, direction of magnetic induction will be towards North.

98. (a) Steel has more retentivity and coercivity, so it is used for making permanent magnet.

99. (b) Above the curie temperature, the susceptibility of a ferromagnetic substance varies inversely as the absolute temperature.
100. (b) $\frac{N_p}{N_s} = \frac{V_p}{V_s} = \frac{i_s}{i_p} \Rightarrow i_s = \frac{N_p i_p}{N_s} = \frac{4 \times 140}{280} = 2A$
101. (b) The image is formed for short sighted person before retina.
102. (a) The rays reflected by a mirror, the mirror is plane.
103. (b) Chemical name of $Mg_3(PO_4)_2$ is magnesium phosphate and its oxidation number is + 2.
104. (b) According to Boyle, an acid is corrosive, has sour taste and changes blue litmus to red.
105. (b) Energy is released during a nuclear change. e.g., Nuclear fission, decay, half-life etc.
106. (c) Sodium chloride (NaCl) is the essential solute in saline water and this salt is responsible for salinity.
107. (c)
$$\begin{array}{c} {}^2_1\text{H} + {}^2_1\text{H} \longrightarrow {}^4_2\text{He} \\ \text{Hydrogen} \qquad \text{Helium} \end{array}$$
108. (a) Group 16 elements are called chalcogens. Group 17 elements are called halogens.
109. (c) **Temperature** Kinetic energy increases as temperature because temperature is a measure of the speed with which the particle move. Higher the temperature, the faster the molecules move.
110. (d) Number of electron in the outer energy level are represented by an arrangement of dots.
Electron dot structure of carbon
- 
111. (d) Its just simple, turn off the gas.
112. (b) Chemical name of $Cd(MnO_4)_2$ is cadmium permanganate and chemical name of $Fe_3(PO_4)_2$ is Iron (II) phosphatets in this (II) represent the oxidation number of Fe.
113. (a) Atomic radius is the size of the atom and on going from left to right in a period. It decreases, while on going down in the group it increase, due to increase in number of valence shells.
114. (b) Froth-floatation process is used for the concentration of sulphide ore.
115. (a) Non-biodegradable wastes are generated by Thermal Power Plants which produces fly ash integrated iron and steel plants which produce blast furnace slag and steel melting slag.
116. (c) Restriction enzymes play a very important role in the construction of recombinant DNA molecules, as is done in gene cloning experiments.
117. (a) Teresa goat is mainly found in Teresa Island and Nicobar Island.
118. (d) Yellow fever, plantar wart, AIDS and rubella all are viral diseases.
Yellow fever-Yellow Fever Virus
Plantar wart disease-Human Papilloma Virus (HPV)
AIDS- Human Immunodeficiency Virus (HIV)
Rubella (German measles)-Rubella Virus
119. (c) Ozone layer in the upper parts of the atmosphere serves as a protective shield against harmful solar ultraviolet radiation.
120. (b) Marine animals do survive in water, without air contact because they take (dissolved) oxygen from water.
121. (a) When red blood cells are placed in pure water, water rapidly enters the cells by osmosis and causes the cells to burst, a phenomenon known as 'hemolysis'.
122. (c) Tooth enamel is the hardest and most highly mineralised substance in the human body. It is also found in the dermal denticles of sharks.
123. (a) White revolution is associated with milk and milk products while green revolution pertains to our higher and assured agricultural productivity. Yellow revolution is associated with vegetable oils and blue revolution is related to aquaculture.
124. (d) The kidney which is left out in the body undergo enlargement and carries out the extra work of missing kidney. This is called compensatory- hypertrophy.
125. (c) The carbohydrates are stored in plants and animals in the form of starch and glucose, respectively.
126. (b) Here, as $AB \parallel CD$
In $\triangle ABO$ and $\triangle CDO$,
 $\angle B = \angle C$ (alternate interior angles)
 $\angle A = \angle D$
 $\angle AOB = \angle COD$
So, $\triangle ABO \approx \triangle CDO$



