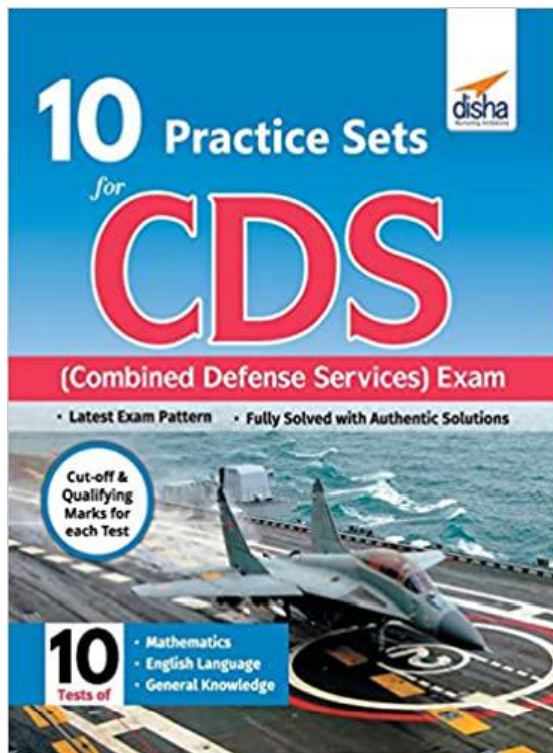


# Practice Set for CDS Exam

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# PRACTICE SET

6

Time : 360 Minutes

Marks: 300

## MATHEMATICS

- A boy multiplied a certain number  $x$  by 13. He found that the resulting product consisted of all nines entirely. Find the smallest value of  $x$ .  
(a) 76913 (b) 76933  
(c) 76923 (d) 75933
- What is the remainder when  $1! + 2! + 3! + \dots + 100!$  is divided by 7?  
(a) 0 (b) 5  
(c) 6 (d) 3
- The value of  $3 \div \left[ (8-5) \div \left\{ (4-2) \div \left( 2 \div \frac{8}{13} \right) \right\} \right]$  is  
(a)  $\frac{15}{17}$  (b)  $\frac{13}{17}$   
(c)  $\frac{15}{19}$  (d)  $\frac{13}{19}$
- A boy wanted to write the numbers from the smallest number to the greatest number of three digits. How many times he needs to press the keys of the computer to do this job?  
(a) 2708 (b) 2889  
(c) 2644 (d) 2978
- Arrange the following in ascending order  $3^{34}, 2^{51}, 7^{17}$ , we get  
(a)  $3^{34} > 2^{51} > 7^{17}$  (b)  $7^{17} > 2^{51} > 3^{34}$   
(c)  $3^{34} > 7^{17} > 2^{51}$  (d)  $2^{51} > 3^{34} > 7^{17}$
- $5^6 - 1$  is divisible by  
(a) 13 (b) 31  
(c) 5 (d) None of these
- A student, instead of finding the value of  $7/8$ th of a number, found the value of  $7/18$ th of the number. If his answer differed from the actual one by 770, find the number.  
(a) 1584 (b) 2520  
(c) 1728 (d) 1656
- Which of the following is true?  
(a)  $7^{3^2} (7^3)^2$  (b)  $7^{3^2} (7^3)^2$   
(c)  $7^{3^2} (7^3)^2$  (d) None of these
- If  $n$  is any odd number greater than 1, then  $n(n^2 - 1)$  is  
(a) divisible by 48 always  
(b) divisible by 24 always  
(c) divisible by 6 always  
(d) None of these
- $2^{73} - 2^{72} - 2^{71}$  is equal to  
(a)  $2^{69}$  (b)  $2^{70}$   
(c)  $2^{71}$  (d)  $2^{72}$
- How many two digits numbers exist which have only two factors.  
(a) 21 (b) 23  
(c) 25 (d) 27
- How many factors of 900 are not perfect squares?  
(a) 18 (b) 19  
(c) 21 (d) 17
- If  $x=1001$ , then find the value of  $\sqrt[3]{x(x^2 - 3x - 3) - 1}$ ?  
(a) 999 (b) 1000  
(c) 1001 (d) 1002
- If  $4x = 18y$ , then the values of  $\left( \frac{x}{y} - 1 \right)$  is :  
(a)  $1/3$  (b)  $7/2$   
(c)  $2/3$  (d)  $3/2$
- A B and C invested capitals in the ratio 2 : 3 : 5; the timing of their investments being in the ratio 4 : 5 : 6. In what ratio would their profit be distributed?  
(a) 7 : 16 : 21 (b) 2 : 4 : 5  
(c) 5 : 9 : 14 (d) 8 : 15 : 30
- In a bag, there are 150 coins of ₹1,50p and 25p denominations. If the total value of coins is ₹ 150, then find how many rupees can be constituted by 50 coins.  
(a) ₹ 16 (b) ₹ 20  
(c) ₹ 28 (d) None of these
- A man buys milk at ₹ 6 per litre and adds one third of water to it and sells mixture at ₹ 7.20 per litre. The gain is  
(a) 40% (b) 80%  
(c) 60% (d) 25%
- A sum of money invested at simple interest triples itself in 8 years. How many times will it become in 20 years time?  
(a) 8 times (b) 7 times  
(c) 6 times (d) 9 times
- A does a work in 10 days and B does the same work in 15 days. In how many days they together will do the same work?  
(a) 5 days (b) 6 days  
(c) 8 days (d) 9 days
- Zinc and copper are melted together in the ratio 9 : 11. What is the weight of melted mixture, if 28.8 kg of zinc has been consumed in it?  
(a) 58 kg (b) 60 kg  
(c) 64 kg (d) 70 kg

21. One fill pipe A is 3 times faster than second fill pipe B and takes 10 minutes less time to fill a cistern than B takes. Find when the cistern will be full if fill pipe B is only opened.  
(a) 20 min (b) 18 min  
(c) 15 min (d) 10 min
22. A milkman sells the milk at the cost price but he mixes the water (freely available) in it and thus he gains 9.09%. The quantity of water in the mixture of 1 litres is :  
(a) 83.33 ml (b) 90.90 ml  
(c) 99.09 ml (d) Can't be determined
23. In a class of 60 students, the average height of 30 students is  $x$  cm and that of the remaining students is  $y$  cm. Find the average height of the whole class.  
(a)  $(x + y)$  cm (b) 30 cm  
(c)  $\frac{x + y}{2}$  cm (d) None of these
24. Two trains starting at the same time from two stations, 200 km apart and going in opposite directions, cross each other at a distance of 110 km from one of them. What is the ratio of their speeds?  
(a) 11 : 20 (b) 9 : 20  
(c) 11 : 9 (d) 19 : 20
25. The difference between simple and compound interest on ₹ 6000 for 1 year at 20% per annum reckoned half yearly is :  
(a) ₹ 120 (b) ₹ 60  
(c) ₹ 180 (d) ₹ 72
26. Mallah can row 40 km upstream and 55 km downstream in 13 hours and 30 km upstream and 44 km downstream in 10 hours. What is the speed of Mallah in still water?  
(a) 6 km/h (b) 12 km/h  
(c) 3 km/h (d) 8 km/h
27. The price of consumer goods increased by 50% and its consumption decreased by 25%. Find the ratio of new expenditure to initial expenditure.  
(a) 8 : 9 (b) 9 : 8  
(c) 7 : 8 (d) 11 : 8
28. A is 30% more efficient than B. How much time will they take working together, to complete a job which A alone could have done in 23 days?  
(a) 11 days (b) 13 days  
(c)  $20\frac{3}{17}$  days (d) None of these
29. Two runner start running together for a certain distance, one at 8 km/h and another at 5 km/h. The former arrives one and half an hour, before the latter. The distance (in km) is:  
(a) 12 (b) 20  
(c) 25 (d) 36
30. If  $a = \log_8 225$  and  $b = \log_2 15$ , then  $a$ , in terms of  $b$ , is :  
(a)  $b/2$  (b)  $2b/3$   
(c)  $b$  (d)  $3b/2$
31. If one root of  $x^2 + px + q = 0$  is 4, while the equation  $x^2 + px + q = 0$  has equal roots, then the value of  $q$  is  
(a) 49/4 (b) 4/49  
(c) 4 (d) 1/4
32. One root of  $x^2 + kx - 8 = 0$  is square of the other. Then the value of  $k$  is  
(a) 2 (b) 8  
(c) -8 (d) -2
33. One year payment to a servant is ₹90 plus one turban. The servant leaves after 9 months and receives ₹65 and a turban. Then find the price of the turban  
(a) ₹ 10 (b) ₹ 15  
(c) ₹ 7.5 (d) Cannot be determined
34. You can collect Rubies and Emeralds as many as you can. Each Ruby is worth ₹ 4crores and each Emerald is worth of ₹ 5crore. Each Ruby weights 0.3 kg. and each Emerald weighs 0.4 kg. Your bag can carry at the most 12 kg. What you should collect to get the maximum wealth?  
(a) 20 Rubies and 15 Emeralds  
(b) 40 Rubies  
(c) 28 Rubies and 9 Emeralds  
(d) None of these
35. Let  $x, y$  be two positive numbers such that  $x + y = 1$ . Then, the minimum value of  $\left(x - \frac{1}{x}\right)^2 + \left(y - \frac{1}{y}\right)^2$  is  
(a) 12 (b) 20  
(c) 12.5 (d) 13.3
36. If  $x, y$  and  $z$  are real numbers such that,  $x + y + z = 5$  and  $xy + yz + zx = 3$ . What is the largest value that  $x$  can have?  
(a) 5/3 (b)  $\sqrt{19}$   
(c)  $\frac{13}{3}$  (d) None of these
37. Find the value of  $a$  for which  $(x + a)$  is a factor of the polynomial  $f(x) = x^3 + ax^2 - 2x + a + 6$ .  
(a) -3 (b) -4  
(c) 2 (d) None of these
38. If  $(x + 2)$  and  $(x - 1)$  are the factors of  $(x^3 + 10x^2 + mx + n)$ , the values of  $m$  and  $n$  are :  
(a)  $m = 5, n = -3$  (b)  $m = 17, n = -8$   
(c)  $m = 7, n = -18$  (d)  $m = 23, n = -19$
39. If the sum of the square of zeroes of the quadratic polynomial  $f(x) = x^2 - 8x + k$  is 40, find the value of  $k$ .  
(a) 3 (b) 6  
(c) 9 (d) 12
40. Simplify:  $\frac{y^2 - 5y + 4}{y^2 - 1} \cdot \frac{y - 5}{y - 1}$   
(a)  $\frac{(y - 3)(y - 5)}{y - 1}$  (b)  $\frac{(y - 4)(y - 5)}{y - 1}$   
(c)  $\frac{(y - 4)(y - 5)}{(y - 1)}$  (d)  $\frac{(4 - 3)}{(y - 1)}$

41. Perform the indicated operation and reduce the answer to lowest terms.

$$\frac{x^2 - 5x - 14}{x^2 - 3x + 2} \times \frac{x^2 - 4}{x^2 - 14x - 49}$$

- (a)  $\frac{(x-3)^2}{(x-1)(x-7)}$  (b)  $\frac{(x-1)^2}{(x-1)(x-7)}$   
(c)  $\frac{(x-2)^2}{(x-1)(x-7)}$  (d)  $\frac{(x-2)^2}{(x-1)(x-7)}$

42. Simplify:  $\frac{x-10}{(3x-8)^3} \div \frac{x}{(3x-8)^2}$

- (a)  $\frac{3x^2-9x-10}{(3x-8)^3}$  (b)  $\frac{2x^2-9x-10}{(3x-8)^2}$   
(c)  $\frac{3x^2-10}{(3x-8)^3}$  (d) None of these

43. Simplify:  $\frac{1}{x^2-13x+42} + \frac{x-1}{x-6} - \frac{x^2}{x-7}$

- (a)  $\frac{-x^3+7x^2-6x-6}{(x-6)(x-7)}$  (b)  $\frac{-x^3-7x^2-6x}{(x-6)(x-7)}$   
(c)  $\frac{+x^3-7x^2-6x}{(x-6)(x-7)}$  (d) None of these

44. If  $\frac{97}{19} = a + \frac{1}{b + \frac{1}{c}}$  where a, b and c are positive integers,

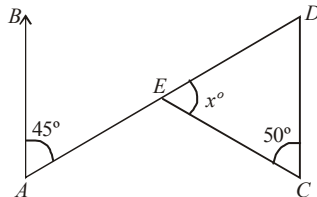
then what is the sum of a, b and c?

- (a) 16 (b) 20  
(c) 9 (d) Cannot be determined

45. If  $x - \frac{1}{x} = 2$ , then  $x^{2013} + \frac{1}{x^{2014}} = ?$

- (a) 0 (b) 1  
(c) -1 (d) 2

46. In the given figure,  $AB \parallel CD$ ,  $\angle BAE = 45^\circ$ ,  $\angle DCE = 50^\circ$  and  $\angle CED = x$ , then find the value of x.

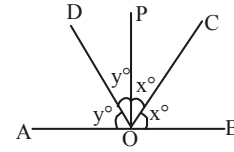


- (a)  $85^\circ$  (b)  $95^\circ$   
(c)  $60^\circ$  (d)  $20^\circ$

47. How many sides a regular polygon has with its sum of interior angles eight times its sum of exterior angles?

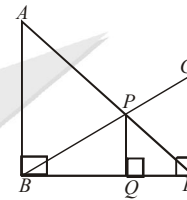
- (a) 16 (b) 24  
(c) 18 (d) 30

48. In the following figure  $\angle BOP = 2x^\circ$ ,  $\angle AOP = 2y^\circ$ , OC and OD are angle bisectors of  $\angle BOP$  and  $\angle AOP$  respectively. Find the value of  $\angle COD$  :



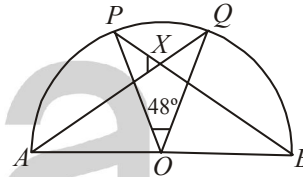
- (a)  $75^\circ$  (b)  $90^\circ$   
(c)  $100^\circ$  (d)  $120^\circ$

49. In the diagram given below,  $\angle ABD = \angle CDB = \angle PQD = 90^\circ$ . If  $AB : CD = 3 : 1$ , the ratio of  $CD : PQ$  is



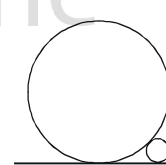
- (a) 1 : 0.69 (b) 1 : 0.75  
(c) 1 : 0.72 (d) None of these

50. In the figure given below, AB is a diameter of the semicircle APQB, centre O,  $\angle POQ = 48^\circ$  cuts BP at X, calculate  $\angle AXP$ .



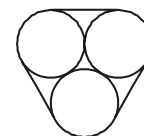
- (a)  $50^\circ$  (b)  $55^\circ$   
(c)  $66^\circ$  (d)  $40^\circ$

51. A circle with radius 2 unit is placed against a right angle. Another smaller circle is also placed as shown in the adjoining figure. What is the radius of the smaller circle?



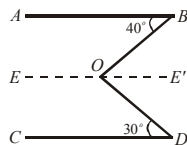
- (a)  $3 - 2\sqrt{2}$  (b)  $4 - 2\sqrt{2}$   
(c)  $7 - 4\sqrt{2}$  (d)  $6 - 4\sqrt{2}$

52. The diagram below represents three circular garbage cans, each of diameter 2 m. The three cans are touching as shown. Find, in metres, the perimeter of the rope encompassing the three cans.

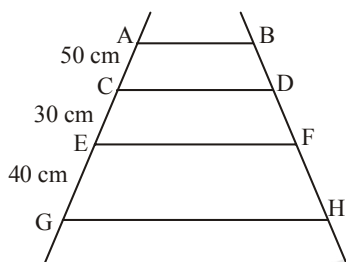


- (a)  $2\pi + 6$  (b)  $3\pi + 4$   
(c)  $4\pi + 6$  (d)  $6\pi + 6$

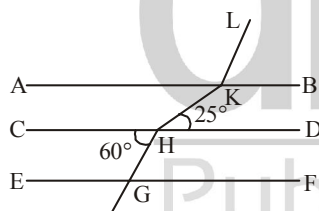
53. In the given figure,  $AB \parallel CD$ ,  $\angle ABO = 40^\circ$  and  $\angle CDO = 30^\circ$ . If  $\angle DOB = x$ , then find the value of  $x$ .



- (a)  $10^\circ$  (b)  $70^\circ$   
(c)  $110^\circ$  (d)  $20^\circ$
54. In the given figure  $AB \parallel CD \parallel EF \parallel GH$  and  $BH = 100$  cm. Find the value of  $DF$  :



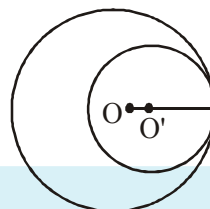
- (a) 26 cm (b) 40 cm  
(c) 25 cm (d) 24 cm
55. Maximum number of points of intersection of four lines on a plane is :
- (a) 4 (b) 6  
(c) 8 (d) 5
56. In the given figure  $AB \parallel CD \parallel EF$  and  $GH \parallel KL$ . Find  $m\angle HKL$  :



- (a)  $85^\circ$  (b)  $145^\circ$   
(c)  $120^\circ$  (d)  $95^\circ$
57. The measures of the angles of a quadrilateral taken in order are proportional to  $1 : 2 : 3 : 4$ , then the quadrilateral is :
- (a) parallelogram (b) trapezium  
(c) rectangle (d) rhombus
58. The length and breadth of a rectangle are in the ratio  $9 : 5$ . If its area is  $720 \text{ m}^2$ , find its perimeter.
- (a) 112 metre (b) 115 metre  
(c) 110 metre (d) 118 metre
59. In an isosceles right angled triangle, the perimeter is 20 metre. Find its area.
- (a)  $100 \cdot 3 - 2\sqrt{2} \text{ m}^2$  (b)  $150 \cdot 5 - \sqrt{3} \text{ m}^2$   
(c)  $500 \text{ m}^2$  (d) None of these
60. A rectangular lawn  $70 \text{ m} \times 30 \text{ m}$  has two roads each 5 metres wide, running in the middle of it, one parallel to the length and the other parallel to the breadth. Find the cost of

gravelling the road at the rate of ₹ 4 per square metre.

- (a) ₹ 2,000 (b) ₹ 1,800  
(c) ₹ 1,900 (d) ₹ 1,700
61. Four equal circles are described about the four corners of a square so that each touches two of the others. If a side of the square is 14 cm, then the area enclosed between the circumferences of the circles is :
- (a)  $24 \text{ cm}^2$  (b)  $42 \text{ cm}^2$   
(c)  $154 \text{ cm}^2$  (d)  $196 \text{ cm}^2$
62. The ratio between the length and the breadth of a rectangular park is  $3 : 2$ . If a man cycling along the boundary of the park at the speed of  $12 \text{ km/hr}$  completes one round in 8 minutes, then the area of the park (in sq. m) is:
- (a) 15360 (b) 153600  
(c) 30720 (d) 307200
63. The water from a roof, 9 sq metres in area, flows down to a cylinder container of  $900 \text{ cm}^2$  base. To what height will the water rise in cylinder if there is a rainfall of  $0.1 \text{ mm}$  ?
- (a) 1 cm (b) 0.1 metre  
(c) 0.11 cm (d) 10 cms
64. The length of a cold storage is double its breadth. Its height is 3 metres. The area of its four walls (including the doors) is  $108 \text{ m}^2$ . Find its volume.
- (a)  $215 \text{ m}^3$  (b)  $216 \text{ m}^3$   
(c)  $217 \text{ m}^3$  (d)  $218 \text{ m}^3$
65. How many spherical bullets can be made out of a lead cylinder 28 cm high and with base radius 6 cm, each bullet being 1.5 cm in diameter?
- (a) 1845 (b) 1824  
(c) 1792 (d) 1752
66. The surface area of a cube is  $150 \text{ m}^2$ . The length of its diagonal is
- (a)  $5\sqrt{3} \text{ m}$  (b) 5m  
(c)  $\frac{10}{\sqrt{3}} \text{ m}$  (d) 15m
67. A rectangular block has length 10 cm, breadth 8 cm and height 2 cm. From this block, a cubical hole of side 2 cm is drilled out. Find the volume and the surface area of the remaining solid :
- (a)  $152 \text{ cm}^3, 512 \text{ cm}^2$  (b)  $125 \text{ cm}^3, 215 \text{ cm}^2$   
(c)  $152 \text{ cm}^3, 240 \text{ cm}^2$  (d)  $125 \text{ cm}^3, 512 \text{ cm}^2$
68. Two parallel chords of a circle of diameter 20 cm are 12 cm and 16 cm long. If the chords are in the same side of the centre, then the distance between them is
- (a) 28 cm (b) 2 cm  
(c) 4 cm (d) 8 cm
69. Two circles touch internally and their centres are O and  $O'$  as shown. The sum of their areas is  $180\pi \text{ sq. cm.}$  and the distance between their centres is 6 cm.

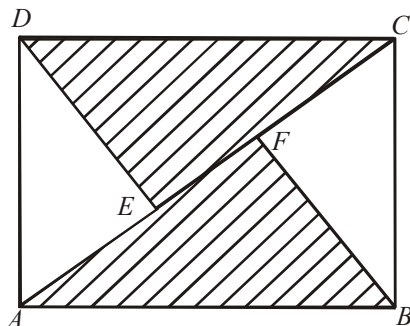




What is the diameter of the larger circle ?

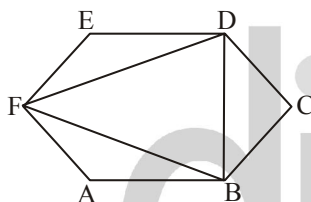
- (a) 16 cm (b) 12 cm  
(c) 18 cm (d) 24 cm

70. ABCD is a rectangle of dimensions 6 cm  $\times$  8 cm. DE and BF are the perpendiculars drawn on the diagonal of the rectangle. What is the ratio of the shaded region to that of unshaded region?



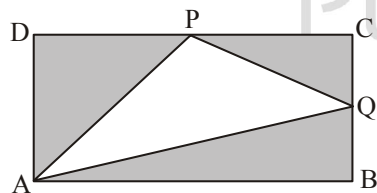
- (a) 7 : 3 (b) 16 : 9  
(c)  $4 : 3\sqrt{2}$  (d) Data insufficient

71. ABCDEF is a regular hexagon of side 6 cm. What is the area of triangle BDF?



- (a)  $32\sqrt{3} \text{ cm}^2$  (b)  $27\sqrt{3} \text{ cm}^2$   
(c)  $24 \text{ cm}^2$  (d) None of these

72. In the given figure, ABCD is a rectangle. P and Q are the mid-points of sides CD and BC respectively. Then the ratio of area of shaded portion to the area of unshaded portion is :



- (a) 5 : 4 (b) 3 : 5  
(c) 5 : 3 (d) 5 : 8

73. A circle is inscribed in an equilateral triangle of side a. What is the area of any square inscribed in this circle?

- (a)  $\frac{a^2}{3}$  (b)  $\frac{a^2}{4}$   
(c)  $\frac{a^2}{6}$  (d)  $\frac{a^2}{8}$

74. Chords AB and CD of a circle intersect at E and are perpendicular to each other. Segments AE, EB and ED are of lengths 2 cm, 6 cm and 3 cm respectively. Then the length of the diameter of the circle (in cm) is

- (a)  $\sqrt{65}$  (b)  $\frac{1}{2}\sqrt{65}$

- (c) 65 (d)  $\frac{65}{2}$

75. With P, Q & R centres, three circles are drawn such that they touch each other externally. If the sides of the  $\triangle PQR$  are 4 cm, 6 cm & 8 cm, then what is the sum of radii of the circles?