Then, $\frac{AB}{CD} = \frac{AO}{OD} \Rightarrow \frac{5}{4} = \frac{10}{OD}$
 $\therefore OD = \frac{4 \times 10}{5} = 8\text{cm}$

127. (c) Let the numbers of boys and girls be x and y, respectively.
Then, $71x + 73y = 71.8(x + y) \Rightarrow 0.8x = 1.2y$
 $\therefore \frac{x}{y} = \frac{1.2}{0.8} = \frac{3}{2}$

128. (a) Here, $\alpha + \beta = \frac{4}{2} = 2$ and $\alpha\beta = \frac{1}{2}$

Now,
$$\frac{1}{\alpha + 2\beta} + \frac{1}{\beta + 2\alpha} = \frac{\beta + 2\alpha + \alpha + 2\beta}{(\alpha + 2\beta)(\beta + 2\alpha)}$$

$$= \frac{3\alpha + 3\beta}{\alpha\beta + 2\alpha^2 + 2\beta^2 + 4\alpha\beta} = \frac{3(\alpha + \beta)}{2(\alpha + \beta)^2 + \alpha\beta}$$

$$= \frac{3(2)}{2(2)^2 + \frac{1}{2}} = \frac{12}{17}$$

129. (a) Radius of sphere = 6 cm

\therefore Volume of sphere = $\frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 6 \times 6 \times 6$

$$= \frac{88 \times 2 \times 36}{7} \text{ cm}^3$$

Let r be its internal radius and R be its external radius, then material used to cast the cylinder

$$= \pi h(R^2 - r^2) = \frac{22}{7} \times 32(25 - r^2)$$

Hence, $\frac{22}{7} \times 32 \times (25 - r^2) = \frac{88 \times 2 \times 36}{7}$

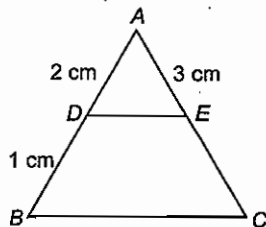
$$\Rightarrow (25 - r^2) = \frac{88 \times 2 \times 36 \times 7}{22 \times 32 \times 7} = 9$$

$$\Rightarrow r^2 = 25 - 9 = 16$$

$$\therefore r = 4 \text{ cm}$$

Thickness of cylinder = $R - r = 5 - 4 = 1 \text{ cm}$

130. (a) In $\triangle ADE$ and $\triangle ABC$,



$$\angle A = \angle ADE \parallel BC$$

$$\therefore \triangle ADE \sim \triangle ABC$$

$$\therefore \frac{AD}{BD} = \frac{AE}{EC}$$

$$\frac{2}{1} = \frac{3}{EC} \Rightarrow EC = \frac{3}{2} = 1.5 \text{ cm}$$

131. (a) Exterior angle of a regular hexagon = $\frac{360^\circ}{6} = 60^\circ$

$$\therefore \text{Each of interior angle} = 180^\circ - 60^\circ = 120^\circ$$

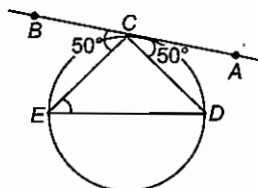
$$\therefore \text{Each interior angle of the given polygon} = \frac{9}{8} \times 120^\circ = 135^\circ$$

$$\therefore \text{Each of exterior angle of the given polygon} = 180^\circ - 135^\circ = 45^\circ$$

$$\therefore \frac{360^\circ}{n} = 45^\circ$$

$$\Rightarrow n = \frac{360^\circ}{45^\circ} = 8$$

132. (a) Join ED , then



$$\angle DEC = \angle ACD = 50^\circ$$

(angles in alternate segment)

$$\angle EDC = \angle BCE = 50^\circ$$

(angles in alternate segment)