- (a) 9 cm (b) 18 cm  
(c) 10 cm (d) 15 cm

76. The mean of six numbers is 30. If one number is excluded, the mean of the remaining numbers is 29. The excluded number is

- (a) 29 (b) 30  
(c) 35 (d) 45

77. The observations 29, 32, 48, 50, x, x + 2, 72, 78, 84, 95 are arranged in ascending order. What is the value of x if the median of the data is 63?

- (a) 61 (b) 62  
(c) 62.5 (d) 63

78. The median of a set of 9 distinct observation is 20.5. If each of the largest 4 observations of the set is increased by 2, then the median of the new set is

- (a) increased by 2  
(b) decreased by 2  
(c) two times the original median  
(d) remains the same as that of original set

79. If the mean of n observations  $1^2, 2^2, 3^2, \dots, n^2$  is  $\frac{46n}{11}$ , then n is equal to

- (a) 11 (b) 12  
(c) 23 (d) 22

80. In a batch of 15 students, if the marks of 10 students who passed are 70, 50, 95, 40, 60, 70, 80, 90, 75, 80 then the median marks of all the 15 students is:

- (a) 40 (b) 50  
(c) 60 (d) 70

81. Consider the following data

Size	20	21	22	23	24
Frequency	6	4	5	1	4

I. Mean of the data is 22.65.

II. Mean deviation of the data is 1.25.

III. Mean of the data is 21.65.

IV. Mean deviation of the data is 2.25.

- (a) I and II are true (b) II and III are true  
(c) I and IV are true (d) III and IV are true

82. Tea worth ₹ 126 per kg and ₹ 135 per kg are mixed with a third variety of tea in the ratio 1 : 1 : 2. If the mixture is worth ₹ 153 per kg, what is the price of the third variety per kg ?

- (a) ₹ 182.50 (b) ₹ 170.5  
(c) ₹ 175.50 (d) ₹ 180

83. Two vessels A and B contain spirit and water in the ratio 5 : 2 and 7 : 6 respectively. Find the ratio in which these mixtures be mixed to obtain a new mixture in vessel C containing spirit and water in the ratio 8 : 5 ?
- (a) 3 : 4 (b) 4 : 3  
(c) 9 : 7 (d) 7 : 9
84. If the length of the shadow of a tower is  $\sqrt{3}$  times that of its height, then the angle of elevation of the sun is
- (a)  $15^\circ$  (b)  $30^\circ$   
(c)  $45^\circ$  (d)  $60^\circ$
85. If  $\sec \theta + \tan \theta = x$ , then  $\sec \theta = ?$
- (a)  $\frac{x^2 - 1}{x}$  (b)  $\frac{x^2 + 1}{2x}$   
(c)  $\frac{x^2 - 1}{2x}$  (d)  $\frac{x^2 + 1}{x}$
86. If  $\theta$  &  $2\theta - 45^\circ$  are acute angles such that  $\sin \theta = \cos (2\theta - 45^\circ)$ , then  $\tan \theta$  is equal to
- (a) 1 (b) -1  
(c)  $\sqrt{3}$  (d)  $\frac{1}{\sqrt{3}}$
87. The value of  $\tan^6 20^\circ - 33 \tan^4 20^\circ + 27 \tan^2 20^\circ$  is :
- (a) 2 (b) 3  
(c) 4 (d) 5
88.  $\tan 5x \tan 3x \tan 2x = ?$
- (a)  $\tan 5x - \tan 3x - \tan 2x$   
(b) 0  
(c)  $\frac{\sin 6x - \sin 3x - \sin 2x}{\cos 5x - \cos 3x - \cos 2x}$   
(d)  $\tan 9x$
89. Find the maximum and minimum value of  $16^{\sin \theta} \cdot 4^{\sin \theta} \cdot 2^{\cos \theta} \cdot 128^{\cos \theta}$
- (a) 10, -10 (b) 5, -5  
(c) 1, -1 (d) 0, -1
90. If  $3 \cos \theta = 5 \sin \theta$ , then the value of  $\frac{5 \sin \theta - 2 \sec^3 \theta + 2 \cos \theta}{5 \sin \theta + 2 \sec^3 \theta - 2 \cos \theta}$  is equal to
- (a)  $\frac{271}{979}$  (b)  $\frac{376}{2937}$   
(c)  $\frac{542}{2937}$  (d) None of these
91. If  $\theta$  is an acute angle such that  $\sec^2 \theta = 3$ , then  $\frac{\tan^2 \theta - \operatorname{cosec}^2 \theta}{\tan^2 \theta + \operatorname{cosec}^2 \theta}$  is
- (a)  $\frac{4}{7}$  (b)  $\frac{3}{7}$   
(c)  $\frac{2}{7}$  (d)  $\frac{1}{7}$
92.  $\frac{\tan \theta}{\sec \theta - 1} - \frac{\tan \theta}{\sec \theta + 1}$  is equal to
- (a)  $2 \tan \theta$  (b)  $2 \sec \theta$   
(c)  $2 \operatorname{cosec} \theta$  (d)  $2 \tan \theta \cdot \sec \theta$
93. The minimum value of  $2 \sin^2 \theta + 3 \cos^2 \theta$  is
- (a) 0 (b) 3  
(c) 2 (d) 1
94. If  $\tan 2\theta \tan 4\theta = 1$ , then the value of  $\tan 3\theta$  is
- (a)  $\sqrt{3}$  (b) 0  
(c) 1 (d)  $\frac{1}{\sqrt{3}}$
95. If  $\operatorname{cosec} 39^\circ = x$ , the value of  $\frac{1}{\operatorname{cosec}^2 51^\circ} + \sin^2 39^\circ + \tan^2 51^\circ - \frac{1}{\sin^2 51^\circ \sec^2 39^\circ}$  is
- (a)  $\sqrt{x^2 - 1}$  (b)  $\sqrt{1 - x^2}$   
(c)  $x^2 - 1$  (d)  $1 - x^2$
96. The angles of elevation of the top of a tower from two points at distances m and n metres are complementary. If the two points and the base of the tower are on the same straight line, then the height of the tower is
- (a)  $\sqrt{mn}$  (b) mn  
(c)  $\frac{m}{n}$  (d) None of these
97. The top of two poles of height 20 m and 14 m are connected by a wire. If the wire makes an angle of  $30^\circ$  with the horizontal, then the length of the wire is
- (a) 12 m (b) 10 m  
(c) 8 m (d) 6 m
98. Two men standing on opposite sides of a flagstaff measure the angles of the top of the flagstaff is  $30^\circ$  and  $60^\circ$ . If the height of the flagstaff is 20 m, distance between the men is
- (a) 46.19 m (b) 40 m  
(c) 50 m (d) 30 m
99. The value of k for which the system of equations  $3x + 5y = 0$  and  $kx + 10y = 0$  has a non-zero solution is
- (a) 0 (b) 2  
(c) 6 (d) 8
100. If the system of equations  $3x + y = 1$   
 $(2k - 1)x + (k - 1)y = 2k + 1$  is inconsistent, then k =
- (a) 1 (b) -1  
(c) -2 (d) 2

## ENGLISH LANGUAGE

**DIRECTIONS (Qs. 1-10) :** Each of the following items consists of a sentence followed by four words or group of words. Select the synonym of the word or group of words (occurring in the sentence in capital letters) as per the context.

- The engineer ROUGHED OUT his ideas on a piece of paper while he talked.  
(a) Shaped roughly (b) Rejected  
(c) Drew a quick plan (d) Described inaccurately
- He fell into an ABYSS of despair.  
(a) Well (b) Deep pit  
(c) Sea (d) Hollow
- He had the AUDACITY to interrupt the Governor of the State while the latter was addressing a gathering of academicians.  
(a) Courage (b) Authority  
(c) Foolishness (d) Arrogance
- After weeks of FRENETIC activity, the ground was ready for the big match.  
(a) Strenuous (b) Hurried  
(c) Excited (d) Hectic
- The students took COPIOUS notes during the lecture delivered by the visiting professor.  
(a) Extensive (b) Exhaustive  
(c) Bounteous (d) Abounding
- Very few people are IMPERVIOUS to criticism.  
(a) Impenetrable (b) Unaffected  
(c) Unstoppable (d) Unmindful
- The policemen kept on questioning the criminal but failed to ELICIT the truth.  
(a) Evoke (b) Wrest  
(c) Obtain (d) Extort
- Teaching in universities is now considered a LUCRATIVE job.  
(a) Risky (b) Profitable  
(c) Honourable (d) Undignified
- His descriptions are VIVID.  
(a) Detailed (b) Categorical  
(c) Clear (d) Ambiguous
- Friends have always DEPLORED my unsociable nature.  
(a) Deprived (b) Implored  
(c) Denied (d) Regretted

**DIRECTIONS (Qs. 11 - 20):** In the following items, some parts of the sentence have been jumbled up. You are required to rearrange these parts which are labelled P, Q, R, and S to produce the correct sentence. Choose the proper sequence and mark in your Answer sheet accordingly.

- in estimating the size of the earth but they were  
P  
hampered by the lack of instruments of precision  
Q  
ancient astronomers  
R

used methods which were theoretically Valid

S

Which one of the following is the correct sequence?

- (a) R-P-Q-S (b) P-R-Q-S  
(c) R-S-Q-P (d) R-P-S-Q

- it is a pity that  
P

by offering a handsome dowry

Q

a number of parents think that

R

they will be able to ensure the happiness of their daughters

S

- (a) S-Q-R-P (b) P-R-S-Q  
(c) P-S-R-Q (d) P-R-Q-S

- The common man in nurturing a more active role  
P Q

communal harmony should play

R

S

Which one of the following is the correct sequence ?

- (a) P-R-S-Q (b) S-Q-P-R  
(c) S-Q-R-P (d) P-R-Q-S

- The doctor able to find out what had caused  
P Q

the food poisoning had not been

R

S

What one of the following is the correct sequence?

- (a) S-P-R-Q (b) P-R-Q-S  
(c) P-R-S-Q (d) S-P-Q-R

- was suspended the officer being corrupt  
P Q

before his dismissal from service

R

S

Which one of the following is the correct sequence ?

- (a) Q-P-S-R (b) Q-P-R-S  
(c) R-S-Q-P (d) R-S-Q-P

- With an unsteady hand on my desk from his pocket  
P Q

he took an envelope and threw it

R

S

Which one of the following is the correct sequence?

- (a) Q-R-P-S (b) Q-R-S-P  
(c) R-Q-P-S (d) R-Q-S-P



17. she gave her old coat to a beggar  
P Q

the one with the brown fur on it shivering with cold  
R S

Which one of the following is the correct sequence?

- (a) S-Q-R-P (b) S-P-R-Q  
(c) P-R-Q-S (d) P-S-Q-R
18. At the door that he would have the door broken open  
P

the guard shouted  
Q

if the persons inside did not heed his call  
R

at the top of his voice  
S

The correct sequence should be

- (a) S-P-R-Q (b) Q-S-P-R  
(c) P-R-S-Q (d) P-Q-R-S
19. by bandits were driving through a desert area  
P Q

a man and his daughter when they were held up  
R S

The correct sequence should be

- (a) S-P-R-Q (b) R-Q-S-P  
(c) S-R-P-Q (d) P-Q-R-S

20. Our finest contemporary achievement and toil  
P

in the provision of higher education  
Q

is our unprecedented expenditure of wealth  
R

for all  
S

The correct sequence should be

- (a) P-Q-R-S (b) R-Q-P-S  
(c) R-P-Q-S (d) P-R-Q-S

**DIRECTIONS (Qs. 21-30) : Each of the following items is followed by four words or group of words. Fill in the blanks with the appropriate word or group of words.**

21. Although I was \_\_\_\_\_ of his plans, I encouraged him, because there was no one else who was willing to help.  
(a) sceptical (b) remorseful  
(c) fearful (d) excited
22. You have no business to \_\_\_\_\_ pain on a weak and poor person.  
(a) inflict (b) put  
(c) direct (d) force

23. Her uncle died in a car accident. He was quite rich. She suddenly \_\_\_\_\_ all her uncle's money.  
(a) succeeded (b) caught  
(c) gave (d) inherited

24. There was a major accident. The plane crashed. The pilot \_\_\_\_\_ did not see the tower.  
(a) likely (b) probably  
(c) scarcely (d) hurriedly

25. The car we were travelling in \_\_\_\_\_ a mile from home.  
(a) broke off (b) broke down  
(c) broke into (d) broke up

26. What are you \_\_\_\_\_ in the kitchen cupboard?  
(a) looking in (b) looking on  
(c) looking to (d) looking for

27. I did not see the point of \_\_\_\_\_ waiting for them, so I went home.  
(a) hanging around (b) hanging on  
(c) hang together (d) hanging up

28. He lost confidence and \_\_\_\_\_ of the deal at the last minute.  
(a) backed out (b) backed on  
(c) backed down (d) backed onto

29. Your present statement does not \_\_\_\_\_ what you said last week.  
(a) accord to (b) accord in  
(c) accord with (d) accord for

30. I had a vague \_\_\_\_\_ that the lady originally belonged to Scotland.  
(a) notion (b) expression  
(c) imagination (d) theory

**DIRECTIONS (Qs. 31-40) : Each of the following items consists of a sentence followed by four words. Select the antonym of the word (occurring in the sentence in capital letters) as per the context.**

31. He is a man of EXTRAVAGANT habits.  
(a) Sensible (b) Careful  
(c) Economical (d) Balanced
32. They employ only DILIGENT workers.  
(a) Unskilled (b) Lazy  
(c) Careless (d) Idle
33. His success in the preliminary examination made him COMPLACENT.  
(a) Discontented (b) Self-satisfied  
(c) Curious (d) Militant
34. In this competition, he has become the VICTOR.  
(a) Beaten (b) Frustrated  
(c) Disappointed (d) Vanquished
35. His behaviour at social gatherings is LAUDABLE.  
(a) Condemnable (b) Impolite  
(c) Unpleasant (d) Repulsive
36. The characters in this story are not all FICTITIOUS.  
(a) Common (b) Factual  
(c) Real (d) Genuine
37. The RELUCTANCE of the officer was obvious.  
(a) Eagerness (b) Hesitation  
(c) Enjoyment (d) Unwillingness

38. He is a GENEROUS man.  
 (a) Stingy (b) Uncharitable  
 (c) Selfish (d) Ignoble
39. What the critic said about this new book was ABSURD ?  
 (a) Interesting (b) Impartial  
 (c) Sensible (d) Ridiculous
40. The issue raised in the form can be IGNORED.  
 (a) Removed (b) Considered  
 (c) Set aside (d) Debated

**DIRECTIONS : (Qs. 41-50) In the following items, each passage consists of six sentences. The first sentence( $S_1$ ) and the sixth sentence ( $S_6$ ) are given in the beginning. The middle four sentences in each have been removed and jumbled up. These are labelled P, Q, R and S. You are required to find out the correct sequence of the four sentences.**

41.  $S_1$  : Political empowerment apart, the state should recognise the right to life of every citizen.  
 $S_6$  : The state should prepare for the seasons ahead, not just winter, and create shelters on a war footing.  
 P : Places of religious worship play an important role in this respect, providing food and shelter.  
 Q : Where lives are at stake, resource crunch cannot work as an excuse.  
 R : It can still intervene to save lives, by ensuring that offices, schools and other institutions that function only during the day are used as night shelters.  
 S : However, civil society organisations cannot be expected to compensate for state neglect.  
 Which one of the following is the correct sequence?  
 (a) S - Q - R - P (b) R - P - S - Q  
 (c) S - P - R - Q (d) R - Q - S - P
42.  $S_1$  : This is the age of knowledge.  
 $S_6$  : Not surprisingly then that we Indians are often labelled as being overly superstitious.  
 P : Logic and intuition are no longer enemies.  
 Q : It is also the Age of Aquarius.  
 R : The two live together comfortably in every Indian household.  
 S : So why should superstitions be considered out of place in this age of nanotechnology and computers?  
 Which one of the following is the correct sequence ?  
 (a) Q - P - S - R (b) R - S - P - Q  
 (c) Q - S - P - R (d) R - P - S - Q
43.  $S_1$  : Sachin has scored centuries against all oppositions, in all countries.  
 $S_6$  : But largely, he has been the dictator, giving nightmares to quality bowlers of the world.  
 P : There have been those rare occasions when he looked entangled at the crease.  
 Q : In fact, some of his most memorable essays came in adverse conditions.  
 R : Gavaskar called him "the closest thing to batting perfection this game has ever seen".

S : Sachin has established his stamp over all types of attack.

Which one of the following is the correct sequence ?

- (a) P - Q - S - R (b) R - Q - S - P  
 (c) P - S - Q - R (d) R - S - Q - P
44.  $S_1$  : Jagan has been working in our home for over 25 years.  
 $S_6$  : Then came the question of raising his children on the paltry sum of money he earned washing cars and sweeping homes.  
 P : And another.  
 Q : Till finally his wife delivered a son and he declared his innings.  
 R : I remember the day his first daughter was born.  
 S : And then came another.  
 Which one of the following is the correct sequence?  
 (a) R - P - S - Q (b) Q - S - P - R  
 (c) R - S - P - Q (d) Q - P - S - R
45.  $S_1$  : Diabetes is a silent killer and because it does not seem as potent as cancer or AIDS is very often overlooked without too much heed by patients.  
 $S_6$  : Though diabetes can never be totally cured it can be definitely controlled from causing serious consequences.  
 P : Worse, as many as a third of them don't even know it.  
 Q : Untreated diabetes can lead to heart and kidney failure, amputations and even death.  
 R : Millions of people suffer from diabetes.  
 S : The early symptoms of diabetes are often confused with other less grave conditions.  
 Which one of the following is the correct sequence ?  
 (a) S - Q - R - P (b) R - P - S - Q  
 (c) S - P - R - Q (d) R - Q - S - P
46.  $S_1$  : Ships, built in dry docks, are launched amidst chanting of Atharva Veda.  
 $S_6$  : The latest INS Mumbai is the tenth reincarnation of its original INS Bombay.  
 P : Even now newer warships are given names of old decommissioned warships.  
 Q : One of the enduring superstitions of the Navy is that old ships don't die.  
 R : In Europe, they break champagne bottles on the bow; in India we break coconuts.  
 S : It derives from the animistic belief that a ship has a soul that lives on and that it is reborn.  
 Which one of the following is the correct sequence ?  
 (a) R - Q - S - P (b) S - P - R - Q  
 (c) R - P - S - Q (d) S - Q - R - P
47.  $S_1$  : Jaswant Singh of 4 Garhwal Rifles was apparently relaxing at 10,000 feet when he spotted a whole battalion of Chinese troops advancing towards an Indian Army post.  
 $S_6$  : Versions of the story vary.  
 P : They surrounded him, captured the three and beheaded them.

Q : Finally the enemy sent a scout party to ascertain the real strength of the Indian defence and they found just a rifleman and two girls.

R : After the war, the Chinese, impressed by the rifleman's valour, gave his head back to the Indians who set up a temple for him.

S : With just one 303 and ammunition supplied by two girls from an abandoned dump, he mowed down about 50 enemy troopers.

Which one of the following is the correct sequence ?

- (a) P - Q - S - R (b) S - R - P - Q  
(c) P - R - S - Q (d) S - Q - P - R

48. S<sub>1</sub> : Each creature of the sea has its own significance for seamen.

S<sub>6</sub> : A dead dolphin is a bad omen.

P : One reason could be that dolphins and sharks do not cohabit.

Q : Sighting a dolphin is supposed to bring luck.

R : A dolphin swimming with the ship brings good luck.

S : Upon sighting the first dolphin on a voyage even the admiral will come up on deck to watch it.

Which one of the following is the correct sequence ?

- (a) S - R - Q - P (b) Q - P - S - R  
(c) S - P - Q - R (d) Q - R - S - P

49. S<sub>1</sub> : The debate on whether women leaders are better than men cannot be conclusive.

S<sub>6</sub> : Educating the girl-child, especially in the rural areas, could go a long way in empowering women.

P : Though they constitute about 50 per cent of the population, women's representation in the elected bodies is grossly inadequate.

Q : If there are a few good men leaders, there are a few good woman leaders too.

R : Drawing gender differences in leadership or management is unnecessary.

S : However, very few women have entered politics, which is largely a man's world.

Which one of the following is the correct sequence ?

- (a) R - Q - S - P (b) P - S - R - Q  
(c) R - Q - P - S (d) P - S - Q - R

50. S<sub>1</sub> : Any discussion on human rights is incomplete without reference to the security and terrorist threats facing the country.

S<sub>6</sub> : It is necessary to underline that it will be wrong to treat all such violent movements as pure law and order problems.

P : The police as also the armed forces are facing an uphill task in containing these violent activities and maintaining peace and order.

Q : It must be appreciated that there is an imperative need for such special legislations as the normal laws are not adequate to deal with the situation.

R : An important issue which has come up in this context relates to the need for special legislation to cope with the situation.

S : Several parts of the country have been rocked violence, terrorism, secessionist movement and insurgency.

Which one of the following is the correct sequence ?

- (a) S - P - Q - R (b) P - S - Q - R  
(c) S - P - R - Q (d) P - S - R - Q

**DIRECTIONS (Qs. 51-70) : In this Section you have a short passage. After this passage, you will find four questions based on the passage. First, read the passage and then answer the questions based on it. You are required to select your answers based on the contents of the passage and opinion of the author only.**

### PASSAGE-1

The young are those to whom we look for future strength and for future good; and the longer we live, the more anxious we become that they who are to be the fresh recruits should be morally of right stature. Around them are peculiar temptations and trials, witching, cunning, insidious and forceful: and we are obliged to see thousands falling by the way, whose fall seems needless. They, like ourselves, are to have but one chance in life. We who are somewhat advanced in years, seeing how many perils there are round about that one chance, feel an earnest desire that every advantage should be given to those who are coming onto fill our places. We can live but once; and life is usually moulded and takes its shape very early.

51. Which one of the following is correct? The author looks upon the young as :

- (a) handsome and healthy  
(b) an embodiment of possibilities  
(c) strong and hardworking  
(d) a group of boys and girls who are obedient and dutiful

52. What does the phrase "morally of right stature" mean?

- (a) Being highly educated  
(b) Having a good personality  
(c) Having rectitude  
(d) Feeling superior to others

53. Which one of the following is correct?

The failure of many a young men and women is

- (a) well deserved (b) unwarranted  
(c) fortuitous (d) sad

### PASSAGE-2

There are a great many people who have all the material conditions of happiness, i.e., health, sufficient income and clout, but who nevertheless, are profoundly unhappy. In such cases it would seem as if the fault must lie with a wrong theory as to how to live. We imagine ourselves more different from the animals than we are. Animals live on impulse and are happy as long as external conditions are favourable. Your needs are more complex than those of your pets but they still have their basis in instinct. In civilised societies, this is too apt to be forgotten. People propose to themselves some paramount objective and restrain all

impulses that do not minister to it. A businessman may be so anxious to grow rich that to this end he sacrifices health and private affection. When at last he has become rich, no pleasure remains to him except harrying other people by exhortations to initiate his noble example.

54. Which one of the following is correct?  
The "material conditions of happiness" do not include  
(a) health (b) money  
(c) power (d) hope
55. Which one of the following is correct? Modern man is very unhappy because he  
(a) is always busy making money  
(b) feels alienated from his fellow beings  
(c) cannot communicate with animals  
(d) suppresses his inner urges
56. Which one of the following is correct? The author is of the opinion that  
(a) we are superior to animals  
(b) animals are more impulsive than us  
(c) we are really not very different from animals  
(d) we have the unique ability to control our impulses
57. What does the phrase "do not minister to it" mean?  
(a) Do not support it (b) Do not oppose it  
(c) Are ignorant about it (d) Are careless about it

### PASSAGE-3

The first of the political causes of war is war itself. Many wars have been fought, among other reasons, for the sake of seizing some strategically valuable piece of territory, or in order to secure a 'natural' frontier, that is to say, a frontier which is easy to defend and from which it is easy to launch attacks upon one's neighbours. Purely military advantages are almost as highly praised by the rulers of nations as economic advantages. The possession of an army, navy and air force is itself a reason for going to a war. "We must use our forces now", so runs the militarist's argument, 'in order that we may be in a position to use them to better effect next time.'

58. Why have wars been fought?  
(a) To use weapons and make room for fresh purchase  
(b) Because people want to show their neighbours that they are strong  
(c) To capture some areas of another country which are of strategic importance  
(d) To each neighbouring countries a good lesson
59. What does a 'natural' frontier mean?  
(a) An area on the border from where you can keep watch on or attack your enemy  
(b) Some place on the border of a country having beautiful natural scenery  
(c) A borderline that has been naturally chosen by two neighbouring countries  
(d) A sudden gift of land by nature because of sudden change in the course of a river

60. Which one of the following is correct? 'Military advantages' and 'economic advantages' :  
(a) are the same for a country  
(b) may or may not be the same but the rulers make them appear to be the same  
(c) are completely different for a country  
(d) go against each other

### PASSAGE-4

When a bee, or an ant, beetle, moth or butterfly visits a flower for food, it simultaneously, and without knowing it, performs another vital function by carrying pollen from one plant to another. But not all flowers are visited by insects. A reliable guide to those that are, is their flamboyance. If the petals are large and colourful, if they smell sweet, it is because the plant needs to attract insects. Some plants have flowers which are graceful but not showy and therefore of no interest to insects. In this case the pollen is carried by the wind. Most flowers manufacture these minute grains called pollen which must be transferred to another flower of the same type before they can make seeds.

61. Which one of the following is correct?  
Plants that do not have showy flowers  
(a) get their pollen transferred to other flowers by wind  
(b) produce more pollen than others  
(c) don't reproduce easily  
(d) are very few in number
62. Which one of the following is correct?  
The fact that some flowers are flamboyant implies  
(a) that some plants do not need pollination  
(b) that we can distinguish between flowers pollinated by insects and those that are not  
(c) that flowers are more important to some plants than they are to others  
(d) that bright colours are important to all flowers
63. Which one of the following is correct?  
When insects carry pollen from one flower to another  
(a) they help the flowers to make seeds  
(b) the flowers become colourful and smell sweet  
(c) the insects find it easy to take food from the flowers  
(d) they help the plants to grow beautiful flowers
64. Which one of the following is correct?  
Insects carry pollen from one flower to another  
(a) deliberately (b) unconsciously  
(c) reluctantly (d) with extreme care
65. Which one of the following is correct?  
Insects visit flowers because they  
(a) want to carry pollen from one flower to another  
(b) are attracted by the bright colours  
(c) wish to obtain food  
(d) are in search of a mate



### PASSAGE-5

Not all sounds made by animals serve for communication, and we have only to turn to that extraordinary discovery of echo-location in bats to see a case in which the voice plays a strictly utilitarian role. To get a full appreciation of what this means we must turn first to some recent human inventions. Everyone knows that if a person shouts in the vicinity of a wall or a mountainside, an echo will come back. The further off this solid obstruction, the longer time will elapse for the return of the echo. A sound made by tapping on the hull of a ship will be reflected from the sea bottom, and by measuring the time interval between the taps and the receipt of the echoes, the depth of the sea at that point can be calculated. So was born the echo-sounding apparatus, now in general use in ships. Every solid object will reflect a sound, varying according to the size of and nature of the object. A shoal of fish will do this. So it is a comparatively simple step from locating the sea bottom to locating a shoal of fish. With experience, and with improved apparatus, it is now possible not only to locate a shoal, but to tell if it is herring, cod, or other well-known fish, by the pattern of its echo.

A few years ago it was found that certain bats emit squeaks and by receiving the echoes they could locate and steer clear of obstacles or locate flying insects on which they feed. This echo-location in bats is often compared with radar, the principle of which is similar.

66. Which one of the following is correct?  
Echo-location was first discovered in  
(a) bats (b) cods  
(c) navigation (d) radars
67. Which one of the following is correct?  
An echo will come back if you shout near  
(a) solid obstruction (b) only wall  
(c) only a mountainside (d) the sea
68. Which one of the following is correct?  
In the first paragraph, the writer says that bats use sound for  
(a) communicating with one another  
(b) communicating with animals in general  
(c) some practical purpose  
(d) fun

### PASSAGE-6

Perhaps the best political epigram of recent years is the saying that this is the century of the common man. The coming of this century can be seen far back in the extension of the suffrage and later in the development of social legislation. For many years all men have been equal before the law, every adult man and woman has the vote. We are slowly creating economic democracy, that is, such a measure of economic freedom that poverty prevents no one from taking his part in public affairs or enjoying the facilities, educational and other which the state provides for all. It might seem that when this is achieved our work is done. In fact, it is only the beginning.

69. What does the term 'epigram' mean?  
(a) A flattering remark  
(b) An unsuitable remark  
(c) A caustic remark  
(d) A short and precise remark
70. Which one of the following is correct?  
Extension of the suffrage indicates  
(a) spread of suffering  
(b) suffering of the common man  
(c) right of vote for more and more people  
(d) spread of crime in politics

**DIRECTIONS (Qs. 71-90) : In this Section a number of sentences is given. The sentences are in three separate parts and each one is labelled (a), (b), (c). Read each sentence to find out whether there is an error in any part. No sentence has more than one error. When you find an error in any one of the parts (a), (b), (c), indicate your response on the separate Answer Sheet at the appropriate space. You may feel that there is no error in a sentence. In that case letter (d) will signify a 'No error' response.**

71. He hesitated to accept the post as he did not think  
(a) (b)  
that the salary would not be enough for a man with a  
(c)  
family of three No Error.  
(d)
72. Have you gone through either of these three chapters  
(a) (b)  
that have been included in this volume? No Error.  
(c) (d)
73. I am learning English for ten years  
(a) (b)  
without much effect No Error.  
(c) (d)
74. Ramesh has agreed to marry with the girl  
(a) (b)  
of his parent's choice. No Error.  
(c) (d)
75. The pity is that no sooner. he had left the place  
(a) (b)  
than the fire broke out No Error.  
(c) (d)
76. When he was arriving the party was  
(a) (b)  
in full swing. No Error.  
(c) (d)



77. The dean wrote that he constituted a committee of experts  
(a) comprising five members  
(b) before the next meeting took place. No Error.  
(c) (d)
78. I can't help to sneeze I got drenched yesterday  
(a) (b)  
and have a bad cold. No Error.  
(c) (d)
79. I have lived from the hand to the mouth  
(a) (b)  
for all these fifty years though nobody knows it. No Error.  
(c) (d)
80. Both he as well as his friend worked in close harmony  
(a) (b)  
on this same project. No Error.  
(c) (d)
81. Let us congratulate him for his success  
(a) (b)  
in the examination No error  
(c) (d)
82. Many people prefer to travel by the road  
(a) (b)  
because it is less expensive No error  
(c) (d)
83. She was beside herself in joy  
(a)  
when she came to know  
(b)  
that she had been selected for the job No error  
(c) (d)
84. Mother tongue is as natural  
(a)  
for the development of man's mind  
(b)
85. as mother's milk is for the development of the infant's body  
(c)  
No error  
(d)
86. The Prime Minister as well as his secretary were expected to  
(a)  
arrive in Chennai on Saturday morning.  
(b) (c)  
No error  
(d)
87. The speaker was not only slow  
(a) (b)  
but also inaudible as well No error  
(c) (d)
88. The crowd surged forward to have a glimpse  
(a) (b)  
of their favourite leader. No error  
(c) (d)
89. There is a distinctive possibility  
(a)  
that he will leave the job  
(b)  
once the investigation is over No error  
(c) (d)
90. Many a star are  
(a) (b)  
twinkling in the sky. No error  
(c) (d)
91. We discussed the problem so thoroughly that  
(a) (b)  
I found it easy to work it out. No error  
(c) (d)

**DIRECTIONS (Qs. 91-105):** In the following passage there are blanks, each of which has been numbered. These numbers are printed below the passage and against each, four words are suggested, one of which fits the blank appropriately. Find out the appropriate word in each case.

As the country embarks on planning (91) the 12th Plan (2012-17) period, a key question mark (92) hangs over the process is on the energy requirements.

Growth is energy hungry, and the aspirations of growing at 9-10% will (93) huge demands on the energy resources of the country. In this energy Jigsaw, renewable energy will (94) like never before in the 12th Plan and the (95). By the rule of the thumb, India will (96) about 100 gigawatts (GW)-100,000 megawatts-of capacity addition in the next five years. Encouraging trends on energy efficiency and sustained (97) by some parts of the government the Bureau of Energy Efficiency in particular needs to be complimented for this-have led to substantially lesser energy intensity of economic growth. However, even the tendered demand numbers are (98) to be below 80GW. As against this need the coal supply from domestic sources is unlikely to support more than 25 GW equivalent capacity. Imported coal can add some more, but at a much (99) cost. Gas-based electricity generation is unlikely to contribute anything substantial in view of the unprecedented gas supply challenges. Nuclear will be (100) in the foreseeable future. Between imported coal, gas, large hydro and nuclear, no more than 15-20GW equivalent can be (101) to be added in the five-year time block. (102) (103) this, capacity addition in the renewable energy based power generation has touched about 3GW a year. In the coming five years, the overall capacity addition in the electricity grid (104) renewable energy is likely to range between 20GW and 25GW. Additionally, over and above the grid-based capacity, off-grid electricity applications are reaching remote places and (105) lives where grid-based electricity supply has miserably failed.

91. (a) On (b) Against  
(c) For (d) Onwards
92. (a) Where (b) That  
(c) Inside (d) Always
93. (a) Replace (b) Forward  
(c) Subject (d) Place
94. (a) Light (b) Pass  
(c) Publish (d) Feature
95. (a) Earlier (b) Likewise  
(c) Publicity (d) Next
96. (a) Consumed (b) Waste  
(c) Require (d) Highlight
97. (a) Developmental (b) Structures  
(c) Efforts (d) Projections
98. (a) Likely (b) Sure  
(c) Unsure (d) Unlikely
99. (a) Expected (b) Nominal  
(c) Excelled (d) Higher
100. (a) Marginal (b) Failure  
(c) Success (d) Dangerous
101. (a) Sure (b) Certain  
(c) Linked (d) Expected
102. (a) As (b) When  
(c) But (d) However
103. (a) Against (b) For  
(c) With (d) Is

104. (a) Capacity (b) Through  
(c) Project (d) Versus
105. (a) Generating (b) Lightening  
(c) Making (d) Touching

**DIRECTIONS (Qs. 106-120) : In the following questions, four alternatives are given for the meaning of the given Idiom/Phrase. Choose the alternative which best expresses the meaning of the Idiom/Phrase.**

106. A bolt from the blue  
(a) a delayed event (b) an inexplicable event  
(c) an unexpected event (d) an unpleasant event
107. Cold comfort  
(a) absurdity (b) deception  
(c) slight satisfaction (d) foolish proposal
108. To be all at sea.  
(a) a family voyage  
(b) lost and confused  
(c) in the middle of the ocean  
(d) a string of islands
109. To take to one's heels  
(a) to walk slowly (b) to run away  
(c) to march forward (d) to hop and jump
110. To bite the dust  
(a) eat voraciously (b) have nothing to eat  
(c) eat roots (d) None of the above
111. A damp squib  
(a) rainy weather (b) a disappointing result  
(c) a skirt in a laundry (d) None of the above
112. In cold blood  
(a) angrily (b) deliberately  
(c) excitedly (d) slowly
113. To take someone for a ride  
(a) to give a ride to someone  
(b) to deceive someone  
(c) to be indifferent  
(d) to disclose a secret
114. To move heaven and earth  
(a) to cause an earthquake  
(b) to try everything possible  
(c) to pray to all Gods  
(d) to tavel in a rocket
115. To smell a rat  
(a) to smell foul (b) to see a rat  
(c) to chase a rat (d) to be suspicious
116. An iron will  
(a) A widely debated issue  
(b) A fair bargain  
(c) An impracticable plan  
(d) A firm opinion
117. Get into a soup  
(a) To make things difficult  
(b) To be worrisome  
(c) To be familiar of  
(d) To get an advantage

118. Haul over the coals  
 (a) Talk irrelevantly (b) Laugh heartily  
 (c) To scold (d) Without hope
119. To carry the day  
 (a) To run away  
 (b) To die while in service  
 (c) To take an unimportant task  
 (d) To succeed
120. Go over  
 (a) Continue (b) Review  
 (c) Harmonize (d) Terminate

## GENERAL KNOWLEDGE

1. With reference to the history of ancient India, which of the following was/were common to both Buddhism and Jainism?  
 1. Inclination towards peace and celibacy.  
 2. Indifference to the authority of Vedas  
 3. Denial of efficacy of rituals.  
 Select the correct answer using the codes given below:  
 (a) 1 only (b) 2 and 3 only  
 (c) 1 and 3 only (d) 1, 2 and 3
2. With reference to the Balance of Payments, which of the following constitute/constitutes the Capital Account?  
 1. External assistance.  
 2. External Commercial Borrowings (net).  
 3. Balance of trade.  
 4. Banking Capital.  
 Select the correct answer using the codes given below:  
 (a) 1 and 2 (b) 2, 3 and 4  
 (c) 1, 2 and 4 (d) 1, 2, 3 and 4
3. Consider the following statements:  
 1. The constitution empowers the president to promulgate ordinances during the recess of parliament.  
 2. The power of the president to legislate by ordinance is a parallel power of legislation.  
 3. President can promulgate an ordinance even when any one of house of the parliament is not in session.  
 Choose the correct statement/statements using the codes given below:  
 (a) 1 and 2 only (b) 1 and 3 only  
 (c) 2 and 3 only (d) 1, 2 and 3
4. Monsoon in India enters with sudden outburst of rainfall. But the continuous rainfall is interspersed with dry spells. What is the reason behind these dry spells.  
 (a) Western disturbance  
 (b) Jet streams  
 (c) Cyclonic depressions  
 (d) None of the above.
5. Recently, Ministry of External Affairs has decided to develop a "Soft power matrix" to measure the effectiveness of India's soft power outreach.

Which of the following is/are true about "soft power"?

1. It is the ability of a country to persuade other nations of a line of thought in consonance with its goals.  
 2. It includes economic sanctions, military support etc.  
 Select the correct answer using the codes given below.  
 (a) Only 1 (b) Only 2  
 (c) Both 1 and 2 (d) Neither 1 nor 2
6. With reference to Mahalwari system, consider the following statements:  
 1. Ownership rights were vested with Zamindars.  
 2. It was an amalgamation of both the Zamindari system and Ryotwari system.  
 Which of the statements given above is/are correct?  
 (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2
7. Consider the following statements with reference to lakes in India.  
 1. In India, Natural lakes mostly lie in the peninsula region.  
 2. On the basis of their nutrient content, vast majority of lakes are Eutrophic or mesotrophic.  
 Select the correct statement/statements using codes given below:  
 (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) Neither 1 nor 2
8. Consider the following statements:  
 1. Finance Commission is a 5 member body (including the chairman)  
 2. Finance Commission submits its report to parliament.  
 Which of the above statements is/are correct.  
 (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) None of the above
9. Regarding the Loksabha and Assembly elections in India consider the following statements:  
 1. The winning candidate need not secure a majority of the votes.  
 2. Constitution prescribes a plurality system as the method of election.  
 Which of the above is/are correct.  
 (a) 1 only (b) 2 only  
 (c) Both 1 and 2 (d) None of the above
10. In 1913, under the leadership of Gandhi, Indians in South Africa protested by illegally migrating from Natal into Transvaal. What was the main cause of discontent among Indians in South Africa?  
 (a) Cancellation of suffrage rights of Indians.  
 (b) A supreme court order which invalidated all marriages not conducted according to Christian rites.  
 (c) Mass arrest of Indians protesting against colonial regime.  
 (d) British regime not giving constitutional concessions.

11. Which among the following is/are favourable condition/conditions for the formation of tropical cyclones:
1. A source of warm, moist air derived from tropical oceans.
  2. Winds near the ocean surface blowing from different directions.
  3. Winds which do not vary greatly with height.
  4. Coriolis force.
- Select the correct answer using the codes given below:
- (a) 1, 2 and 3 only (b) 2, 3 and 4 only  
(c) 1, 3 and 4 only (d) 1, 2, 3 and 4
12. Consider the following statements:
1. The Fundamental Duties are confined to citizens only and do not extend to foreigners.
  2. Fundamental Duties are non-justiciable.
  3. There is no legal sanction against the violation of fundamental duties.
- Select the correct statement/statements using the codes given below:
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3 all
13. What does venture capital mean?:
- (a) A short-term capital provided to industries.
  - (b) A long term start up capital provided to new entrepreneurs.
  - (c) Funds provided to industries at times of incurring losses.
  - (d) Funds provided for replacement and renovation of industries.
14. Which of the following is the method for converting files from Binary to ASCII?
- (a) BNCODE (b) BIASCODE  
(c) UDECODE (d) UUENCODE
15. With reference to hydrogen as a fuel read the following statements,
1. It can be extracted from any of hydrogen containing compound.
  2. Production cost of hydrogen based fuel is very less.
  3. In comparison to fossil fuels it generates lower nitric oxide.
  4. Energy content per unit weight of hydrogen based fuel is highest among all known fuels.
- Which of the statements given above is/are correct?
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 3 and 4 only (d) 1 and 4 only
16. Consider the following statements with reference to Project "Stree Swabhiman"
1. It aims to provide the adolescent girls and women; access to affordable sanitary products in rural areas.
  2. This project is undertaken by Ministry of Electronics and information technology.
- Which of the above statements/statements is/are correct?
- (a) only 1 (b) only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2
17. Consider the following statements:
1. Resistivity of a conductor is smaller than that of Insulator
  2. Resistivity of an alloy is greater than its constituent metals
- Select the correct answer using the code given below:
- (a) 1 only (b) 2 only  
(c) 1 and 2 only (d) Neither 1 nor 2
18. Consider the following statements related of Olympic Task Force:
1. It was formed with an aim to improve the performance of Indian Sportspersons in Olympic, Commonwealth, Asian as well as other International Games.
  2. Pullela Gopichand and Abhinav Bindra are members of this Task force.
  3. One of the recommendations submitted by task force is for restructuring of Sports Authority of India.
- Select the correct statement/statements using the codes given below:
- (a) 1 only (b) 2 only  
(c) 2 and 3 only (d) 1, 2 and 3
19. Consider the following statements:
1. Sulphur dioxide ( $\text{SO}_2$ ) is a major contributor to smog and acid rain.
  2. Paper industry releases ( $\text{SO}_2$ ) in the environment.
- Select the correct statement/statements using the codes given below:
- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
20. Which among the following explains the habitat areas of "Chiru"?
- (a) Open Sal with grassland farms
  - (b) High altitude plain, hill plateau & Montane Valley
  - (c) Open terrain plains, alpine meadows
  - (d) Coastal areas with Muddy, brackish water at river mouth
21. Consider the following statements with reference to the Brazzaville declaration signed in March/2018.
1. It was signed to promote world's largest Peatlands.
  2. Peatlands are wetlands that contain mixture of decomposed organic material, partially submerged in layer of water, lacking oxygen.
- Select the correct answer from the codes given below:
- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
22. Least distance of distinct vision and near point of eye,
1. is same for young adults with normal vision.
  2. is same for senior citizens with normal vision.
  3. is same for young adults with vision defect.
- Select the correct answer using the codes given below:
- (a) 1 only (b) 2 only  
(c) 3 only (d) 1, 2 and 3



23. The main objective of the 12<sup>th</sup> five-year plan is
- Inclusive growth and poverty reductions.
  - Inclusive and sustainable growth.
  - Sustainable and inclusive growth to reduce unemployment.
  - Faster, sustainable and more inclusive growth.
24. With reference to Agricultural and processed Food Export Development Authority (APEDA), Consider the following statements.
- It is under Ministry of Agriculture and farmers welfare.
  - It is mandated with the responsibility of promotion and development of the export of its scheduled products.
- Which of the following options are correct?
- Only 1
  - Only 2
  - Both 1 and 2
  - Neither 1 and 2
25. Which of the following is not among the arguments against settlement of Rohingya's in India?
- India is not the signatory of the 1951 convention relating to the status of Refugees.
  - Foreigners Act of 1946, empowers the central government to deport a person who is an illegal immigrant.
  - India is the signatory of the 1967 protocol relating to status of refugees.
  - None of the above
26. Select the range of sound frequency which can be emitted by Bats
- 0.02 kHz to 20 kHz
  - 0.002 kHz to 20000 Hz
  - 0.0025 kHz and above
  - 22kHz and above
27. With reference to elections in India, consider the following statements.
- Election commission allocates sharing of time on the cable television network to different political parties.
  - Election commission allots election symbols to political parties.
  - Registers political parties for the purpose of elections.
- Which of the above statements is/are correct?
- 1 and 2 only
  - 2 and 3 only
  - All 1, 2 and 3
  - 1 and 3 only
28. Which of the following body manages the Dam Rehabilitation and Improvement Project (DRIP) with the financial assistance from World Bank to rehabilitate about 225 dams in India?
- National Disaster Management Authority
  - Damodar Valley Corporation
  - Central Water Commission (CWC)
  - None of the above
29. Which among the following are/is sources of Eutrophication:
- Chemical fertilizers
  - Manure
  - Aquaculture
  - Fossil fuel combustion
- Select the correct answer using the codes given below:
- 1, 2 and 3
  - 2, 3 and 4
  - 1, 3 and 4
  - All of the above
30. Recently, Department of Biotechnology held "Smart Agriculture Conclave" in order to set the stage for Farmer Zone to cater to the needs of the farmers. Which of the following is/are not the features of Farmer Zone?
- It is a cloud based platform to collect, collate and curate field and remotely sensed data.
  - It will be a multi-purpose window.
  - It will be meant specifically for Indian farmers.
- Select the correct answer using the codes given below:
- 2 and 3
  - Only 1
  - 1, 2 and 3
  - 1 and 2
31. Consider the following statements with reference to Project "MAUSAM."
- It will Showcase a Transnational Mixed Route (including Natural and Cultural Heritage) on the world Heritage list.
  - Archaeological Society of India (ASI) is the nodal agency of this project.
- Which of the above statement/statements is/are correct?
- Only 1
  - Only 2
  - Both 1 and 2
  - Neither 1 nor 2
32. Consider the following statements:
- According to Census Act, 1948: Government must keep individual's personal information confidential.
  - All the personal information given in the Socio-Economic Caste Census (SECC) is open for use by Government departments.
- Select the correct statement/statements using the codes given below:
- 1 only
  - 2 only
  - 1 and 2 both
  - Neither 1 nor 2
33. According to a group of scientists, aeroplanes may be ejecting significant amounts of black carbon (BC) and this may be depleting the ozone layer: In this context consider the following statements:
- Black carbon cannot be produced naturally.
  - It is known to be more potent than carbon dioxide in whetting global warming.
  - Black carbon is emitted directly into the atmosphere in the form of fine particles (PM 2.5)
- Select the correct statement/statements using the codes given below:
- 1 and 2 only
  - 2 and 3 only
  - 1 and 3 only
  - 3 only
34. Consider the following statements:
- Betwa is the only big river that joins the Ganga directly from the Southern plateau.
  - Ambala is located on the water divide between the Indus and the Ganga river system.
- Select the correct answer from the codes given below:
- 1 only
  - 2 only
  - Both 1 and 2
  - Neither 1 nor 2



35. Which of the following is/are not the socialist directive principle as enshrined in part-IV of the constitution:

1. Organise Village Panchayats.
2. Equal pay for equal work for men and women.
3. To prohibit the consumption of intoxicating drinks and drugs.
4. Maternity relief and humane conditions of work.