$$\therefore \angle DEC = \angle EDC$$

$$\text{So, } CD = CE$$

133. (a) Geometric mean of 40, 50 and $x = (40 \times 50 \times x)^{1/3}$

$$(40 \times 50 \times x)^{1/3} = 10 \quad (\text{given})$$

$$\Rightarrow 40 \times 50 \times x = 10^3$$

$$\therefore x = \frac{1000}{40 \times 50} = \frac{1}{2}$$

134. (c) List price of article = ₹ 100

Cost price for dealer

$$= \frac{(100 - 20)}{100} \times \frac{(100 - 10)}{100} \times 100$$

$$= \frac{80 \times 90 \times 100}{100 \times 100} = ₹ 72$$

$$\text{Money spent on transport} = \frac{10}{100} \times 72 = ₹ 7.20$$

$$\therefore \text{Total cost price} = 72 + 7.20 = ₹ 79.20$$

$$\therefore \text{Selling price} = \frac{(100 + 15)}{100} \times 79.20$$

$$= \frac{115 \times 79.20}{100}$$

$$= ₹ 91.08$$

135. (c) Area of shaded region

$$= \text{Area of } \triangle ABP + \text{Area of } \triangle PDC$$

$$= \frac{1}{2} \times AB \times AP + \frac{1}{2} \times DC \times PD$$

$$= \frac{1}{2} \times AB \times AP + \frac{1}{2} \times AB \times PD$$

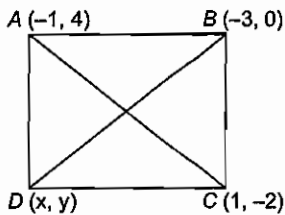
$$= \frac{1}{2} \times AB \times (AP + PD) \quad (\because AB = DC)$$

$$= \frac{1}{2} \times AB \times AD \quad [\because AD = (AP + PD)]$$

$$= \frac{1}{2} \times AB \times \frac{AB}{2} = \frac{1}{4} a^2 \quad \left[\because AB = a \text{ and } AD = \frac{a}{2} \right]$$

136. (a) Total number of 3-letter words formed with three letters E, T and N = 6 out of which TEN is one word, so P(TEN formed) = 1/6

137. (a) Let the points are $A(-1, 4)$, $B(-3, 0)$, $C(1, -2)$ and $D(x, y)$.



$$\text{Mid-point of } AC = \left(\frac{-1+1}{2}, \frac{4-2}{2} \right)$$

$$= (0, 1)$$

$$\text{Mid-point of } BD = \left(\frac{x-3}{2}, \frac{y-0}{2} \right)$$

$$\Rightarrow \frac{x-3}{2} = 0$$

$$\Rightarrow x = 3$$

$$\text{and } \frac{y}{2} = 1$$

$$\Rightarrow y = 2$$

$$\text{Thus, } (x, y) = (3, 2)$$

138. (a) Alcohol in 5 L solution = $\frac{20}{100} \times 5 = 1$ L

$$\therefore \text{Water} = 4 \text{ L}$$

If 3 L of water is added to the mixture, we have 1 L alcohol and $(4 + 3) = 7$ L of water.

$$\therefore \text{Strength of alcohol in mixture} = \left(\frac{1}{8} \times 100 \right) \% = 12.5\%$$

139. (b) Speed $\propto \frac{1}{\text{Time}}$

$$\therefore \text{Required ratio} = \frac{1}{4} : \frac{1}{3} : \frac{1}{2} = 3 : 4 : 6$$

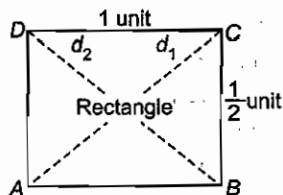
140. (d) $\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$$\therefore (6)^2 = 26 + 2(ab + bc + ca)$$

$$\Rightarrow 2(ab + bc + ca) = 10$$

$$\Rightarrow ab + bc + ca = 5$$

141. (b) Area = $x = 1 \times \frac{1}{2} = \frac{1}{2}$ = Rational



$$d_1 = d_2 = \sqrt{1^2 + (1/2)^2} = \frac{\sqrt{5}}{2}$$

$$\therefore y = d_1 + d_2 = \frac{\sqrt{5}}{2} + \frac{\sqrt{5}}{2}$$

$$= \frac{2\sqrt{5}}{2} = \sqrt{5} = \text{Irrational}$$

142. (c) $(1 + \tan A)(1 + \tan B)$ ($\because A + B = 45^\circ$)