- (a) 1, 2 and 3 only (b) 1 and 3 only  
(c) 2 and 4 only (d) All the above

36. Bioindicators, sometimes seen in the news, are related to

- (a) Health of few endangered species
- (b) Health of the patient
- (c) Health of the ecosystem
- (d) Health of the plant

37. Which State Government has rolled out 'Asmita Yojana' on the International Women's Day to provide affordable sanitary Pads to school girls and women:

- (a) Gujarat (b) Maharashtra  
(c) Kerala (d) Tamilnadu

38. With reference to the Ajanta and Ellora Caves; consider the following statements:

1. The Ajanta Caves are entirely Buddhist Caves.
2. These Caves combine 3 art forms i.e. architecture, sculpture and painting.
3. The paintings in these caves are inspired from Jataka stories.

Select the correct answer from the codes given below:

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1, 2 and 3 all (d) 1 and 3 only

39. Read the following statements with reference to gravitational force

1. The force between any two objects is equal to the sum of their masses
2. It is inversely proportional to the root square of the distance between the objects
3. It is a weak force

Select the correct answer using the codes given below:

- (a) 2 only (b) 3 only  
(c) 1 and 2 only (d) 1, 2 and 3

40. Consider the following Statements about the 'State of World's Children Report':

1. It is a biennial report published by UNICEF.
2. The theme of the 2017 report is 'Children in the Digital World'.
3. The report covers only the positive impact of digitalization on children.

Which of the statements given above is/are incorrect?

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

41. With reference to Satavahana rulers, consider the following statements:

1. They were identified through metonymics
2. Succession to the throne was generally Patrilineal.
3. Many Chaityas were cut out of the solid rock in the north-western Deccan.

Select the correct statement/statements using the code given below:

- (a) 1 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

42. Which of the following statements best describes the process of respiration and respiratory organs in frogs and mammals?

1. Frogs and mammals both contain a pair of lungs
2. Exchange of gases takes place through skin in frog but not in human

Select the correct answer using the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

43. Consider the following events:

1. Chauri-Chaura incident.
2. Moplah rebellion in Kerala.
3. Kakori train robbery.

The above given events took place under the Viceroy ship of

- (a) Lord Chelmsford (b) Lord Reading  
(c) Lord Irwin. (d) Lord Hardinge II

44. With reference to the Jain Philosophy, consider the following statements:

1. The doctrines of Jainism were similar from the period of Rishabhathatha to Mahavira.
2. Jainism recognized the existence of god as a supreme.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

45. Which among the following is/are not Jain literature

1. Kalp Sutra
2. Angutar Nikaya
3. Acharang Sutra
4. Milanda Panho

Select the correct answer from the codes given below.

- (a) 1 and 3 only (b) 2 and 4 only  
(c) 1 and 4 only (d) 2 and 3 only

46. Holographic technology can be used in which of the following fields

1. Engineering and Architecture
2. Health and medicine
3. Tradeshow

Select the correct answer using the codes given below:

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 3 only (d) 1, 2 and 3

47. Which committee suggested the incorporation of eight fundamental duties in the constitution?

- (a) Balwant Rai Mehta Committee  
(b) Justice Shah Committee.  
(c) Sardar Swaran Singh Committee  
(d) None of the above

48. Consider the following statements with reference to the Olive Ridley turtles:

1. They are smallest and most abundant of all the sea turtles.
2. They are carnivorous.
3. They are found only in warmer waters.

Select the correct answer from the codes given below:

- (a) 1 only (b) 1 and 3 only  
(c) 1 and 2 only (d) 1, 2 and 3 only

49. Which among the following is/are source of air pollution?

1. Tobacco smoking
2. Pollen from plants
3. Pesticides
4. Hair from pets

Select the correct answer using the codes given below:

- (a) 1, 2, 3 and 4 (b) 1, 2 and 3 only  
(c) 2, 3 and 4 only (d) 1, 2 and 4 only

50. The UNESCO has inscribed three Indian performing art forms in the Representative list of the Intangible Cultural Heritage of Humanity.

Which among the following is not one of them:

- (a) Mudi yettu (a ritual theatre of Kerala)  
(b) Chhau dance.  
(c) Kalbelia folk songs  
(d) None of the above

51. Which of the following is the correct order of the given hills from north to south

- |                    |                   |
|--------------------|-------------------|
| 1. Gawilgarh Hills | 2. Shevaroy Hills |
| 3. Javadi Hills    | 4. Cardamom Hills |

**Codes :**

- (a) 1, 3, 2, and 4 (b) 1, 3, 2 and 4  
(c) 3, 1, 4 and 2 (d) 3, 4, 1 and 2

52. Read the following statements about Superconductivity,

1. It is the state of matter in which materials lose their electrical resistance
2. The phenomenon takes place generally at higher temperature

Select the correct answer using the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

53. Which of the following is not among the reasons for large number of drug addicts in India?

- (a) Rise of virtual currencies  
(b) Presence of Golden Crescent and Golden Triangle in the border regions up Myanmar, Laos and Thailand.  
(c) Abuse of pharmaceutical preparations like codeine based cough syrups and pain killers like 'Proxikon'.  
(d) Availability of Pucca Roads along the International Border and adequate infrastructure.

54. Consider the following statements with reference to the Faraizi Movement:

1. Its scene of action was in East Bengal.
2. It aimed at promoting social innovations current among the Muslims of the region.

Select the correct statement/statements using the codes given below.

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2.

55. Consider the following statements:

1. A minister can only be a member of the Lok Sabha.
2. The ministers are collectively responsible to the Parliament.

Select the correct statement/statements using the codes given below.

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2.

56. Consider the following statements:

1. The centre of curvature of a convex mirror lies in front of it.
2. Convex lens is also known as converging lens.
3. Focal length is the distance between pole and principal focus of a spherical mirror.

Select the correct answer using the code given below.

- (a) 2 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3

57. The amount of Nitrogen fixed by man through industrial process has far exceeded the amount fixed by the Natural cycle. As a result Nitrogen has become a pollutant which can disrupt the balance of nitrogen. Excess of Nitrogen on the earth may lead to

1. Acid rain
2. Eutrophication
3. Harmful Algal Blooms

Select the correct answer from the codes given below:

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

58. Increasing Sea Salinity is a major concern for the environmentalists. In this context, consider the following statements.

1. Change in temperature influences the salinity of sea.
2. Change in density influences the salinity.
3. Major source of Sea Salinity is terrestrial discharge by rivers.

Which of the statement/statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) All the above

59. Gandhi set up Tolstoy Farm in South Africa in 1910. What was the objective behind establishment of the Tolstoy Farm:

- (a) To arrange the marriage certificates for Indians.  
(b) To house the Indian windows.  
(c) To promote Social reform among Indians residing in South Africa.  
(d) To house the families of the Satyagrahis.

60. Consider the following statements with reference to the Socio Economic Caste Census; 2011 (SECC).

1. SECC; 2011 was conducted by Ministry of Law and Justice.
2. SECC; 2011 was the first paperless census in India.
3. SECC; 2011 data will also be used to identify beneficiary and expand the direct benefit transfer scheme.

Select the correct statement/statements using the codes given below:

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

61. Which nutrient is considered to be the main cause of excessive growth of rooted and free-floating microscopic plants in lakes?

- (a) Phosphorus (b) Sulphur  
(c) Nitrogen (d) Carbon

62. Which of the following is/are among the reasons behind stagnation of Agricultural sector during the colonial period:

1. Land Revenue System.
2. Exploitative nature of zamindars.
3. Lack of irrigation facilities.
4. Negligible use of fertilizers.
5. Commercialisation of Agriculture.

Select the correct answers from the codes given below

- (a) 1, 2, 3 and 5 only (b) 2, 3, 4 and 5 only  
(c) 1, 2, 3 and 4 only (d) 1, 2, 3, 4 and 5 only

63. Consider the following statements about Trans-Pacific partnership-11.

1. Its members include USA and 11 other Pacific Rim nations.
2. The agreement has been renamed as comprehensive and progressive agreement for Trans-Pacific partnership which of the above statement/statements is/are correct?

- (a) only 1 (b) only 2  
(c) Both 1 and 2 (d) Neither 1 nor 2

64. Consider the following statements:

1. Tundra biome is devoid of trees except stunted shrubs.
2. The dominating vegetation of Taiga biome is coniferous evergreen mostly spruce.

Select the correct answer from the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

65. Read the following statements with reference to auditory ossicles,

1. Inside human body three pairs of ossicles are present in each ear
2. These are helpful in increasing the efficiency of transmission of sound waves to the ear.

Select the correct statement/statements using the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

66. Which among the following is/are examples of Direct Taxes:

1. Income Tax
2. Wealth Tax
3. Minimum Alternate Tax (MAT)

Select the correct answer from the codes given below:

- (a) 1 & 2 only (b) 2 & 3 only  
(c) 1 & 3 only (d) All the above.

67. Consider the following statements.

1. G-4 nations comprises of India, South Africa, Brazil and Canada.
2. G-4 nations support each other's bids for permanent seats in the UN Security council

Which of the statement/statements given above is/are correct.

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

68. Consider the following statements:

1. Reaction of a metal with acid produces hydrogen gas.
2. Salt is produced following reaction of metal with acid.
3. Metals are electropositive.

Which of the statements given above is/are correct?

- (a) 1 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3

69. Consider the following statements:

1. The president can pardon sentences inflicted by court martial while governor cannot.
2. Both president and governor can pardon death sentence.

Select the correct statement/statements using the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

70. Which of the following ingredients or components is/are revealed by The Preamble of the Constitution.

1. Nature of Indian State.
2. Source of authority of the constitution.
3. Objectives of the constitution.
4. Date of adoption of the constitution.

- (a) 1, 2 and 3 only (b) 2, 3 and 4 only  
(c) 1, 3 and 4 only (d) All the above

71. The Genetic Engineering Appraisal Committee (GEAC) recently made recommendation on "GM crops and its impact on environment".

With reference to the Impact of GM crops on Environment consider the following statements.

1. GM crops do not contaminate the soil and water.
2. GM products being sold in the country have no labeling.

Select the correct statement/statements using the codes given below:

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

72. Consider the following statements :

1. Constitution declares Delhi as the seat of the Supreme court.
2. The president can appoint other place or places as seat of the Supreme court.

Which of the following are correct –

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) None

73. Read the following statements about Super Pressure Balloon Technology,

1. Super Pressure Balloon Technology serves as low-cost, near-space access for scientific payloads

2. The Super Pressure Balloon is made up of **polyethylene** film  
Select the correct statement/statements using the codes given below:  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
74. With reference to August offer 1940, Consider the following statements:  
1. It proposed dominion status for India.  
2. It proposed the expansion of Viceroy council.  
3. It proposed the appointment of a constitution making body, immediately after war.  
Select the correct statement/statements using the code given below:  
(a) 1 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
75. Which among the following is/are reasons for development of cotton Textile Industry in TamilNadu:  
(a) Availability of cheap hydro-electricity  
(b) Availability of cheap labour  
(c) Availability of internal market.  
(d) All the above.
76. Which among the following is/are ecological cause/causes of Coral bleaching:  
1. Temperature  
2. Solar Irradiance  
3. Sedimentation  
4. Sub aerial Exposure  
Select the correct answer from the codes given below:  
(a) 1 and 2 only (b) 3 and 4 only  
(c) 1, 3 and 4 only (d) All the above
77. Consider the following statements:  
1. Rajasthan was the first state to establish Panchayati Raj.  
2. Formation of Panchayats depend on the will of the state government.  
Select the correct statement/statements using the codes given below:  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
78. Which of the following is/are the characteristic/characteristics of Anthracite grade of coal?  
1. It is the hard coal and best grade of coal  
2. It has 80 to 95 per cent carbon  
3. It has semi-metallic luster and negligible proportion of carbon  
4. In India, It is found only in Odisha and that too in small quantity.  
Select the correct statement/statements using the codes given below:  
(a) 1, 2 and 3 (b) 1 and 2  
(c) 2, 3 and 4 (d) All are correct
79. The relationship between the percentage of income or wealth earned and percentage of people who earned that particular percentage of income/wealth is best described by—  
(a) Kuznets curve (b) Gini coefficient  
(c) Lorenz curve (d) Engel's law
80. Which among the following is/are characteristics of Ecotone:  
1. It is a zone of tension.  
2. It may contain certain species which are entirely different from that of the adjoining communities.  
3. An Ecotone is always a narrow zone.  
Select the correct answer from the codes given below:  
(a) 1 and 3 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3
81. Consider the following statements:  
1. The Governor cannot return a Money Bill for re-consideration of the state legislature.  
2. When a money bill is reserved for consideration of president, he/she can return the bill for the re-consideration of the state legislature.  
With reference to state-legislature, which of the above given statement is/are correct.  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
82. Which of the following correctly explains the purpose of "EoTT equipment" proposed by Indian Railways?  
(a) Prevention of collision of train bogies  
(b) It is wireless communication between stations and train  
(c) Communication system driver and last wagon of train  
(d) Facility to run the train in low visibility conditions like fog
83. Which of the following is/are among the international initiatives taken to contain Nitrogen Pollution?  
1. Gothenburg Protocol  
2. Kyoto Protocol  
3. Minamata Convention  
Select the correct answer using the codes given below.  
(a) Only 1 (b) Only 2  
(c) 1 and 2 only (d) 2 and 3 only
84. Which of the following best explains the term "Thermal Pollution":  
(a) It is rise or fall in average temperature of planet earth  
(b) It is rise/fall in extremes of temperature  
(c) It is rise or fall in the temperature of a natural aquatic environment  
(d) None of the above
85. Which of the following is/are true with respect to HT cotton:  
1. It can transform weeds into super weeds on large-scale.  
2. It will threaten growth and yields of all crops in future.  
Select the correct answer from the codes given below:  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
86. Consider the following statements with reference to Indian Classical Music:  
1. Talas are rhythmic cycles.  
2. Raga is a series of five notes only.  
Select the correct statement/statements using the codes given below:  
(a) 1 only (b) 2 only  
(c) 1 and 2 both (d) Neither 1 nor 2



87. Which of the following is/are among the areas of low rainfall in India?
1. Parts of western coast.
  2. Western Rajasthan.
  3. Interior of the Deccan plateau.
  4. East of the Sahyadris.
- Select the correct answer from the codes given below:
- (a) 1, 2 and 3 only (b) 2, 3 and 4 only  
(c) 1, 3 and 4 only (d) 1, 2, 3 and 4
88. Which of the following best describes 'SOHUM'?
- (a) Indigenously developed low-cost micro-hearing device for hearing-impaired adults.
  - (b) Micro-hearing device for persons with impaired hearing.
  - (c) Micro-hearing device for children above 2 years of age.
  - (d) Indigenously developed low-cost hearing device for hearing-impaired newborns.
89. Montreux Record highlights are those sites where adverse changes in ecological character have occurred or are occurring. Certain Indian sites have been placed on the Montreux Record.
- In this context consider the following statements.
1. Chilika lake was added due to Siltation.
  2. Loktak lake was added due to deforestation in the catchment area.
  3. Keoladeo national park was added due to damage caused by forest fires.
- Select the correct statement/statements using the codes given below:
- (a) 1 and 3 only (b) 1 and 2 only  
(c) 2 and 3 only (d) All the above
90. Arrange the following rivers of northeast India in the order from east to west.
1. Raidak
  2. Jaldhaka
  3. Kamneng
  4. Manas
- Select the correct answer from the codes given below:
- (a) 1, 3, 2, 4 (b) 3, 4, 1, 2  
(c) 4, 3, 2, 1 (d) 1, 2, 3, 4
91. Consider the following statements:
1. Spines of cactus are modified leaves.
  2. Edible parts of onions are Modified leaves.
  3. Modified leaves of saffron called threads are used as seasoning agent in food.
- Which of the statements given above is/are correct?
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
92. Jawara, Matki, Phulpati are the folk dances of
- (a) Rajasthan (b) Himachal Pradesh  
(c) Madhya Pradesh (d) Haryana
93. The eight core industries comprise 40.27% of the weight of items included in the Index of Industrial Production (IIP). Which among the following is not counted in the core industries
- (a) Coal (b) Refinery Products  
(c) Textile (d) Cement
94. Select the correct statement about Free Space Optical Communication technology,
- (a) Data is transmitted by propagation of different electromagnetic waves in vacuum.
  - (b) Data is transmitted by propagation of light waves in free space.
  - (c) Data is transmitted by propagation of light waves in free space using optical fibers.
  - (d) Data is transmitted by propagation of light waves in vacuum using free space optical fibers.
95. Consider the following statements:
1. The savanna is confined within the tropics.
  2. Trade winds are the prevailing winds in Savanna.
  3. Savanna witnesses moderate diurnal range of temperature.
- Select the correct answer from the codes given below:
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 2 and 3 only (d) 1, 2 and 3
96. Which among the following is/are among ways to remove the excess nutrients from a lake:
1. Flushing with nutrient poor water
  2. Deep water abstraction
  3. Removal of fishes and Macrophytes
  4. Sludge removal
- Select the correct answer from the codes given below:
- (a) 1, 2 and 3 (b) 1, 2 and 4  
(c) 2, 3 and 4 (d) 1, 2, 3 and 4
97. Which of the following statements explains Circadian Rhythm?
1. It is associated with Day and night cycle
  2. It is synchronized with silence and noise phase
  3. It influences physiology of the body
- Select the correct statements using the codes given below:
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
98. The Faizpur session ; 1936 of the Indian National Congress is unique in itself. what was so remarkable about the Faizpur session?
- (a) Nehru urged congress to adopt Socialism as its goal.
  - (b) The session held in a village for the first time.
  - (c) Rajendra Prasad took over as president after Subhas Chandra Bose resigned.
  - (d) The Swarajya party was formed.
99. Consider the following statements:
1. The northern hemisphere will have its longest day in Summer Solstice.
  2. On equinoxes, all parts of the world have equal days and nights.
- Select the correct statement/statements using the codes given below:
- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
100. Select the most appropriate statements with reference to 'Multiple Burn Technology',
1. It is related to usage of solid, liquid and cryogenic propellants in the same system.



2. It is used during launching of satellites into multiple orbits using burning of different fuels.
3. It refers to Switching 'off' and switching 'on' of engine to control height.

Select the correct answer using the codes given below:

- (a) 1 only (b) 2 only  
(c) 3 only (d) Both 2 and 3

101. Who among the following was/were associated with 'Social Reform Movements in South India' ?

1. Mahadev Govind Ranade.
2. Ram Krishna Bhandarkar.
3. Sree Narayan Guru.

Select the correct answer using the code given below :

- (a) 1 only (b) 1 and 2 only  
(c) 3 only (d) 1, 2 and 3

102. Which provision of the Present Indian Constitution resembles closely to the "Instrument of Instructions" enumerated in the Government of India Act of 1935—

- (a) Fundamental Rights
- (b) Emergency Provisions
- (c) Directive Principles of State Policy
- (d) Other than those given in the options

103. Consider the following statements with reference to ALGAL BLOOMS:

1. A bloom often results in a colour change in the water.
2. Algal blooms can be of any colour.
3. All algal blooms are harmful for the water ecosystem.

Select the correct answer from the codes given below:

- (a) 1 and 3 only (b) 2 and 3 only  
(c) 1, 2 and 3 (d) 1 and 2 only

104. Consider the following statements with reference to the "Right to Internet Access".

1. Right to access internet comes under fundamental right of expression and cannot be curtailed at any cost.
2. Mumbai is the first state to declare availability of internet as a basic right for every citizen.
3. Nodal officers have been appointed at the state level to keep tabs on the net for offensive material.

Which of the statement/statements given above is/are correct?

- (a) 1 and 3 (b) 2 and 3  
(c) 1 and 2 (d) All are correct

105. Consider the following statements with reference to the Maratha Empire of 18th century.

1. The Maratha raids in Delhi were not conducted for conquest.
2. The Peshwaship of Baji Rao was the period of the greatest expansion of the Maratha power.

Select the correct statements from the codes given below.

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

106. With reference to "National Commission for Scheduled Tribes" consider the following questions.

1. It found place in the original constitution as implemented on 26-Jan 1950.
2. It consists of a chairperson, a vice-chairperson and 3 other members.

3. The commission is vested with the power to regulate its own procedure.

Which of the above statement is/are true.

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3 all are correct

107. Kyanite is a heat resistant mineral. It is used in glass, cement and china clay industries. The largest producer of kyanite in India is

- (a) Maharashtra (b) Karnataka  
(c) Jharkhand (d) Assam

108. Consider the following statements:

1. Calcium carbonate changes into calcium oxide and carbon dioxide on cooling. It is a decomposition reaction.
2. Burning of coal to form carbon dioxide is a type of combination reaction

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

109. Consider the following statements with reference to Pradhan Mantri MUDRA Yojana

1. It is a program launched to give access to cheap credit to poor and small fledgling businesspersons.
2. Under the program, loans are given to non-farm income generating enterprises whose credit needs are below '10 lakh
3. Micro Units Development and Refinance Agency Ltd. (MUDRA) is an NBFC.

Which of the above statement/statements is/are correct?

- (a) 1 and 2 (b) 2 and 3  
(c) All are correct. (d) 1 and 3

110. With reference to the Mughal period the term 'Jizya' refers to

- (a) Religious tax on Muslims  
(b) Religious tax on Non-Muslims  
(c) Land tax  
(d) Trade tax

111. Which of the following statements can be considered as a reason behind judicial delays in India.

1. Poor judge-population ratio.
2. Impasses over appointment of judges.
3. Liberal adjournment of cases.
4. Police lack scientific training.

Select the correct answer using the codes given below:

- (a) 1, 2, 4 only (b) 1, 2, 3 only  
(c) 2, 3, 4 only (d) 1, 2, 3, 4 All

112. Which among the following found place in the Motilal Nehru Report, 1928;

1. Dominion status for India.
2. Separate electorates for Muslims
3. Linguistic provinces.
4. Certain fundamental rights.

Select the correct answer from the codes given below.

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1, 3 and 4 only (d) All the above

113. Match List-I with List-II and select the correct answer using the code given below the Lists

**List-I**

(Person)

- A. Dr. A B Pandey  
B. Mahesh Kumar Jain  
C. Dr. Sanjiv Misra  
D. Pankaj patel

**List-II**

(Post)

1. President, FICCI  
2. Chairman, GST Network  
3. Deputy Governor, RBI  
4. Chairman, Axis Bank

**Code :**

- (a) A B C D                      3 1 2 4  
(b) A B C D                      3 2 1 4  
(c) A B C D                      4 2 1 3  
(d) A B C D                      2 3 4 1

114. Which of the following countries are in top-5 of WJP's Rule of Law Index 2017-18?

1. Sweden  
2. United States  
3. Netherlands  
4. Denmark  
5. Bhutan

Select the correct answer using the code given below.

- (a) 1 and 3 only                      (b) 1, 3 and 4  
(c) 1 and 4 only                      (d) 1, 2, 4 and 5

115. Read the following statements about Regional Comprehensive Economic Partnership (RCEP),

1. It is a free trade agreement (FTA) involving ASEAN nations with non-ASEAN countries  
2. India is one of the members of this partnership.  
3. The number of non-ASEAN members in the RCEP is 5

Choose the correct option.

- (a) 1 and 2 only                      (b) 2 and 3 only  
(c) Both 1 and 3                      (d) 1, 2 and 3

116. Read the following statements about Shanghai Cooperation Organisation (SCO)

1. Pakistan, Russia and Tajikistan are members of this Organisation.  
2. India joined the organisation as observer country in 2018.  
3. The 15<sup>th</sup> meeting of Cultural Ministers of the SCO was held in Shanghai.

Choose the correct option.

- (a) 1 only                                      (b) 2 only  
(c) Both 1 and 3                              (d) Both 2 and 3

117. Who is the author of *The Great Indian Novel*-which was awarded the commonwealth Writer's Prize for Best Book of the Eurasian region?

- (a) V S Naipaul                              (b) Shashi Tharoor  
(c) David Lodge                              (d) Rana Dasgupta

118. Read the following statements about the recent test firing of HeliNa

1. The missile was launched from the Integrated Test Range at Sriharikota, Andhra Pradesh  
2. It is one of the indigenously developed advanced anti-tank missile system

Choose the correct option.

- (a) 1 only                                      (b) 2 only  
(c) 1 and 2 both                              (d) Neither 1 nor 2

119. In which of the following Countries 10<sup>th</sup> and 11<sup>th</sup> World Hindi Conferences were organized?

- (a) South Africa and India respectively  
(b) Suriname and Mauritius respectively  
(c) Nepal and India respectively  
(d) India and Mauritius respectively

120. Which of the following Cities tops the Global Liveability Index-2018?

- (a) Melbourne                              (b) Calgary  
(c) Vienna                                      (d) London

# HINTS & SOLUTIONS

## PRACTICE SET-6

### MATHEMATICS

1. (c) By actual division, we find that 999999 is exactly divisible by 13. The quotient 76923 is the required number.
2. (b)  $7! + 8! + 9! + 10! + \dots + 100! = 7.6! + 8.7.6! + 9.8.7.6! + \dots + 100!$  is completely divisible by 7 as each of the terms contain at least one 7 in it.  
Now,  $1! + 2! + 3! + 4! + 5! + 6!$   
 $= 1 + 2 + 6 + 24 + 120 + 720 = 873$   
which leaves a remainder of 5 when divided by 7.
3. (b)  $3 \div \left[ (8-5) \div \left\{ (4-2) \div \left( 2 + \frac{8}{13} \right) \right\} \right]$   
 $\Rightarrow 3 \div \left[ (3) \div \left( 2 + \frac{34}{13} \right) \right]$   
 $\Rightarrow 3 \div \left[ (3) \div \left( 2 \times \frac{13}{34} \right) \right]$   
 $\Rightarrow 3 \div \left[ \frac{3 \times 34}{13 \times 2} \right]$   
 $\Rightarrow \frac{3 \times 13 \times 2}{3 \times 34} = \frac{13}{17}$
4. (b) He wants to write from 1 to 999. He has to write 9 numbers of one digit, 90 numbers of two digits and 900 numbers of three digits.  
Total number of times  $= 1 \times 9 + 2 \times 90 + 3 \times 900 = 2889$
5. (b)  $3^{34} = (3^2)^{17} = 9^{17}$   
 $2^{51} = (2^3)^{17} = 8^{17}$   
Clearly,  $7^{17} > 8^{17} > 9^{17}$   
or  $7^{17} > 2^{51} > 3^{34}$
6. (b)  $5^6 - 1 = (5^3)^2 - 1 = 125^2 - 1 = (125 - 1)(125 + 1)$   
 $= 124 \times 126 = 15624$   
which is divisible by 31
7. (a) Let the number be x  
 $\therefore \frac{7x}{8} - \frac{7x}{18} = 770 \Rightarrow \frac{x}{2} \left[ \frac{1}{4} - \frac{1}{9} \right] = 110$   
 $\Rightarrow \frac{x}{2} \times \frac{5}{36} = 110 \Rightarrow x = \frac{110}{5} \times 36 \times 2$   
 $\therefore x = 1584$
8. (b)  $7^{3^2} = (7^3)^2 = 7^9$  while  $(7^3)^2 = 7^6 < 7^9$   
Hence,  $7^{3^2} > (7^3)^2$
9. (b) n is an odd no.  $> 1$   
 $\therefore$  The minimum possible value of  $n = 3$   
 $n(n^2 - 1) = 3 \times 8 = 24$   
Hence,  $n(n^2 - 1)$  is divisible by 24 always
10. (c)  $2^{73} - 2^{72} - 2^{71} = 2^{71}(2^2 - 2^1 - 1) = 2^{71}$
11. (a) Only prime numbers have two factors, so here we have to find two digit prime numbers. We know that there are 21 two digit prime numbers in all.
12. (b) We know that  $900 = 2^2 3^2 5^2$  total number of factors of  $900 = 3 \times 3 \times 3 = 27$ . For perfect square powers of prime factors must be even hence number of perfect square factors is  $2 \times 2 \times 2 = 8$ . Therefore number of non perfect square factors is  $27 - 8 = 19$ .
13. (d)  $\sqrt[3]{x(x^2 + 3x + 3)} + 1 = \sqrt[3]{x^3 + 3x^2 + 3x + 1}$   
 $= \sqrt[3]{(x+1)^3} = (x+1)$   
So, for 'x' = 1001, the value will be 1002.
14. (b)  $\therefore 4x = 18y \Rightarrow \frac{x}{y} = 18/4 = 9/2 \Rightarrow \frac{x}{y} - 1 = 7/2$
15. (d)
16. (d) For 150 coins to be of a value of ₹150, using only 25 paise, 50 paise and ₹1 coins, we cannot have any coins lower than the value of ₹1. Thus, the number of 50 paise coins would be 0. Option (d) is correct.
17. (b) C.P. of one litre = ₹6  
After adding water to it  
One has to pay ₹7.20 for  $\frac{2}{3}$  litre of milk.  
So, S.P. of  $\frac{2}{3}$  litre of milk = ₹7.20  
 $\Rightarrow$  S.P. of 1 litre of milk  
 $= ₹ \frac{7.20 \times 3}{2} = ₹10.80$   
 $\therefore$  S.P.  $>$  C.P.  
Hence gain  
 $= \frac{10.80 - 6}{6} \times 100 = \frac{4.80}{6} \times 100$   
 $= 0.80 \times 100 = 80\%$
18. (c) Tripling in 8 years means that the interest earned in 8 years is equal to 200% of the capital value. Thus, interest per year (simple interest) is 25% of the capital. In 20 years, total interest earned = 500% of the capital and hence the capital would become 6 times it's original value.
19. (b) A's 1 day's work =  $\frac{1}{10}$  and B's 1 day's work =  $\frac{1}{15}$   
 $\therefore$  (A+B)'s 1 day's work =  $\left( \frac{1}{10} + \frac{1}{15} \right) = \frac{1}{6}$ .  
So, both together will finish the work in 6 days.

20. (c) For 9 kg zinc, mixture melted = (9 + 11) kg.  
For 28.8 kg zinc, mixture melted

$$= \left( \frac{20}{9} \times 28.8 \right) \text{ kg} = 64 \text{ kg}.$$

21. (c) Let B can fill the cistern in x min. Then,

then A can fill the cistern in  $\frac{x}{3}$  min

$$\text{Given } x - \frac{x}{3} = 10 \Rightarrow x = 15 \text{ min}$$

22. (a) Profit (%) = 9.09% =  $\frac{1}{11}$

Since the ratio of water and milk is 1 : 11,  
Therefore the ratio of water to mixture  
= 1 : 12

Thus the quantity of water in mixture of 1 litre

$$= 1000 \times \frac{1}{12} = 83.33 \text{ ml}$$

23. (c)  $\frac{30x + 30y}{60} = \frac{x + y}{2}$

24. (c) Let the speed of trains be x km/h and y km/h, respectively.

When the trains cross each other, time taken by both the trains will be equal.

$$\text{i.e. } \frac{110}{x} = \frac{90}{y} \Rightarrow \frac{x}{y} = \frac{110}{90} \Rightarrow x : y = 11 : 9$$

25. (b)  $6000 \left( \frac{10}{100} \right)^2 = ₹60$

26. (d)  $\frac{40}{(B-S)} + \frac{55}{(B+S)} = 13 \quad \dots (i)$

$$\frac{30}{(B-S)} + \frac{44}{(B+S)} = 10 \quad \dots (ii)$$

After solving (i) and (ii),

$$B - S = 5$$

$$B + S = 11$$

$$\therefore \text{Speed of Mallah in still water} = \frac{5+11}{2} = 8 \text{ km/h}$$

27. (b)

28. (b) Ratio of times taken by A and B = 100 : 130 = 10 : 13.  
Suppose B takes x days to do the work.  
Then, 10 : 13 :: 23 : x

$$\Rightarrow x = \left( \frac{23 \times 13}{10} \right) \Rightarrow x = \frac{299}{10}.$$

$$\text{A's 1 day's work} = \frac{1}{23}; \text{ B's 1 days work} = \frac{10}{299}.$$

(A + B)'s 1 day's work

$$= \left( \frac{1}{23} + \frac{10}{299} \right) = \frac{23}{299} = \frac{1}{13}.$$

$\therefore$  A and B together can complete the job in 13 days.

29. (b) Required distance =  $\frac{S_1 S_2}{(S_1 - S_2)} \times \text{Time difference}$

$$= \frac{8 \times 5}{3} \times \frac{3}{2} = 20 \text{ km}$$

30. (b)  $a = \log_8 225 = \log_8 15^2 = (2/3) \log_2 15 = (2/3)b$   
Since  $b = \log_2 15$

31. (a) Given  $x^2 + px + 12 = 0$

Since, x = 4 is the one root of the equation, therefore  
x = 4 will satisfy this equation

$$\therefore 16 + 4p + 12 = 0 \Rightarrow p = -7$$

Other quadratic equation becomes  $x^2 - 7x + q = 0$

(By putting value of p)

Its roots are equal, so,  $b^2 = 4ac$

$$\Rightarrow 49 = 4q \text{ or } q = \frac{49}{4}$$

32. (d) Given  $x^2 + kx - 8 = 0$

Let a and b be the roots of given equation and  
 $b = a^2$  (given)

$$\text{Sum of roots} = a + b = -k = a + a^2 \quad \dots (i)$$

$$\text{Product of roots} = ab = -8 = a^3 \Rightarrow a = -2$$

$$\text{Using } a = -2 \text{ in (i), } -k = -2 + 4 = 2 \text{ or } k = -2$$

33. (a) Let turban be of cost ₹ x. So, payment to the servant  
= 90 + x for 12 month  
Payment for 9 months

$$= \frac{9}{12} \times (90 + x) = 65 + x$$

$$\Rightarrow x = ₹ 10$$

34. (b) Basically, the question is of weights, so let us analyse them.

4 Rubies weight as much as 3 Emeralds

Cost of 4 Rubies = 16 crores

Cost of 3 Emeralds = 15 crores

$\therefore$  All Rubies, multiple of 4 allowed, is the best deal,

$$\text{so } \frac{12}{0.3} = 40 \text{ Rubies} \equiv 160 \text{ crores}$$

35. (c) Given,  $x + y = 1$

Then,

$$\left( x + \frac{1}{x} \right)^2 + \left( y + \frac{1}{y} \right)^2 = x^2 + y^2 + \frac{1}{x^2} + \frac{1}{y^2} + 4$$

Minimum value of  $x^2 + y^2$  occur when  $x = y$

$$[\because x + y = 1]$$

Put  $x = y = \frac{1}{2}$

Minimum value =  $\left(\frac{5}{2}\right)^2 + \left(\frac{5}{2}\right)^2 = \frac{25}{2} = 12.5$

36. (c) We know,  
 $(x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy+yz+zx)$   
 or  $(5)^2 = x^2 + y^2 + z^2 + 2 \times 3$   
 $\Rightarrow x^2 + y^2 + z^2 = 19$   
 For maximum value of  $x, y = z = 0$   
 but both cannot be zero at the same time  
 as  $xy + yz + zx \neq 0$   
 So,  $x^2 < 19$

$\therefore x$  can be  $\frac{13}{3}$  as  $x^2 = \frac{169}{9}$

37. (d)  $(x+a)$  is a factor of  
 $f(x) = x^3 + ax^2 - 2x + a + 6$ .  
 $\Leftrightarrow f(-a) = 0$  [ $\because x+a=0 \Leftrightarrow x=-a$ ]  
 $\Leftrightarrow (-a)^3 + a(-a)^2 - 2(-a) + a + 6 = 0$   
 $\Leftrightarrow 3a = -6 \Leftrightarrow a = -2$   
 Hence, the required value of  $a$  is  $-2$ .
38. (c) Since,  $x+2$  and  $x-1$  are factors of  
 $x^3 + 10x^2 + mx + n$ .  
 So,  $x^3 + 10x^2 + mx + n$  is divisible by  $x+2$  and  $x-1$ .  
 $f(-2) = 0 \Rightarrow (-2)^3 + 10 \times (-2)^2 - 2m + n = 0$   
 $\Rightarrow -2m + n = -32$  .... (i)  
 $f(1) = 0 \Rightarrow (1)^3 + 10 \times (1)^2 + m + n = 0$   
 $m + n = -11$  .... (ii)  
 From (i) and (ii) we get  
 $m = 7$  &  $n = -18$ .
39. (d)  $\alpha^2 + \beta^2 = 40$ ;  $\alpha + \beta = 8$ ;  $\alpha\beta = k$ .  
 Now use  $(\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta$   
 $\Rightarrow 64 = 40 + 2k \Rightarrow k = 12$

40. (b)  $\frac{y^2 + 5y + 4}{y^2 - 1} = \frac{(y^2 + 5y + 4)(y+5)}{(y+1)(y-1)}$

$= \frac{(y+4)(y+1)(y+5)}{(y+1)(y-1)} = \frac{(y+4)(y+5)}{y-1}$

41. (c)  $\frac{x^2 - 5x - 14}{x^2 - 3x + 2} \times \frac{x^2 - 4}{x^2 - 14x + 49}$   
 $= \frac{(x-7)(x+2)}{(x-2)(x-1)} \times \frac{(x+2)(x-7)}{(x-7)(x-7)}$   
 $= \frac{(x+2)^2}{(x-1)(x-7)}$

42. (a)  $\Rightarrow \frac{x+10}{(3x+8)^3} + \frac{x(3x+8)}{(3x+8)^2(3x+8)}$   
 $\Rightarrow \frac{(x+10)+x(3x+8)}{(3x+8)^3} \Rightarrow \frac{3x^2 + 9x + 10}{(3x+8)^3}$

43. (a)  $\frac{1}{x^2 - 13x + 42} + \frac{x+1}{x-6} - \frac{x^2}{x-7}$   
 $\Rightarrow \frac{1}{(x-6)(x-7)} + \frac{x+1}{x-6} - \frac{x^2}{x-7}$   
 $\Rightarrow \frac{1 + (x+1)(x-7) - x^2(x-6)}{(x-6)(x-7)}$   
 $\Rightarrow \left[ \frac{1 + x^2 - 6x - 7 - x^3 + 6x^2}{(x-6)(x-7)} \right] \Rightarrow \frac{-x^3 + 7x^2 - 6x - 6}{(x-6)(x-7)}$

44. (a)  $\frac{97}{19} = 5 + \frac{2}{19}$ . Also,  $\frac{19}{2}$  can be written as  $9 + \frac{1}{2}$ . So  
 the values of  $a, b$  and  $c$  are 5, 9 and 2 respectively.  
 Hence, the sum of  $a, b$  and  $c$  is 16.

45. (d)  $x + \frac{1}{x} = 2 \Rightarrow x + \frac{1}{x} - 2 = 0$   
 $\Rightarrow x^2 - 2x + 1 = 0$ ;  $(x-1)^2 = 0$ ;  $x = 1$

Now,  $x^{2013} + \frac{1}{x^{2014}} = 1 + 1 = 2$

46. (a)  $\angle EDC = \angle BAD = 45^\circ$  (alternate angles)  
 $\therefore x = \angle DEC = 180^\circ - (50^\circ + 45^\circ) = 85^\circ$ .
47. (c) Let  $n$  be the number of sides of the polygon  
 Now, sum of interior angles =  $8 \times$  sum of exterior angles  
 i.e.  $(2n-4) \times \frac{\pi}{2} = 8 \times 2\pi$   
 or  $(2n-4) = 32 \Rightarrow n = 18$
48. (b)  $2x + 2y = 180^\circ \Rightarrow x + y = 90^\circ$   
 $\therefore \angle COD = 90^\circ$

49. (b) Using the quality of similar triangles,  $\frac{CP}{PB} = \frac{CD}{AB} = \frac{1}{3}$ ;

In  $\triangle BPQ$  and  $BCD$ ,

$\frac{CD}{PQ} = \frac{BC}{BP} = \frac{4}{3} = 1 : 0.75$

50. (c)  $\angle PBQ = \frac{1}{2} (48^\circ)$

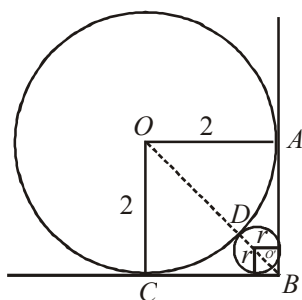
(angle at centre =  $2 \times$  angle at circumference on same PQ)  $24^\circ$

$\angle AQB = 90^\circ$  ( $\angle$  In semi-circle)

$\angle QXB = 180^\circ - 90^\circ - 24^\circ = 66^\circ$



51. (d)



$OABC$  is square with side = 2

$$\therefore OB = \sqrt{2^2 + 2^2} = 2\sqrt{2}$$

$$OB = 2\sqrt{2} = OD + r + O'B = 2 + r + r\sqrt{2}$$

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

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

$$= 6 - 4\sqrt{2}$$

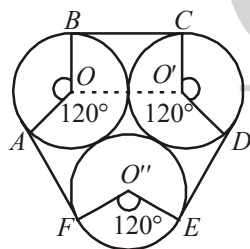
52. (a)  $\angle AOB = \angle CO'D = \angle FO'E = 120^\circ$

Distance between 2 centres = 2 m

$$\therefore BC = DE = FA = 2 \text{ m}$$

Perimeter of the figure =  $BC + DE + FA +$  circumference of sectors  $AOB, CO'D$  and  $FO'E$ .

But three equal sectors of  $120^\circ = 1$  full circle of same radius.



Therefore, perimeter of surface

$$= 2\pi r + BC + DE + FA = (2\pi + 6) \text{ m}$$

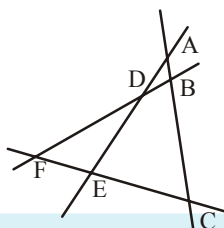
53. (b)  $\angle BOE' = \angle ABO = 40^\circ$  (alternate angles)

$\angle EOD = \angle CDO = 30^\circ$  (alternate angles)

$\therefore \angle BOD = (40^\circ + 30^\circ) = 70^\circ$ . So,  $x = 70$ .

54. (c)  $\frac{AG}{BH} = \frac{CE}{DF} \Rightarrow \frac{120}{100} = \frac{30}{DF} \Rightarrow DF = 25 \text{ cm}$

55. (b)  ${}^4C_2 = \frac{4!}{2!2!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{(2 \cdot 1)(2 \cdot 1)} = 6$



56. (b)  $\angle AKH = \angle KHD = 25^\circ$

$$\angle EGH = \angle AKL = 180^\circ - 60^\circ = 120^\circ$$

$$\therefore \angle HKL = 120^\circ + 25^\circ = 145^\circ$$

57. (b)  $x + 2x + 3x + 4x = 360 \Rightarrow x = 36$

$\therefore$  The angles of quadrilateral (in order) are  $36^\circ, 72^\circ, 108^\circ, 144^\circ$

Since two pairs of adjacent angles are supplementary, therefore  $AB \parallel CD$ .

Hence it is a trapezium.

58. (a) Let the length and breadth of a rectangle are  $9 \times \text{m}$  and  $5 \times \text{m}$  respectively.