$$= (1 + \tan A)[1 + \tan(45^\circ - A)]$$

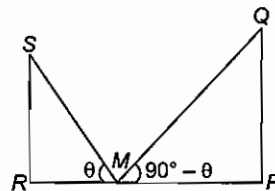
$$= (1 + \tan A) \left[1 + \frac{\tan 45^\circ - \tan A}{1 + \tan 45^\circ \tan A} \right]$$

$$= (1 + \tan A) \left[1 + \frac{1 - \tan A}{1 + \tan A} \right]$$

$$= (1 + \tan A) \left[\frac{1 + \tan A + 1 - \tan A}{1 + \tan A} \right]$$

$$= (1 + \tan A) \left[\frac{2}{1 + \tan A} \right] = 2$$

143. (b) Let PQ and RS be the two posts such that $PQ = 2RS$ (given)



If M is the mid-point of RP .

$$RM = PM = \frac{K}{2} \quad (\because RP = K, \text{ given})$$

$$\angle RMS = \theta \quad \Rightarrow \quad \angle QMP = 90^\circ - \theta$$

Let $RS = h$, then $PQ = 2h$

Now, in $\triangle PMQ$,

$$\tan(90^\circ - \theta) = \frac{PQ}{MP}$$

$$\frac{PQ}{PM} = \cot \theta \quad \Rightarrow \quad \frac{2h}{K/2} = \cot \theta$$

$$\Rightarrow \cot \theta = \frac{4h}{K} \quad \dots(i)$$

$$\text{In } \triangle SRM, \tan \theta = \frac{SR}{RM} \Rightarrow \frac{h}{K/2} = \tan \theta$$

$$\Rightarrow \frac{2h}{K} = \tan \theta \quad \dots(ii)$$

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

$$\frac{4h}{K} \times \frac{2h}{K} = 1$$

$$\Rightarrow 8h^2 = K^2 \Rightarrow h^2 = \frac{K^2}{8}$$

$$\therefore h = \frac{K}{2\sqrt{2}} \text{ m}$$

144. (d) Here, let days taken by Ravi, Mahesh and Suresh be A, B and C .

$$\frac{1}{A} = \frac{1}{B} + \frac{1}{C} \quad \dots(i)$$

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{10} \quad \dots(ii)$$

$$\text{and } \frac{1}{C} = \frac{1}{15}$$

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

$$\therefore \frac{1}{A} - \frac{1}{B} = \frac{1}{C} = \frac{1}{15}$$

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

$$\Rightarrow \frac{2}{A} = \frac{1}{10} + \frac{1}{15} = \frac{1}{6}$$

$$\therefore A = 12$$

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

$$\frac{2}{B} = \frac{1}{10} - \frac{1}{15} = \frac{1}{30}$$

$$\therefore B = 60$$

So, Mahesh alone do it in 60 days.

145. (a) Let principal be ₹ x .

Rate = $R\%$ per annum

Amount, $A_1 = ₹ 9680$, $t_1 = 2$ yr

Amount, $A_2 = ₹ 10648$, $t_2 = 3$ yr

$$A_1 = P \left(1 + \frac{R}{100} \right)^{t_1}$$

$$\Rightarrow 9680 = x \left(1 + \frac{R}{100} \right)^2$$

$$\Rightarrow A_2 = x \left(1 + \frac{R}{100} \right)^{t_2}$$

$$\Rightarrow 10648 = x \left(1 + \frac{R}{100} \right)^3$$

On dividing equations (ii) by (i), we get

$$\Rightarrow \left(1 + \frac{R}{100} \right) = \frac{10648}{9680}$$

$$\Rightarrow \frac{R}{100} = \frac{10648}{9680} - 1 = \frac{968}{9680}$$

$$\Rightarrow \frac{R}{100} = \frac{1}{10}$$

$$\therefore R = 10\%$$

From Eq. (i), we get

$$9680 = x \left(1 + \frac{10}{100} \right)^2 = x \left(\frac{11}{10} \right)^2$$

$$x = 9680 \times \frac{10}{11} \times \frac{10}{11}$$

$$\Rightarrow x = 8000$$

$$\therefore \text{Principal} = ₹ 8000$$

146. (c) The East India Company Act 1784, also known Pitt's India Act, was an Act of the Parliament of Great Britain intended to address the shortcomings of the Regulating Act of 1773, by bringing the East India company's rule in India under the control of the British Government.