In a rectangle, area = length  $\times$  breadth

$$\therefore 720 = 9x \times 5x$$

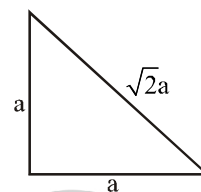
$$\text{or } x^2 = 16 \Rightarrow x = 4$$

Thus, length =  $9 \times 4 = 36 \text{ m}$

and breadth =  $5 \times 4 = 20 \text{ m}$

Therefore, perimeter of rectangle =  $2(36 + 20) = 112 \text{ m}$

59. (a)



Perimeter of triangle =  $a + a + \sqrt{2}a = 20 \text{ m}$

$$a(2 + \sqrt{2}) = 20$$

$$a = \frac{20}{2 + \sqrt{2}} \times \frac{(2 - \sqrt{2})}{(2 - \sqrt{2})} = 10(2 - \sqrt{2}) \text{ m}$$

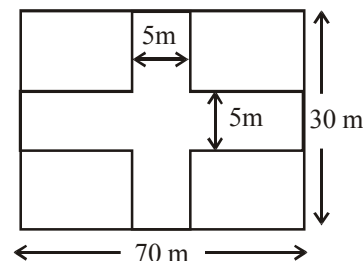
$$\text{Area of triangle} = \frac{1}{2} \times a \times a$$

$$= \frac{1}{2} \times 10(2 - \sqrt{2}) \times 10(2 - \sqrt{2})$$

$$= 50(4 + 2 - 4\sqrt{2})$$

$$= 100(3 - 2\sqrt{2}) \text{ m}^2$$

60. (c)



Total area of road

= Area of road which parallel to length + Area of road which parallel to breadth - overlapped road

$$= 70 \times 5 + 30 \times 5 - 5 \times 5$$



$$70. (b) \frac{\text{Area of } \triangle DAE}{\text{Area of } \triangle DEC} = \frac{\frac{1}{2} \times DE \times AE}{\frac{1}{2} \times DE \times CE}$$

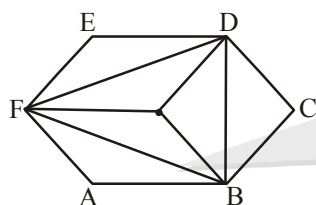
$$= \frac{AE}{CE} = \frac{(AD)^2}{(DC)^2} = \left(\frac{6}{8}\right)^2 = \frac{9}{16}$$

Similarly, in  $\triangle ABC$ ,

$$\frac{\text{Area of } \triangle BCF}{\text{Area of } \triangle BFA} = \frac{9}{16}$$

$$\therefore \text{The area of shaded to unshaded region} = \frac{16}{9}$$

71. (b)



$$\frac{\text{Area of } \triangle BDF}{\text{Area of hexagon}} = \frac{1}{2}$$

As there is a perfect symmetry.

$\therefore$  Area of hexagon

$$= \frac{3\sqrt{3}}{2} \times (6)^2 = 54\sqrt{3} \text{ cm}^2$$

$$\therefore \text{Area of } \triangle BDF = 27\sqrt{3} \text{ cm}^2$$

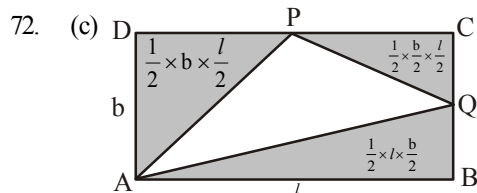
Alternatively:

Subtract the areas of three triangles DEF, BAF, BCD from the area of hexagon.

$$\text{Area of } \triangle DEF = \frac{1}{2} \times 6 \times 6 \times \sin 120^\circ = 9\sqrt{3} \text{ cm}^2$$

$$\therefore \text{Area of all the three triangles} = 27\sqrt{3} \text{ cm}^2$$

$$\therefore \text{Required area of } \triangle BDF = 54\sqrt{3} - 27\sqrt{3} = 27\sqrt{3} \text{ cm}^2$$

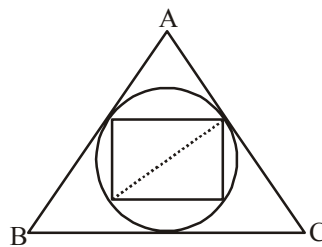


$$\text{Shaded area} = \frac{lb}{4} + \frac{lb}{4} + \frac{lb}{8} = \frac{5lb}{8}$$

$$\text{Unshaded portion} = lb - \frac{5lb}{8} = \frac{3lb}{8}$$

$$\text{Required ratio} = \frac{5lb}{8} : \frac{3lb}{8} = 5 : 3$$

73. (c)



$$\text{Altitude of equilateral triangle} = \frac{\sqrt{3}}{2} a$$

$$\text{Radius of incircle} = \frac{\sqrt{3}}{2} a \cdot \frac{1}{3} = \frac{a}{2\sqrt{3}}$$

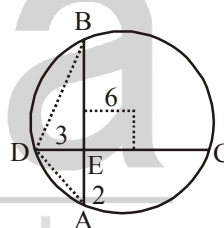
Diameter of incircle = Diagonal of square

$$\text{Diameter} = \frac{a}{2\sqrt{3}} \times 2 = \frac{a}{\sqrt{3}}$$

$$\text{Diagonal of square} = \frac{a}{\sqrt{3}}$$

$$\text{Area} = \frac{(\text{Diagonal})^2}{2} = \frac{\left(\frac{a}{\sqrt{3}}\right)^2}{2} = \frac{a^2}{6}$$

74. (a)



$$DB = \sqrt{(BE)^2 + (DE)^2} = \sqrt{6^2 + 3^2} = \sqrt{45}$$

$$DA = \sqrt{(DE)^2 + (AE)^2} = \sqrt{3^2 + 2^2} = \sqrt{13}$$

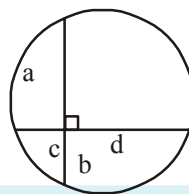
$$\text{Area ABD} = \frac{1}{2} \times DE \times AB = \frac{1}{2} \times 3 \times 8$$

$$\text{Also, Area ABD} = \frac{DB \times DA \times AB}{4R}$$

$$\Rightarrow \frac{1}{2} \times 3 \times 8 = \frac{\sqrt{45} \times \sqrt{13} \times 8}{4R} \Rightarrow R = \frac{\sqrt{65}}{2}$$

$$\text{Diameter} = \frac{\sqrt{65}}{2} \times 2 = \sqrt{65} \text{ cm}$$

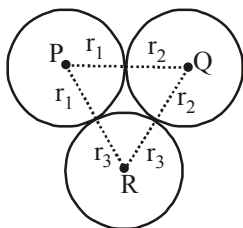
Shortcut 2nd method



$$a^2 + b^2 + c^2 + d^2 = (2r)^2$$

$$\text{Here, } 6^2 + 2^2 + 3^2 + 4^2 = (2r)^2 \Rightarrow 2r = \sqrt{65}$$

75. (a)



$$PQ = 4; QR = 6; PR = 8$$

$$PQ + QR + PR = 18$$

$$\Rightarrow r_1 + r_2 + r_2 + r_3 + r_3 + r_1 = 18$$

$$\Rightarrow 2(r_1 + r_2 + r_3) = 18$$

$$\Rightarrow r_1 + r_2 + r_3 = 9\text{cm.}$$

76. (c) Sum of 6 numbers =  $30 \times 6 = 180$

$$\text{Sum of remaining 5 numbers} = 29 \times 5 = 145$$

$$\therefore \text{Excluded number} = 180 - 145 = 35.$$

77. (b) Given observations are 29, 32, 48, 50, x, x + 2, 72, 78, 84, 95.

$$\text{Number of observations} = 10$$

As per definition

$$\therefore \text{median} = \frac{\text{value of } \frac{10}{2} \text{th term} + \text{value of } \left(\frac{10}{2} + 1\right) \text{th term}}{2}$$

$$= \frac{\text{value of 5th term} + \text{value of 6th term}}{2}$$

$$= \frac{x + x + 2}{2} = \frac{2(x + 1)}{2} = x + 1$$

But Median = 63, is given.

$$\text{So, } 63 = x + 1 \Rightarrow x = 62$$

78. (d) After arranging the terms in ascending order median is

$$\text{the } \left(\frac{n+1}{2}\right)^{\text{th}} \text{ term i.e., } 5^{\text{th}} \text{ term.}$$

Here, we increase largest four observations of the set which will come after 5<sup>th</sup> term.

Hence, median remains the same as that of original set.

79. (a) Mean of n observations is

$$\frac{1^2 + 2^2 + 3^2 + \dots + n^2}{n} = \frac{n(n+1)(2n+1)}{6n}$$

From the description of the problem:

$$\frac{(n+1)(2n+1)}{6} = \frac{46n}{11}$$

$$\Rightarrow 11 \times (2n^2 + 3n + 1) = 6 \times 46n$$

$$\Rightarrow 22n^2 + 33n + 11 = 276n \Rightarrow 22n^2 + 243n + 11 = 0$$

$$\Rightarrow 22n^2 - 242n - n + 11 = 0$$

$$\Rightarrow 22n(n-11) - 1(n-11) = 0$$

$$\Rightarrow (n-11)(22n-1) = 0$$

$$\text{Now, } 22n - 1 = 0 \Rightarrow n = \frac{1}{22}$$

which is discarded as n cannot be a fraction.

$$\therefore n - 11 = 0 \Rightarrow n = 11$$

80. (c) As given : marks of 10 students out of 15 in the ascending order are 40, 50, 60, 70, 70, 75, 80, 80, 90, 95  
Total number of terms = 15 and 5 students who failed

$$\text{are below 40 marks, median} = \left(\frac{n+1}{2}\right)^{\text{th}} \text{ term}$$

$$= \left(\frac{15+1}{2}\right)^{\text{th}} \text{ term} = 8^{\text{th}} \text{ term} = 60$$

81. (b) Let us write the given data in tabular form and calculate the required values to find mean deviation about the mean as

$x_i$	$f_i$	$f_i x_i$	$ d_i  =  x_i - \bar{x}  =  x_i - 21.65 $	$f_i  d_i $
20	6	120	1.65	9.90
21	4	84	0.65	2.60
22	5	110	0.35	1.75
23	1	23	1.35	1.35
24	4	96	2.35	9.40
<b>Total</b>	<b>20</b>	<b>433</b>		<b>25.00</b>

$$\text{Mean } (\bar{x}) = \frac{\sum f_i x_i}{\sum f_i} = 21.65$$

Hence, mean of the data is 21.65

$$\text{Mean deviation} = \frac{\sum f_i |x_i - \bar{x}|}{\sum f_i} = \frac{25}{20} = 1.25$$

82. (c) Tea worth ₹ 126 per kg and ₹ 135 per kg are mixed in the ratio 1 : 1

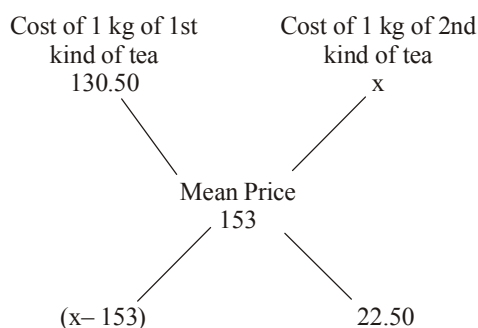
So their average price

$$= \frac{(126 + 135)}{2} = 130.5$$

Hence let's consider that the mixture is formed by mixing two varieties of tea, one at ₹ 130.50 per kg and the other at ₹ x per kg in the ratio 2 : 2, i.e., 1 : 1. Now let's find out x.

By rule of allegation,





$$(x-153) : 22.5 = 1 : 1$$

$$\Rightarrow x - 153 = 22.50 \Rightarrow x = 153 + 22.5 = ₹175.5$$

83. (d) Let Cost Price (CP) of 1 litre spirit be ₹1

Quantity of spirit in 1 litre mixture from vessel A = 5/7

Cost Price(CP) of 1 litre mixture from vessel A = ₹ 5/7

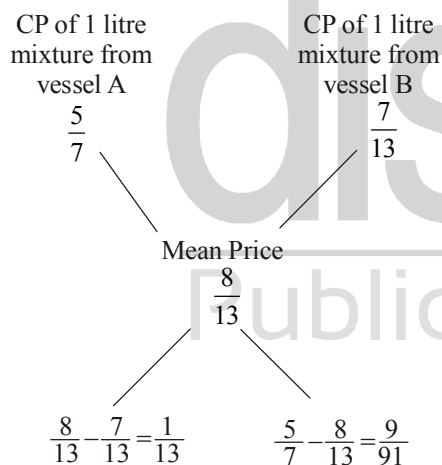
Quantity of spirit in 1 litre mixture from vessel B = 7/13

Cost Price(CP) of 1 litre mixture from vessel B = ₹ 7/13

Quantity of spirit to be obtained in 1 litre mixture from vessel C = 8/13

Cost Price(CP) of 1 litre mixture from vessel C (Mean Price) = ₹ 8/13

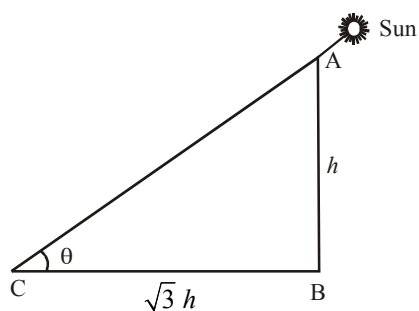
By rule of allegation,



$\Rightarrow$  Mixture from vessel A : Mixture from vessel B

$$= \frac{1}{13} : \frac{9}{91} = 7 : 9$$

84. (b) Let height of tower (AB) be  $h$  metres, then length of its shadow (BC) =  $\sqrt{3} h$  metres.



Let angle of elevation be  $\theta$ , then

$$\tan \theta = \frac{h}{\sqrt{3}h} = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30^\circ$$

85. (b) Given,  $\sec \theta + \tan \theta = x$  ... (i)

$$\sec^2 \theta - \tan^2 \theta = 1$$

$$\Rightarrow (\sec \theta - \tan \theta) (\sec \theta + \tan \theta) = 1$$

$$\text{or } \sec \theta - \tan \theta = \frac{1}{\sec \theta + \tan \theta} = \frac{1}{x} \dots (ii)$$

Adding (i) & (ii), we get

$$2 \sec \theta = x + \frac{1}{x} = \frac{x^2 + 1}{x}$$

$$\sec \theta = \frac{x^2 + 1}{2x}$$

86. (a)  $\sin \theta = \cos (2\theta - 45^\circ)$

$$\text{or } \cos (90^\circ - \theta) = \cos (2\theta - 45^\circ)$$

$$\Rightarrow 90^\circ - \theta = 2\theta - 45^\circ$$

$$\Rightarrow \theta = 45^\circ$$

$$\therefore \tan \theta = \tan 45^\circ = 1$$

87. (b)  $\sqrt{3} = \tan 60^\circ = \tan(3 \times 20^\circ)$

$$= \frac{3 \tan 20^\circ - \tan^3 20^\circ}{1 - 3 \tan^2 20^\circ}$$

$$\text{Squaring, } 3 = \frac{9t^2 + t^6 - 6t^4}{1 + 9t^4 - 6t^2}, \tan 20^\circ = t$$

$$\Rightarrow t^6 - 33t^4 + 27t^2 = 3$$

$$\Rightarrow \tan^6 20^\circ - 33 \tan^4 20^\circ + 27 \tan^2 20^\circ = 3$$

88. (a) We know,  $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \cdot \tan B}$

$$\Rightarrow \tan(5x) = \frac{\tan 3x + \tan 2x}{1 - \tan 3x \cdot \tan 2x}$$

$$\Rightarrow \tan 5x - \tan 3x \cdot \tan 2x = \tan 3x + \tan 2x$$

$$\Rightarrow \tan 5x - \tan 3x - \tan 2x = \tan 3x \cdot \tan 2x$$

89. (a)  $16^{\sin \theta} \cdot 4^{\sin \theta} \cdot 2^{\cos \theta} \cdot 128^{\cos \theta}$

$$= 2^{4 \sin \theta} \cdot 2^{2 \sin \theta} \cdot 2^{\cos \theta} \cdot 2^{7 \cos \theta}$$

$$= 2^{6 \sin \theta + 8 \cos \theta}$$

$$\max 6 \sin \theta + 8 \cos \theta$$

$$\left[ \begin{array}{l} \text{Minimum value of } a \sin \theta + b \cos \theta = -\sqrt{a^2 + b^2} \\ \text{Maximum value of } a \sin \theta + b \cos \theta = \sqrt{a^2 + b^2} \end{array} \right]$$

$$= \sqrt{6^2 + 8^2} = 10$$

$$\text{Min } 6 \sin \theta + 8 \cos \theta$$

$$= -\sqrt{6^2 + 8^2} = -10$$

$$\text{Maximum value of the expression} = 2^{10}$$

$$\text{Minimum value of the expression} = 2^{-10}$$

90. (a) Given,  $3 \cos \theta = 5 \sin \theta \Rightarrow \tan \theta = \frac{3}{5}$ .

$$\sec \theta = \sqrt{1 + \tan^2 \theta} = \sqrt{1 + \left(\frac{3}{5}\right)^2}$$

$$= \sqrt{\frac{25+9}{25}} = \frac{\sqrt{34}}{5}$$

In expression, dividing the numerator & denominator by  $\cos \theta$ ,

$$= \frac{5 \tan \theta - 2 \sec^4 \theta + 2}{5 \tan \theta + 2 \sec^4 \theta - 2}$$

$$= \frac{5 \times \frac{3}{5} - 2 \times \left(\frac{\sqrt{34}}{5}\right)^4 + 2}{5 \times \frac{3}{5} + 2 \times \left(\frac{\sqrt{34}}{5}\right)^4 - 2}$$

$$= \frac{3 - 2 \times \frac{1156}{625} + 2}{3 + 2 \times \frac{1156}{625} - 2} = \frac{5 - \frac{2312}{625}}{1 + \frac{2312}{625}}$$

$$= \frac{813}{2937} = \frac{271}{979}$$

91. (d)  $\sec^2 \theta = 3$   
 $\tan^2 \theta = \sec^2 \theta - 1 = 3 - 1 = 2$   
 $\operatorname{cosec}^2 \theta = \frac{\sec^2 \theta}{\tan^2 \theta} = \frac{3}{2}$

Now,  $\frac{\tan^2 \theta - \operatorname{cosec}^2 \theta}{\tan^2 \theta + \operatorname{cosec}^2 \theta} = \frac{2 - \frac{3}{2}}{2 + \frac{3}{2}} = \frac{\frac{1}{2}}{\frac{7}{2}} = \frac{1}{7}$

92. (c)  $\tan \theta \left[ \frac{1}{\sec \theta - 1} + \frac{1}{\sec \theta + 1} \right]$

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

$$= \tan \theta \left[ \frac{2 \sec \theta}{\sec^2 \theta - 1} \right]$$

$$= \tan \theta \times \frac{2 \sec \theta}{\tan^2 \theta} = \frac{2 \sec \theta}{\tan \theta} = \frac{2}{\cos \theta \times \frac{\sin \theta}{\cos \theta}}$$

$$= \frac{2}{\sin \theta} = 2 \operatorname{cosec} \theta.$$

93. (c)  $2 \sin^2 \theta + 3 \cos^2 \theta$   
 $= 2 \sin^2 \theta + 2 \cos^2 \theta + \cos^2 \theta$   
 $= 2 (\sin^2 \theta + \cos^2 \theta) + \cos^2 \theta$

$$= 2 + \cos^2 \theta$$

$\therefore$  Minimum value of  $\cos^2 \theta = 0$   
 $\therefore$  Required minimum value  $= 2 + 0 = 2$

94. (c)  $\tan 2\theta = \frac{1}{\tan 4\theta} = \cot 4\theta$   
 $\Rightarrow \tan 2\theta = \tan (90^\circ - 4\theta)$   
 $\Rightarrow 2\theta = 90^\circ - 4\theta$   
 $\Rightarrow 6\theta = 90^\circ \Rightarrow \theta = 15^\circ$   
 $\therefore \tan 3\theta = \tan 45^\circ = 1$

95. (c)  $\frac{1}{\operatorname{cosec}^2 51^\circ} + \sin^2 39^\circ + \tan^2 51^\circ$

$$= \frac{1}{\sin^2 51^\circ \cdot \sec^2 39^\circ}$$

$$= \sin^2 51^\circ + \sin^2 39^\circ + \tan^2 (90^\circ - 39^\circ)$$

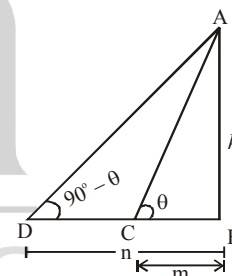
$$= \frac{1}{\sin^2 (90^\circ - 39^\circ) \cdot \sec^2 39^\circ}$$

$$= \cos^2 39^\circ + \sin^2 39^\circ + \cot^2 39^\circ$$

$$= \frac{1}{\cos^2 39^\circ \cdot \sec^2 39^\circ}$$

[ $\therefore \sin (90^\circ - \theta) = \cos \theta$ ,  $\tan (90^\circ - \theta) = \cot \theta$ ]  
 $= 1 + \cot^2 39^\circ - 1$   
 $= \operatorname{cosec}^2 39^\circ - 1 = x^2 - 1$

96. (a) In  $\triangle ABC$ ,



$$h = m \tan \theta \quad \dots (1)$$

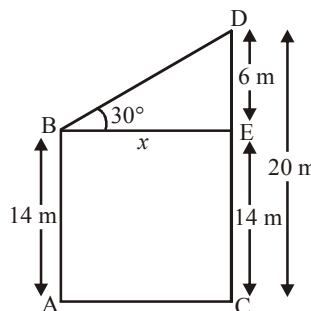
In  $\triangle ABD$ ,

$$h = n \tan (90^\circ - \theta) \dots (2)$$

Multiplying (1) and (2),  
 $h^2 = m \tan \theta \times n \tan (90^\circ - \theta)$   
 $= mn \tan \theta \cot \theta = mn$

$$\Rightarrow h = \sqrt{mn}$$

97. (a) Here,  $CD = 20$  m [Height of big pole]  
 $AB = 14$  m [Height of small pole]



$$\Rightarrow DE = CD - CE \Rightarrow DE = CD - AB [\because AB = CE]$$

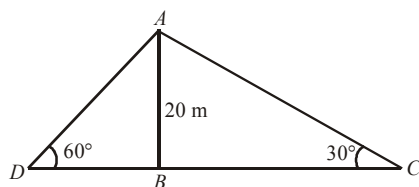
$$\Rightarrow DE = 20 - 14 = 6 \text{ m}$$

$$\text{In } \triangle BDE, \sin 30^\circ = \frac{DE}{BD}$$

$$\Rightarrow \frac{1}{2} = \frac{6}{BD} \Rightarrow BD = 12 \text{ m}$$

$\therefore$  Length of wire = 12 m

98. (a) C and D be the position of the men and AB is the height of flagstaff.



$$\text{In } \triangle ABC, \tan 30^\circ = \frac{AB}{BC}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{20}{BC} = BC = 20\sqrt{3}$$

$$\text{In } \triangle ABD, \tan 60^\circ = \frac{AB}{BD}$$

$$\Rightarrow \sqrt{3} = \frac{20}{BD} \Rightarrow BD = \frac{20}{\sqrt{3}}$$

Distance between the men,  $CD = BC + BD$

$$= 20\sqrt{3} + \frac{20}{\sqrt{3}} = \frac{60 + 20}{\sqrt{3}} = \frac{80}{\sqrt{3}}$$

$$= \frac{80\sqrt{3}}{3} = \frac{80 \times 1.73}{3} = 46.19 \text{ m}$$

99. (c)

100. (d) The system of equations is inconsistent

$$\text{if } \frac{3}{2k-1} = \frac{1}{k-1} \neq \frac{1}{2k+1} \Rightarrow 3k-3 = 2k-1 \text{ and}$$

$$2k+1 \neq -1$$

$$\Rightarrow k = 2 \therefore (d) \text{ is true and } k \neq -2 \therefore (c) \text{ is false}$$

$$\text{Also } \frac{3}{2k-1} \neq \frac{1}{2k+1} \Rightarrow 6k+3 \neq 2k-1 \Rightarrow 4k \neq -4$$

$$\Rightarrow k \neq -1 \therefore (b) \text{ is false}$$

$$\text{For } k = 1, x = 3, y = 1 - 9 = -8 \text{ i.e. } x = 3, y = -8$$

This means, equations are consistent. Thus (d) holds.

## ENGLISH LANGUAGE

1. (c) The word 'roughed out' is a phrasal verb which means to draw or write something without including all the details. Thus 'drew a quick plan' is the nearest in meaning to it.
2. (c) The word 'abyss' means cavity, void, a deep hollow. Thus 'sea' is contextually nearest in meaning.
3. (a) The word 'audacity' means daring, fearlessness, bravery, spirit etc. which is the most similar in meaning to 'courage'.
4. (d) The word 'frenetic' means 'wildly excited or active', energetic, hectic, fast and furious etc.
5. (a) The word 'copious' means abundant, plentiful, extensive, lavish etc.
6. (a) The word 'impervious' means impermeable, water tight etc.
7. (c) The word 'elicit' means draw out, extract, obtain, provoke etc.
8. (b) The word 'Lucrative' means gainful, remunerative, well-paid which is most similar in meaning to 'profitable'.
9. (c) Vivid means presented in very clear/distinct way. From the options, 'detailed' is the other option which can replace but only if 'clear' as option is not available. Also 'detailed' can be confusing as well. So, it is not the best choice. Ambiguous is opposite for 'Vivid'. 'Categorical' means without any condition.
10. (d) Deplore means to disapprove /to condemn /to regret. Deprive means lack of something. Implored is to beg impatiently. Deny is to refuse. So, clear choice is 'regretted' as this is direct meaning of the word.
11. (c) Here, the verb *used* is the clue which connects itself with *ancient* and thus helps us to find the qualifier and also the correct answer. Hence the correct sequence is RSQP.
12. (b) Here, *a number of parents* is the clue; It helps us conclude that our answer will close with Q. Hence, the correct sequence is PRSQ.
13. (b) Here, the verb *should* is the clue which connects itself with the subject *the common man* and followed by Q. Hence, the correct sequence is SQPR.
14. (d) Here, the verb *had* is followed by the subject *the doctor*. It helps us conclude that our answer will close with R. Hence, the correct sequence is SPQR.
15. (a) Here, *the officer* is the clue which is followed by verb *was* and ends with R. Hence, the correct sequence is QPSR.
16. (d) Here, *he* may work as a clue. The sentence R qualifies sentence I because *he* reverses the word *hand*. Thus, the answer will begin with R. There are two choices with R. The sense of sequence helps us locate RQSP as the correct answer.
17. (c) Here, *the one* is followed by *old coat* which acts as the clue and helps us to locate the qualifier and through that the correct answer. Thus, our answer will begin with P and end with S. Hence, the correct sequence is PRQS.
18. (b) 'Shouted' in the Q and 'top of the voice' in the S can be linked to give a sensible combination QS. Further, 'he' in P and 'his' in R is used for the 'guard' of Q. So, Q follows the given statement and is a starter.

19. (b) P cannot fit anywhere but at last. And the only option with P as the finisher is (b). So this question can be quickly solved by using options. Otherwise, 'they' of S is used for 'man and daughter' of R. So it should be... R...S.... not ...S....R...by this logic option (a) and (d) can be rejected.
20. (c) Opening given statement requires a helping verb to connect. R provides it. P follows with 'and'. S is best at last. Hence RPQS is right sequence.
21. (a) The word 'sceptical' means suspicious or doubtful.
22. (a) The word 'inflict' means burden someone with or impose.
23. (d) The word 'inherit' means become heir to or take over.
24. (b) The word 'probably' means likely (very/most).
25. (b) The word 'broke down' means collapse.
26. (d) The word 'looking for' means in search of.
27. (a) The word 'hanging around' means linger or wait around.
28. (a) The word 'backed out' means go back on or withdraw from.
29. (c) For statements, phrase 'accord with' is used. See the use of phrase in one of the judgments of a court - 'However, the evidence suggests that the administration of complaints does not always accord with established procedures.' Use of 'Accord to' is not right in this sentence.
30. (a) Vague notion is a right choice. Imagination is in itself vague (unclear). While expressions cannot be vague. Theory is out of place for the context. Thoughts can be vague or unclear or unstable.
31. (c) The word 'extravagant' means prodigal, lavish, costly etc. which is opposite in meaning to the word 'economical'.
32. (b) The word 'diligent' means industrious, hard-working, rigorous etc. which is opposite in meaning to the word 'lazy'.
33. (a) The word 'complacent' means smug, self-satisfied, proud etc. Its opposite word is 'discontented' from the given options.
34. (d) The word 'victor' means champion, winner etc. which is opposite in meaning to 'vanquished'.
35. (a) The word 'laudable' means worthy, commendable. Thus, 'condemnable' is the right answer.
36. (c) The word 'fictitious' means fake, spurious etc. Its opposite word will be genuine or real.
37. (a) The word 'reluctance' means timid, unwilling, curious etc. Hence, 'eagerness' is the opposite word.
38. (b) The word 'generous' means liberal, charitable, benevolent etc. Hence, uncharitable is the opposite word.
39. (c) Absurd is meaningless/irrational/incongruous /out of place. Proper opposite word is Sensible. (a) and (b) are not right. Ridiculous can be synonym but not the antonym.
40. (b) Ignored is to overlook /to avoid /not considered/set aside. If something is ignored then it can be removed. So 'remove' gives the same sense as 'ignored'.
41. (b) The correct sequence is R – P – S – Q which is marked by (b), therefore, (b) is the correct answer.
42. (a) The correct sequence is Q – P – S – R which is marked by (a), therefore, (a) is the correct answer.
43. (d) The correct sequence is R – S – Q – P which is marked by (d), therefore, (d) is the correct answer.
44. (c) The correct sequence is R – S – P – Q which is marked by (c), therefore, (c) is the correct answer.
45. (b) The correct sequence is R – P – S – Q which is marked by (b), therefore, (b) is the correct answer.
46. (a) The correct sequence is R – Q – S – P which is marked by (a), therefore, (a) is the correct answer.
47. (d) The correct sequence is S – Q – P – R which is marked by (d), therefore, (d) is the correct answer.
48. (b) The correct sequence is Q – P – S – R which is marked by (d), therefore, (d) is the correct answer.
49. (a) The correct sequence is RQSP which is marked by (a), therefore, (a) is the correct answer.
50. (c) The correct sequence is SPRQ which is marked by (c), therefore, (c) is the correct answer.
51. (b) The author looks upon the young, as an embodiment of possibilities, which is option (b). The line of the passage which gives clue regarding this is the very first line 'The young are those to whom we look for future strength and for future good.'
52. (c) The phrase 'morally of right stature' means having rectitude which is option 'c'. The line of the passage which gives clue regarding this is 'that they who are to be the fresh recruits should be morally of right stature, this means that the youngsters should have rectitude which is moral and truth futures and spirit of go-getters.'
53. (b) The failure of many a young men and women is unwarranted, which is option (b). The clue regarding this is mentioned in the following line of passage 'we are obliged to see thousands falling by the way whose fall seems headless. 'The word 'unwarranted' means 'unknowingly or without any justification or unnecessary.'
54. (d) The "material conditions of happiness" does not include hope. This is mentioned in very first line of the passage. There are a great many people who have all the material conditions of happiness i.e. health, sufficient income and clout ...!. The word 'hope' is not mentioned.
55. (d) Modern man is very unhappy because he "suppresses his inner urges, which is option (d). The clue regarding this lies in the following lines of the passage. 'Your needs are more compare than those of your pets but they still have their basic in instinct. 'In civilised societies, this is too apt to be forgotten.



56. (c) The author is of the opinion that 'we are really not very different from animals', which is option (c). The clue regarding this is in the following line of the passage - 'Animals live on impulse, your needs are more compare than those of your pets but still they have their basis in instinct'. The line shows that man is not very different from animals.
57. (a) The phrase "do not minister to it" means do not support it' which is option (a). The writer gives the clue regarding it when he says that 'people prose to themselves some paramount or important objective and restrain or stop all impulses that do not minister or support to it.'
58. (c) Wars have been fought 'to capture some areas of another country which are of strategic importance' which is option 'c', therefore, 'c' is the correct answer. The clue regarding this is given in the following line of the passage 'for the sake of seizing some strategically valuable piece of territory'.
59. (a) The 'natural' frontier means 'An area on the border from where you can keep watch on or attack your enemy which is option (a), so (a) is the correct answer. The writer has explained it in the following lines of the passage - 'natural frontier is frontier which is easy to defend and from which it is easy to launch attacks upon one's neighbours.'
60. (b) Military advantages and economic advantages may or may not be the same but the rulers make them appear to be the same' which is option (b), so 'b' is the correct answer. The lines from the passage which give the clue regarding this are 'purely military advantages are almost as highly praised by the rulers of nations as economic advantages.'
61. (a) Plants that do not have showy flowers, get their pollen transferred to other flowers by winds since insects do not get attracted towards them. They get attracted to those flowers whose petals are large and beautiful and also smells sweet.
62. (b) The fact that some flowers are flamboyant implies that we can distinguish between flowers pollinated by insects and those that are not. Flamboyance is a trait of insects which helps us in understanding pollination done by insects or by winds.
63. (a) When insects carry pollen from one flower to another, they help the flowers to make seeds. That's what author of this para suggest, when insects carry pollen from one flowerplant to another, it can help in developing seeds, through the pollen must be carried by insects to the same type of flower or insect. Refer the last sentence for better understanding.
64. (b) Insects carry pollen from one flower to another unconsciously. Since insects visit plants/flowers in search of food and simultaneously, they carry pollen grains from one flower to another. Option 'b' suggests/ explains it all so, that would be the correct answer. 'Refers without knowing it' means unconsciously'.
65. (c) Insects visit flowers because they are in search of food. That's how they obtain their food from visiting one flower to another. Option 'c' explains it all so, that would be the correct answer. Just go through first sentence of this para.
66. (a) Writer explains in the intro of this passage that the extra-ordinary discovery of echo location was experienced in bats. So option 'a' would be correct answer.
67. (a) An echo comes back if a person shouts in the vicinity of a wall or solid obstruction. Though the further off this solid obstruction, the longer time will elapse for the return of the echo.
68. (c) In the first paragraph, the writer says that bats use sound for some practical purpose. Option 'c' explains it all so that would be the correct answer.
69. (d) Epigram means a short, crisp and precise remark. Option 'd' has it all so that would be the correct answer.
70. (c) The dictionary meaning of suffrage is right to vote. So, the extension of suffrage will certainly indicate the right to vote for more and more people. So, option 'c' would be the correct answer.
71. (b) Replace 'did not think' with the word *thought*.
72. (b) 'Either' refers to each one of a number while 'any' tells us how many or denotes order in a series. So, replace either with *any*.
73. (a) Being present perfect continuous tense, replace 'am' with *have been*.
74. (b) The connector 'with' should be remove.
75. (b) 'No sooner ..... had'. Use *had he* instead of 'he had'.
76. (a) The past continuous tense is used for an action that was still going on at a particular moment in the past. The past continuous is often used in combination with the simple past. So, Replace 'was arriving' with *arrived*.
77. (a) The past perfect is used for an action completed before a certain point in the past or before another action happened. Add *had* after the subject 'he'.
78. (c) Have + verb. Use *got* after *have*.
79. (b) Remove 'the' article in 'from hand to mouth'.
80. (a) The conjunction 'Both' is followed by 'and'. Replace 'as well as' with *and*.
81. (b) 'his' is not required as it is understood that success is related to him and redundancy is not acceptable for correctness.
82. (b) Road is a mean to reach somewhere. So, we reach through road. A Road remains at its place as it is. 'By' can be used for a vehicle but not roads.
83. (a) Replace 'in' with 'with'.
84. (c) Replace 'the' with 'an'.
85. (a) 'as well as' takes the verb of second subject ,so replace 'were' with 'was' in part (a).

86. (c) 'But also' and 'as well' carry the same sense and use of both at single place does not add value to sentence. So avoid redundancy by using one of them only.
87. (d) There is no error in the sentence.
88. (a) 'Distinct' should be used in place of 'distinctive'. Distinct means separate.
89. (b) 'many a...' takes singular verb. So, replace 'are' with 'is'.
90. (c) 'Found it easy to work out' should be used. Repetitive use of 'it' is not right. Another way to write it is like - 'found easy to work it out'
91. (c) We plan for future as sentence is about planning for future.
92. (d)
93. (d) A word like 'place' or 'put' can be used. Other words would give different direction to the passage.
94. (d) Feature is best among the options for something to appear in a plan.
95. (d) Next suits best.
96. (c) Need of power for India is being mentioned so 'require' is proper word for denoting it.
97. (c) An effort for fulfilling the energy need of India is being discussed in this part of passage. Projections / development or other options are not discussed here.
98. (d) It is an unexpected line so either option (d) or (e) is to be used. But the structure and place of blank space suits more to option (e).
99. (d) Contrasting word with the supply and cost should be used. Supply is there but at higher cost. Supply is low but cost is low. So first case is relevant here as per the context of the passage.
100. (a) Limited nuclear power/energy is referred here up to a particular time.
101. (d) Figures are not certain and only can be expected.
102. (a) A combination of words with question no. 33 has to be found out.
103. (a) Expectation line was crossed so for blank in 32. And 33. As, against is to be used.
104. (b) 'Through' gives a right usage for the context. Other options are not in line with context and also not grammatically correct.
105. (d) With lives 'touching' is proper word to use. Making, generating are incorrect with 'lives'. Saving is illogical and out of context. Lightning lives is a too strong word for the context.
106. (c) Idiom 'a bolt from the blue' means : an event or a piece of news which is sudden and unexpected; a complete surprise.
107. (c) Cold Comfort (Noun) means : the fact that something that would normally be good does not make you happy because the whole situation is bad.
108. (b) Idiom to be all at sea means : confused and not knowing what to do.
109. (b) Idiom take to your heels means : to run away from somebody/something.
110. (d) Idiom bite the dust means : to fail or to be defeated or destroyed.
111. (b) Idiom 'A damp Squib' means: a situation or event which is much less impressive than expected.
112. (a) Idiom 'In cold blood' means: Violent or aggressive.
113. (b) Idiom 'To take someone for a ride' means: to trick or cheat somebody.
114. (b) Idiom 'To move heaven and earth' means: to try everything possible, to exert the utmost effort.
115. (d) Idiom 'To smell a rat' means: to believe that something is wrong in a particular situation, to be suspicious.
116. (d) 'An iron will' mean a burning determination that cannot be stopped or hindered by anything.
117. (a) 'Get into a soup' mean be in, or get yourself or somebody into, trouble or difficulties.
118. (c) 'Haul over the coals' means to scold, reprimand, or reprove someone severely for an error or mistake.
119. (d) 'To carry the day' mean to be victorious or successful.
120. (b) 'Go over' means to examine or look at something in a careful or detailed way.

## GENERAL KNOWLEDGE

- (d) Both are inclined towards peace, denied the efficacy of rituals in difference to the authority of Vedas and follow Celibacy.
- (c) Capital account transactions are two way and multiple transactions. It means paid money can be recovered through periodical income and/or by disposal of the asset created.  
The Capital Account Constitutes of
  - External assistance (Net).
  - Net External Commercial Borrowings.
  - Short term debt.
  - Banking Capital.
  - Foreign Investment.
  - Foreign Direct Investment (FDI)
- (b) Article-123 of the constitution empowers the president to promulgate ordinance during the recess of Parliament. These ordinances have the same force and effect & as an act of Parliament, but are in nature temporary laws.
  - He can promulgate an ordinance only when both the Houses of parliament are not in session or when either of the two houses of parliament is not in session. An ordinance made when both the houses are in session is void. Thus the power of the president to legislate by ordinance is not a parallel power of legislation.
- (c) The monsoon rains occur in wet spells of few days duration at a time. The wet spells are interspersed with rainless intervals. Thus pulsating nature of the monsoon is attributed to the cyclonic depressions mainly formed at the head of the Bay of Bengal and their crossing into the mainland.

5. (a) Soft power is derived from three resources i.e. a country's culture. Its Political values and its foreign policy. Hard power includes economic sanctions, trade embargos, physical military intervention and the actual threat of military or economic force.
6. (b) Mahal wari system was introduced in 1833 during the period of William Bentick. In this system owner ship rights were vested with the peasants. It had many provisions of both the Zamindari system and Ryotwari system. In this system, the land was divided into Mahals. Each Mahal comprised of one or more villages.
7. (b) In India, natural lakes (relatively few) mostly lie in the Himalayan region, the flood plains of Indus, Ganga and Brahmaputra.
  - On the basis of their nutrient content, they are categorized as oligotrophic (very low nutrient), mesotrophic (moderate nutrients) and Eutrophic (highly nutrient rich).
  - Vast majority of lakes in India are either eutrophic or mesotrophic because of the nutrients derived from their surroundings or organic wastes entering them.
8. (a) Finance Commission consists of a chairman and four other members to be appointed by the president.
  - The commission submits its report to the president. He lays it before both the houses of parliament.
9. (c) In India the method of election followed for the General elections and assembly elections is First Past the Post (FPTP) system. In this system whoever has more votes than all other candidates is declared elected. The winning candidate need not secure a majority of the votes.
  - This method of election is also called the plurality system.
  - This is the method of election prescribed by the constitution.

**Source:** N.C.E.R.T. (Std. XI<sup>th</sup>) (Chapter 3)
10. (b) A supreme court order invalidated all marriages not conducted according to Christian rites and registered by the registrar of marriage. By implication, Hindu, Muslim and Parsi marriages were illegal and children born out of such marriages illegitimate.
 

**Source:** Spectrum's Modern India.
11. (d) According to the Indian Meteorological Centre, Tropical cyclones require certain conditions for their formation. All the above mentioned conditions are favourable for the formation of tropical cyclones.
12. (d) All the above given statements are true regarding the fundamental duties. There is no legal sanction against the violation of fundamental duties. However parliament is free to enforce them by suitable legislation. Also fundamental duties are non-justiciable that is they are not enforceable in the court.
13. (b) Venture capital is a long term start-up capital provided to new entrepreneurs.
  - Venture capital is financing that investors provide to start up companies and small business that are believed to have long-term growth potential.
  - Venture capital generally comes from well-off investors, investment banks and any other financial institutions.
  - However it does not always take just a monetary form; it can be provided in the form of technical or managerial expertise.

**Source:** The Hindu
14. (d) UUENCODE- is a method for converting files from Binary to ASCII for the purpose of transfer across the Internet.
15. (d) Hydrogen can be extracted from any of the hydrogen containing compounds. It produces water vapour mixed with warm air as waste products. Presently the production cost of hydrogen fuel based vehicles is high.
16. (c) Under the Project Stree Swabhiman, sanitary napkin micro manufacturing units (semi-automatic and manual process production unit) are being set up at CSCs across India, particularly those operated by women entrepreneurs.
17. (c) Resistivity of conductor is smaller than that of Insulator. Resistivity of an alloy is greater than its constituent metals.
18. (c) Olympic Task Force was formed with an aim to improve the performance of Indian Sportspersons in next three coming Olympics. Pullela Gopichand, Abhinav Bindra, Viren Rasquinha and others are members of this Task force. One of the recommendations submitted by task force is for restructuring of Sports Authority of India.
19. (c) Sulphur dioxide (SO<sub>2</sub>) is a gas produced from burning coal, mainly in thermal power plants. Some industrial processes, such as production of paper and smelting of metals, produce Sulphur dioxide. It is a major contributor to smog and acid rain. Sulfur dioxide can lead to lung diseases.
20. (b) Chiru has been placed under Endangered list of species in the wildlife protection Act:1972. Chiru is found in China, India (J & K). High altitude plain, hill plateau and Montane valley. Chiru is hunted for (Shahtosh) which is used for making "Shawls".
21. (c) The Brazzaville declaration was signed to promote better management and conservation of world's largest tropical peatlands-Cuvette centrale region in Congo basin from unregulated land use and prevent its drainage and degradation. It was signed jointly by Democratic Republic of Congo (DRC), Republic of Congo and Indonesia on the sidelines of Third Partners Meeting of Global Peatlands Initiative held in Brazzaville, Republic of Congo.
  - Peatlands are globally important carbon store.
22. (d) Least distance of distinct vision and near point is the same. It is therefore same for all individuals.
23. (d) The time span of the India's 12<sup>th</sup> Five Year Plan is (2012-2017).



Basic objective: Faster, more inclusive and sustainable growth.

The monitorable targets of the 12<sup>th</sup> FYP are

- Average GDP growth of 8%.
  - Agriculture growth of 4%.
  - Reducing head count poverty by 10 percent point.
  - Generating 50 million work opportunities.
  - Eliminating gender and Social gap in education.
  - Reducing IMR to 25, MMR to 100 and TFR to 2.1.
  - Enhance infrastructure investment to 9% of GDP.
  - Achieve universal road connectivity and access to power for all villages.
  - Access to banking services for 90 percent households
  - Major welfare benefits and subsidies via Aadhaar.
- There are total 25 monitorable Targets of the 12<sup>th</sup> Five Year Plan.

24. (b) Agricultural and processed food Export Development Authority (APED) is an export promotion organization under ministry of commerce and Industries. It was established under the Agricultural and Processed Food Products Export Development Authority Act.
25. (c) India is not the signatory of the 1967 protocol relating to the status of refugees. So, Rohingya cannot claim the residence on legal ground and thus provision of non-refoulement does not extend to immigrants.
26. (c) Bats can emit sound frequency greater than 20,000 Hz.
27. (c) Under a 2003 provision, the Election Commission should allocate equitable sharing of time on the cable television network and other electronic media during elections to display or propagate any matter or to address public.
  - Allotting election symbols and Registering political parties comes under functions of election commission besides many other functions.
28. (c) CWC is managing DRIP (i.e. Dam Rehabilitation and Improvement Project)
29. (d) Eutrophication is a syndrome of ecosystem, response to the addition of artificial or natural nutrients such as nitrates and phosphates through fertilizers, sewage etc that fertilize the aquatic ecosystem. It is primarily caused by the leaching of phosphate or nitrate containing fertilizers from agricultural lands into lakes or rivers.
  - The growth of green algae which we see in the lake surface layer is the physical identification of an Eutrophication.
  - All the above mentioned are the sources of the eutrophication.
30. (d) “Smart Agriculture Conclave” with international partnership is a step-toward scientific and technological integration of agriculture. It will help to create a roadmap for setting up a cloud-service called “Farmer Zone.” farmer zone will be a multi-purpose window which will provide solution to farmer ranging from climate change based information to weather predictions, soil, water and seed requirements to

market linkages. The information can be accessed by the farmers throughout the world. These services could be accessed by the farmers directly or through intermediaries such as local co-operatives.