147. (a) Model code of conduct is a set of guidelines laid down by the Election Commission to govern the conduct of political parties and candidates in the run-up to an election.

... (iii) **148. (b)** The Election Commission of India is a permanent constitutional body. The commission was established in accordance with the Constitution on January 25, 1950.

... (iv) **149. (c)** Secularism refer to as the state has no religion of its own and will not discriminate on the grounds of religion.

150. (c) The party system in India is a multi-party system. A multi-party system is a system in which multiple political parties have the capacity to gain control of government offices, separately or coalition.

151. (c) The Constitution of India draws its authority from the people of India. The Constitution was adopted by the people of India.

152. (c)

153. (c) Population growth is the change in a population over time and can be qualified as the change in the number of individuals in a population using per unit time.

154. (a) Population density is a measurement of population per unit or unit volume. Population density of India is 364 per sq km as per 2011 census.

... (i) **155. (d)** The balance of trade is the difference between the monetary value of exports and imports of output in an economy.

156. (d) Visakhapatnam port is one of 13 major ports in India and the only major port of Andhra Pradesh. It is India's second largest port by volume of Cargo handled.

... (ii) **157. (d)** A cheque is a document that orders a payment of money from a bank account. It is a type of bill of exchange and were developed as a way to make payments without the need to carry large amount of money.

158. (b)

159. (c) Secured employment is an feature of the organised sector. Employment is secured unless something wrong is committed by the employee.

160. (a) The per capita income of the different countries across the world is calculating in dollars for the comparative study of the countries economy.

161. (a) Kalahandi is a district of Odisha.

162. (b) The Provincial Government of the Sultanate was not well developed. The Provincial Governors of the region were usually called Walis or Muqtas.

163. (d) The Bhakti Movement originated in ancient Tamil Nadu. Nayanars and Alvars played major role in Bhakti Movement. It counters the ideology of caste and calls for universal brotherhood.

164. (a)

165. (d) Labour demand is said to be derived demand because it is derived from the output levels in the goods market, which contribute to employer's revenue and hence profit.

- 166. (d)** A constituent assembly is a body composed for the purpose of drafting or adopting a Constitution as per the provision made under the Cabinet Mission Plan of 1946.
- 167. (d)**
- 168. (d)** The President is the executive head of the state. All the actions of the government are done by Council of Ministers in his name.
- 169. (a)**
- 170. (d)** The main cause of conflict between the Vijayanagar empire and the Bahmani kingdom was the control over Krishna-Godavari Delta, Tungabhadra Doab and the Konkan area.
- 171. (a)**
- 172. (a)** The basic industries produce the primary raw materials for the factories to work steel industry, cotton ginning mills are basic industries that feed the automobiles, heavy industries.
- 173. (a)** Aluminium is the most plentiful metal in the Earth crust. It is found in the form aluminium oxide in an ore called bauxite used for aluminium and alumina production.
- 174. (c)** Business Process Outsourcing (BPO) is a subset of outsourcing that involves the contracting of the operations and responsibilities of specific business functions to a third party service provider.
- 175. (b)** Evaporation is the process by which water is converted from its liquid form to its vapour form and thus transferred from land and water masses to the atmosphere.
- 176. (a)**
- 177. (d)** The Asian Development Bank (ADB) is a regional development bank, established on August 22, 1966 to facilitate economic development of countries in Asia. Its headquarter is situated at Manila, in Philippines.
- 178. (a)** Sunita Sharma, the country's only women cricket coach has been training many Indian team probables for the last 21 years.
- 179. (a)** **180. (a)**