31. (c) Both the statements given in the question are correct. The project aims to understand how the knowledge and manipulation of the monsoon winds has shaped interactions across the Indian Ocean and led to the spread of shared knowledge systems, traditions, technologies and ideas along maritime routes.
32. (c) It is relevant to note that the regular population census is carried out under census Act, 1948. According to this Act, Government must keep individual's personal information confidential. Besides aim of regular population census is to provide overview, it is not concerned with any particular individual/household. Thus personal data given in population census is confidential. On the contrary all the personal information given in the Socio-Economic Caste Census (SECC) is open for use by government departments to grant and/or restrict benefits to households. This required the right of verification of socio economic profile.  
**Source:** The Hindu
33. (d) Black carbon is produced both naturally and by human activities as a result of the incomplete combustion of fossil fuels, bio fuels and biomass.
  - It is known to be one-fourth as potent as carbon dioxide in whetting global warming.
  - Black carbon particles strongly absorb sunlight and give soot its black colour.
34. (b) The Son is the only big river to join the Ganga directly from the southern plateau. Son is the right bank tributary of Ganga and it joins Ganga near Patna. Ambala is located on the water divide between the Indus and the Ganga river system. The plains from Ambala in the northwest to Sunderbans in the east stretch over nearly 1800 km. During its entire stretch from Haryana to Bangladesh, there is a fall of hardly 300 metres in its slope.
35. (b) To organise village panchayat (Art-40) and prohibition of consumption of intoxicating drugs (Art-47) are Gandhian directive principles (not the Liberal).
36. (c) Bioindicators are living organisms that indicate health of the ecosystem.
37. (b) Under the Scheme, school girls studying in Zilla Parishad Schools will get sanitary napkin packet at ₹ 5 while rural women can avail it at subsidised rate of ₹ 24 and ₹ 29.
38. (c) The Ajanta caves are entirely Buddhist and date from about 200 BC to approximately 650 AD. These caves are unique in that they combine three forms of art-architecture, sculpture and painting. The colours used were local pigments and all the colours except blue could be obtained from neighbouring hills. The paintings sought their inspiration from the Jatakas, legendary Buddhist Stories.  
**Source:** Spectrum's : Indian Culture

39. (b) Gravitational force is a type of weak force. The force is proportional to the product of the masses of the objects and inversely proportional to the square of the distance between them.
40. (c) The State of World's Children Report is an annual report published by UNICEF. 'Children in the Digital World' - is the theme of 2017 edition. The report covers both positive and negative impact of digitalization on children along with other related issues.
41. (c) Satavahana rulers were identified through metonymics but the succession to the throne was generally patrilineal. The satavahana rulers claim to have been Brahmanas and they promoted Buddhism. Many Chaityas and monasteries were made during Satavahana reign.
42. (c) Frog and mammals both contain a pair of lungs. The exchange of gases in both of them takes place in lungs. In addition frogs also respire through their moist skin.
43. (b) The above given events took place during the viceroyship of Lord Reading (1921-1926)
44. (d) Jainism taught five doctrines. It is believed that only the fifth doctrine, observe continence, was added by Mahavira and the other four were taken over by him from Previous teachers. In Jain Philosophy the existence of God is accepted but it placed the god lower than Jina.
45. (b) Buddhist Literature: Sutta Pitaks, Vinay Pitaks, Abhidhamma Pitaks, Milanda Panho, Angular Nikaya. Jain Literature: Kalp Sutra, Nayadhamma Kaha, Acharang Sutra.
46. (d) Holographic Technology is being used in different fields like Health and medicine, Engineering and Technology, tradeshow, telepresence etc.  
A 3-D holographic model of buildings and architectural designs gives a real time experience. Holographic imaging is used in medicine to create a 3D image of interior organs of a patient's body. Holographic display is useful during tradeshow to launch and present any product without actually transporting the product at the site. Similarly, holographic telepresence is used to address people at different places simultaneously.
47. (c) In 1976, the Congress Party set up the Sardar Swaran Singh Committee to make recommendations about fundamental duties.  
Though the Swaran Singh Committee suggested the incorporation of eight fundamental duties in the constitution, the 42<sup>nd</sup> Constitutional Amendment Act (1976) included ten fundamental duties.
48. (b) Olive Ridley turtles are smallest and most abundant of all the sea turtles. They are omnivorous. They are found only in warmer waters, including the Southern Atlantic, Pacific and Indian Oceans.
49. (a) Sources of air pollutants are:  
– Volatile organic compounds.  
– Tobacco  
– Biological pollutants  
– Formaldehyde  
– Radon  
– Asbestos  
– Pesticides
50. (d) The UNESCO has inscribed three Indian performing art forms, the Mudiyeetu, a ritual theatre of Kerala, the Chhau dance, a tradition from eastern India and the Kalbelia folk songs and dances, in the Representative List of the Intangible Cultural Heritage of Humanity. This was done at the fifth session of the UNESCO Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage in Nairobi in 2011.  
**Source:** Spectrum : Indian Culture
51. (a)
52. (a) Superconductivity is the state of matter displayed by certain materials to conduct electric current without any resistance. The phenomenon takes place at low temperature.
53. (d) Non-Availability of Pucca roads along the International Border in Punjab, suitable observation posts & obsolete infrastructure for border floodlights has worked in favour of smugglers.
54. (a) The movement also called the Fairazi Movement because of its emphasis on the Islamic pillars of faith was founded by Haji Shariat-Allah.  
Its Scene of action was East Bengal and it aimed at the eradication of social innovations current among the Muslims of the region.
55. (b) A minister can be a member of either of the two houses i.e. Lok-Sabha and Rajya Sabha. A person cannot be a minister without being a member of the parliament. The constitution stipulates that a minister who is not a member of the parliament for a period of 6 consecutive months ceases to be a minister.  
– The Ministers are collectively responsible to the parliament in general and to the Lok Sabha in particular (Art.-75). They act as a team and Swim and Sink together.
56. (c) The centre of curvature of a convex mirror lies behind it. The convex lens is also known as converging lens and focal length is the distance between pole and principal focus of a spherical mirror.
57. (d) All the above statements are correct.  
As a result of Industrial Manufacturing of nitrogen, it has become a pollutant which can disrupt the balance of nitrogen. It may lead to Acid rain, Eutrophication and Harmful Algal Blooms.  
Nitrogen is mainly manufactured by industrial method in the fertilizer sector.
58. (a) Rivers affect salinity only at areas where they enter sea and not the whole of it.
59. (d) When it became rather difficult to Sustain the high pitch of the struggle, Gandhi decided to devote all his attention to the Struggle. The Tolstoy Farm was meant to house the families of the Satyagrahis and to give them a way to sustain themselves.



60. (b) Socio-Economic Caste Census-2011 (SECC-2011) is a survey of socio economic particulars of rural and urban Households comprising three components viz. census in Rural Areas has been conducted by the Ministry of Rural Development (MORD), census in urban areas under the administrative jurisdiction of the Ministry of Housing and Urban Poverty Alleviation (MoHUPA) and caste census under the administrative control of Ministry of Home Affairs, Registrar General and Census Commissioner of India (under the over all co-ordination of Ministry of Rural Development).
- SECC 2011 was the first paperless census in India conducted on hand-held electronic devices by the government in 640 districts.
  - The rural development ministry has taken a decision to use the SECC data in all its programmers such as MGNREGA, National Food Security Act etc.
- Source:** The Hindu
61. (a) Phosphorus plays a central role in aquatic ecosystem and water quality. Unlike carbon and nitrogen which come primarily from the atmosphere, phosphorus occurs in large amounts as a mineral in phosphate rocks and enters the cycle from erosion and mining activities. This is the nutrient considered to be the main cause of excessive growth of rooted and free-floating microscopic plants in lakes.
62. (c) The stagnation in the agricultural sector was caused mainly because of the various systems of land settlement that were introduced by the colonial government.
- The main interest of the zamindars was only to collect rent regardless of the economic condition of the cultivators.
  - The teams of the revenue settlement were also responsible for the zamindars adopting such an attitude.
  - Besides this low levels of technology lack of irrigation facilities and negligible use of fertilizers, all added up to aggravate the plight of the farmers and contributed to the dismal level of agricultural productivity.
  - There are however certain evidence of a relatively higher yield of cash crops in certain areas of the country due to commercialisation of agriculture.
- Source:** N.C.E.R.T - 11<sup>th</sup> - Economics.
63. (b) Transpacific partnership was a free trade agreement between USA and 11 other pacific Rim nations i.e. Australia, New Zealand, Singapore, Malaysia, Brunei, Vietnam, Japan, Canada, Mexico, Peru and Chile and was signed in 2016. However, USA withdraw from it.
64. (c) Tundra biome is devoid of trees except stunted shrubs in the southern part of tundra biome, ground flora includes lichen, mosses and sedges. The dominating vegetation of Taiga/Boreal biome is coniferous evergreen mostly spruce with some pine and firs.
- The Tundra biome is found in Northern and Southern most region of world adjoining the ice bound poles. The Taiga / boreal biome is found in Northern Europe, Asia and North America.
65. (c) Auditory ossicles or ear ossicles present in the each ear as three small bony structures. These are helpful in increasing the efficiency of transmission of sound waves to the ear.
66. (d) Direct Taxes are:
- Incomes Tax
  - Corporate Tax.
  - Wealth Tax.
  - Securities Transaction Tax.
  - Commodities Transaction Tax
  - Minimum Alternate Tax.
67. (b) G-4 nations comprises of Brazil, Germany, India and Japan. They recently demanded an 'early reform' and enhanced role for developing countries and improvement of working methods in UNSC.
68. (d) Metals react with acids to produce salt and liberate hydrogen gas. Metals are electropositive because they lose electrons from their outermost shell and turned positively charged.
69. (a) Article - 72; Pardoning power of the president. Article - (161); Pardoning power of the governor. The pardoning power of the governor differs from that of the president in following two respects.
- The President can pardon sentences inflicted by court martial (Military courts) while the governor cannot.
  - The president can pardon death sentence while governor cannot.
- However governor can suspend, remit or commute a death sentence.
70. (d)
1. The preamble states that the constitution derives its authority from the people of the India.
  2. It declares India to be a Sovereign, Socialist, Secular democratic and republican polity.
  3. It specifies justice, liberty, equality and fraternity as the objectives.
71. (c) GM crops contaminate and cross-pollinate with non-GM crops and create super weeds. GM crops do impact unintended organism including beneficial organisms like bees and butterflies along with predators.
- No is house scientific study has been carried out till date to study the impact of GM crops on human health.
  - Bt toxin produced in GM Bt crops is present in every part of the plant, so when the parts that have not been harvested decompose, a considerable amount of the toxin may reach the soil.
72. (a) Chief Justice of India (Not President) has the power to appoint other seat of Supreme court. But he/she can do so only with the approval of president. Art – 130 deals with seat of the Supreme court.

73. (d) Super Pressure Balloon Technology serves as low-cost, near-space access for scientific payloads. The Super Pressure Balloon is made up of long durable Polyethylene film.
74. (d) To get Indian Cooperation in the war effort, the viceroy announced the August offer. The Congress rejected the August offer. Nehru said, "Dominion status concept is dead as a door mail."
75. (d) All the above are factors responsible for flourishing cotton textile industry in Tamil Nadu. Tamil Nadu has the largest number of cotton textile mills in the country. Tamil Nadu produces about 45% of mill spun cotton of the country.
76. (d) A Coral reef bleaching can be caused by a variety of factors:
- Anomalously low and high sea temperatures can induce Coral bleaching.
  - Solar radiation has been suspected to play a role in Coral bleaching.
  - Relatively few instances of coral bleaching have been linked solely to sediment.
  - Rapid dilution of reef waters from storm-generated precipitation and runoff has been demonstrated to cause Coral reef bleaching.
  - Sudden exposure of reef flat Corals to the atmosphere during events such as extreme low tides can potentially induce bleaching.
77. (a) Rajasthan was the first state to establish Panchayati Raj. The scheme was inaugurated by the Prime Minister on Oct. 2, 1959 in Nagaur district. After the enactment of 73<sup>rd</sup> Amendment Act of 1992, the state governments are under Constitutional obligation to adopt the new Panchayati Raj system in accordance with the provisions of the act. Consequently, neither the formation of panchayats nor the holding of elections at regular intervals depend on the will of the state government any more.
78. (a) Statement (i), (ii) and (iii) are correct with reference to Anthracite grade of coal. In India, it is found only in Jammu and Kashmir and that too in small quantity. It ignites slowly and has very little volatile matter.
79. (c) Lorenz curve explains the relationship between the percentage of income or wealth earned or appropriated and percentage of people who earned that particular percentage of income or wealth. The cumulative percentage of income is measured on the y-axis and the cumulative percentage of people is measured on x-axis.  
**Source:** Key Concepts – Shankarganesh
80. (b) Ecotone is a zone of junction between two or more diverse ecosystems. For example the mangrove forests represent an ecotone between marine and terrestrial ecosystem. Ecotone may be very narrow or quite wide. It has conditions intermediate to the adjacent ecosystems. Hence it is a zone of tension. A well developed ecotone contains some organisms which are entirely different from that of the adjoining communities. Sometimes the number of species and the population density of some of the species is much greater in this zone than either community. This is called edge effect.
81. (a) When a Money Bill is presented to the governor, he may either give his assent, withhold his assent or reserve the bill for presidential assent but cannot return the bill for re-consideration of the state legislature. When such a Money Bill is reserved for the consideration of the president, the president may either give his assent to the bill or withhold his assent to the bill but cannot return the bill for reconsideration of the state legislature.
82. (c) The EoTT equipment proposed by Indian Railways will act as a communication system between driver and last wagon of train. This will ensure that the train is running with all coaches as a complete unit.
83. (c) Gothenburg Protocol aims to abate acidification, eutrophication and ground level ozone and is a part of the convention on long Range Transboundary Air Pollution. Kyoto Protocol aims to reduce the emissions of the Green House Gases such as Methane, Nitrous Oxide, Hydrofluorocarbons, Perfluorocarbons, Sulphur hexafluoride and carbon dioxide. The Minamata Convention on Mercury is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases mercury and mercury compounds.
84. (c) Thermal pollution is the rise or fall in the temperature of a natural aquatic environment caused by human influence. Thermal pollution is caused by either dumping hot water from factories and power plants or removing trees and vegetation that shade streams, permitting sunlight to raise the temperature of these waters, release of cold water which lowers the temperature.
85. (c) Herbicide-Tolerant (HT) cotton also known as BG-III cotton is innovation in Bt cotton as it takes care of weeds problem at much lower cost as compared to physical labour required for weeding.
86. (a) The concept and practice of raga, according to scholars, matured by the fifth century A.D. Raga is a series of five or more notes, upon which a melody is based. Ragas were recognised and named on the basis of several factors, classified and defined. Talas are rhythmic cycles. They have a universal unity, besides being quite complicated.

87. (b) Parts of western coast and north east India receive over about 400 cm of rainfall annually. However it is less than 60 cm in western Rajasthan and adjoining parts of Gujarat, Haryana and Punjab.
- Rainfall is equally low in the interiors of the Deccan plateau, and east of the Sahyadris.
  - A third area of low precipitation is around Leh in Jammu and Kashmir.
  - The rest of the country receives moderate rainfall.
  - Snowfall is restricted to the Himalayan region.
88. (d) 'SOHUM' is an indigenously developed low-cost hearing device for hearing impaired newborns. This innovative medical device uses brain-stem auditory evoked response technology.
89. (b) Keoladeo national park, Rajasthan was placed on the Montreux Record in 1990 due to water shortage and un-balanced grazing regime around it.
90. (b) Kamneng, Manas, Raidak and Jaldhaka are tributaries of Brahmaputra.
91. (d) Leaves are modified into spines in case of cactus and into fleshy edible leaves in onion. Stigma and style of saffron plants commonly called threads are used as seasoning agent in food.
92. (c) Jawara is performed in the Bundelkhand area on wedding occasions, the countryside women of Malwa perform the Matki dance with an earthen pot balanced on the head. The phulpati is exclusively for unmarried girls. It is a dance of the semi-rural women folk.
93. (c) The eight core industries are
- |                      |                |
|----------------------|----------------|
| 1. Coal              | 5. Fertilizers |
| 2. Crude oil         | 6. Steel       |
| 3. Natural Gas       | 7. Cement      |
| 4. Refinery Products | 8. Electricity |
- Source:** The Hindu
94. (d) In Free Space Optical Communication technology, data is transmitted by propagation of light waves in free space allowing optical connectivity. The technology uses optical beams through free space/vacuum for transmission using an optical transceiver at both ends to provide bidirectional capability.
95. (a) The Savanna or Sudan climate is a transitional type of climate found between the equatorial forests and the trade wind hot deserts. It is confined within the tropics and is best developed in the Sudan where the dry and wet seasons are most distinct. The Savanna type of climate is characterized by an alternate hot, rainy season and cool, dry season. The extreme diurnal range of temperature is another characteristic feature of the Savanna climate. The prevailing winds of the region are the Trade winds which bring rain to the coastal districts.
96. (b) Excess of the nutrients from a lake can be removed by following methods:
- Flushing with nutrient-poor waters.
  - Deep water abstraction.
  - On-site algae swimming and separator thickening.
  - Harvest of fishes and macrophytes.
  - Sludge removal.
  - Artificial Mixing/Destratification
97. (c) Circadian Rhythm is associated with Day and night cycle and it also influences various physiological processes inside body. It is not related with silence and noise phases.
98. (b) The faizpur session was held in Dec. 1936. The session was headed by Jawahar Lal Nehru. It was the first annual session of the Indian National Congress that was held in a village.
99. (c) The Sun is vertically overhead at the equator on two days each year. These are usually 21 March and 21 September though the date changes because a year is not exactly of 365 days. These two days are termed equinoxes meaning "equal nights" because on these two days all parts of the world have equal days and nights.
- After the March equinox the sun appears to move north and is vertically overhead at the Tropic of Cancer on about 21 June. This is known as June or Summer Solstice, when the northern hemisphere will have its longest day and shortest night. By about 22 December, the Sun will be overhead at the Tropic of Capricorn. This is the winter solstice when the Southern hemisphere will have its longest day and shortest night.
100. (c) Under Multiple burn technology during satellite launch, the rocket's engine is switched off and then switched on to control its height. It is used to place satellites in two different orbits.
101. (c) Mahadev Govind Ranade and Ram Krishna Bhandarkar were associated with reform movements in western India.
102. (c) In the words of Dr. B.R. Ambedkar "The Directive principles are like the "instrument of instructions", which were issued to the Governor-General and to the Governors of the colonies of India by the British Government under the Government of India Act, 1935.
103. (d) Algae or phytoplankton are microscopic organisms that can be found naturally in coastal waters. They are major producers of oxygen and food for many of the animals that live in these waters.
- When environmental conditions are favourable for their development, these cells may multiply rapidly and form high number of cells and this is called algal bloom.
  - A bloom often results in a color change in the water. Algal blooms can be of any color, but the most common ones are red or brown. These blooms are commonly referred to as red or brown tides.

- Most algal blooms are not harmful but some produce toxins and do affect fish, birds, marine mammals and humans.
104. (a) Statements (i) and (iii) are correct. Besides this, in March 2017, Kerala became the first state to declare internet as a basic right for every citizen. The search giants are also required to have ‘in-house’ experts to spot illegal content and pull them down.
105. (a) Baji Rao I conquered Malwa, Southern Gujarat and Bundelkhand and conducted raids up to the very gates of Delhi. However he didnot occupy Delhi as the Mughal emperor still carried considerable prestige. The Maratha raids were not conducted for conquest. They were primarily interested laying their hand on a major part of the land revenue of these areas. Baji Rao’s son Balaji Baji Rao continued the forward policy of his father. During his peshwaship, the Maratha reached as far as Bihar and Orissa in the east and the Punjab in the north. This was the period of the greatest expansion of the Maratha power  
**Source:** N.C.E.R.T :8th – (old): Modern India
106. (b) In order to Safeguard the interests of the STs more effectively, it was proposed to set up a separate National Commission for STs by bifurcating the existing combined National Commission for SCs and STs.  
This was done by passing the 89<sup>th</sup> constitutional Amendment Act of 2003.  
– It consists of a chairperson, a vice-chairperson and 3 other members, all appointed by president.  
– The commission is vested with the power to regulate its own procedure.
107. (c) The largest producer of kyanite is Jharkhand (83%) followed by Maharashtra (16).
108. (b) Burning of coal to form carbon dioxide from carbon and oxygen is an example of combination reaction. Calcium carbonate on heating dissociates into calcium oxide and carbon dioxide, it is a type of decomposition reaction.
109. (c) All the statements (i), (ii) and (iii) are correct. Mudra debit cards are issued to borrowers. Using these, they can withdraw the loan from any ATM in India, as and when they need the money.
110. (b) Jizya, Zakat, Khams, Kharaj, Ushr, Trade tax, House tax, Horse tax, Mines tax were the main sources of revenue during medieval period. Jizya was a tax on Non-Muslims. Women Children, beggars, priests, Brahmins etc and all those who had no source of income were exempted from this tax Firoz Tughlaq levied this tax on Brahmins also. Zakat was a religious tax which was imposed only on rich Muslims and it was 2.5% of their income. Ushr was the Land tax which was collected from the peasant.
111. (d)  
1. India has only 17 judges per 10 lakh population which is very poor as compared to other European and American countries. eg. USA has 151 and China 170 judges per 10 lakh population.  
2. Vacancies in High courts have reached nearly 50% of their sanctioned strength. Lower courts too have huge unfilled posts.  
3. In efficient and time consuming procedures must be avoided.  
4. Police often fail to collect vital evidences because of lack of scientific training.  
Source – The Hindu.
112. (c) In 1928, the congress appointed a sub committee under the chairmanship of Motilal Nehru to draft a Constitution.  
The major recommendation of the Nehru Report were:  
– Dominion status on lines of self governing dominions as the form of government desired by Indians.  
– Rejection of separate electorates which had been the basis of constitutional reforms so far, instead it demanded for joint electorates with reservation of seats for Muslims  
– Linguistic provinces.  
– Nineteen fundamental rights including equal rights for women right to form unions and universal adult suffrage.  
– Responsible government at the centre and in provinces.
113. (d) Chairman of GST Network- Dr. A B Pandey,  
Chairman of Axis Bank- Sanjiv Mishra  
Deputy Governor of RBI- Mahesh Kumar Jain  
President of FICCI - Pankaj patel
114. (b) Denmark, Norway, Finland, Sweden and Netherlands are the top countries in the 2017-18- Rule of Law Index.
115. (a) RCEP is a free trade agreement (FTA) between ASEAN and the Asia-Pacific states with which ASEAN has existing FTAs (Australia, China, India, Japan, South Korea and New Zealand).
116. (a) India, China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan and Pakistan are the member states of SCO. India became full member of the SCO in 2017. The 15<sup>th</sup> Meeting of Cultural Ministers of the Shanghai Cooperation Organization (SCO) member states was held in Sanya, China.
117. (b) *The Great Indian Novel*-authored by Shashi Tharoor was awarded the commonwealth Writer’s Prize for Best Book of the Eurasian region.
118. (b) India on Sunday successfully test-fired its indigenously developed *HeliNa* anti-tank missile at the Pokhran Range in Rajasthan.
119. (d) The 10<sup>th</sup> and 11<sup>th</sup> World Hindi Conferences were organized in Bhopal (India) and Port Louis (Mauritius) respectively.
120. (c) Vienna tops the list of Global Liveability Index-2018.