

Time: 3 hrs.

Max. Marks:80

**General Instructions: -**

1. This question paper contains five sections A, B, C, D and E. each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion- Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based (4 marks each) with sub parts.

**SECTION A****(Multiple Choice Question)**

Each question carries 1 mark

1. If  $p$  and  $q$  are natural numbers and ' $p$ ' is the multiple of ' $q$ ', then what is the HCF of ' $p$ ' and ' $q$ '  
a)  $pq$       b)  $p$       c)  $q$       d)  $p+q$
2. Zeroes of a polynomial can be determined graphically, then number of zeroes of a polynomial  $P(x)$  is equal to number of points where it  
a) intersect x-axis      b) intersects y-axis      c) Both (a) and (b)      d) None of these
3. If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $x^2 - 4x$  then product of zeroes will be,  
a) 4      b) -4      c) 0      d) None of these
4. Values of  $k$  for which the quadratic equation  $2x^2 - kx + k = 0$ , have equal roots is  
a) 0      b) 4, 1      c) 8      d) 0, 8
5. The father's age is 6 times his son's age. 4 years hence, the age of father will be 4 times his son. The present ages (in years) of the son and the father, respectively are:  
a) 4 and 24      b) 5 and 30      c) 6 and 36      d) 3 and 18
6. Sequences  $4, a, b, 8$  and  $5, c, d, 9$  are in AP, then  $\frac{b+a}{d+c}$  is :  
a)  $\frac{1}{2}$       b)  $\frac{5}{9}$       c)  $\frac{4}{9}$       d)  $\frac{6}{7}$

7. If the ratio of the corresponding sides of two similar triangles is 3 : 2, then the ratio of their corresponding median will be:  
 a) 2 : 3      b) 3 : 2      c) 1 : 1      d) 9 : 4
8. PQRS is a trapezium such that  $QR \parallel PS$  and  $PS = 4\text{cm}$ . If the diagonals PR and SQ intersect at O, such that  $\frac{OP}{OR} = \frac{OS}{OQ} = \frac{1}{2}$ , then QR is equal to :  
 a)  $\frac{1}{2}$       b) 2      c) 4      d) 8
9. If P is a point on y-axis, whose ordinate is 3 and Q is a point  $(-5, 2)$ , then distance PQ is :  
 a) 5      b)  $\sqrt{24}$       c)  $\sqrt{26}$       d)  $\sqrt{65}$
10. The coordinates of a point P dividing line segment joining the points A(1, 3) and B(4, 6) in ratio 2 : 1 are::  
 a) (2, 4)      b) (5, 3)      c) (4, 2)      d) (3, 5)
11. If  $\sec\theta + \tan\theta = \sqrt{2}$ , then  $\sec\theta - \tan\theta$  is equal to:  
 a) 2      b)  $\frac{1}{\sqrt{2}}$       c)  $\sqrt{2}$       d) none of these
12. A tree of height 6 m casts a shadow of length 4 m. At the same time a flag pole casts a shadow of length 50 m. The height of flag pole will be:  
 a) 50 m      b) 75 m      c) 100 m      d) 150 m
13. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle  $80^\circ$ , then  $\angle POA$  is equal to:  
 a)  $80^\circ$       b)  $50^\circ$       c)  $70^\circ$       d)  $60^\circ$
14. The number of tangents to a circle from a point P lying inside the circle is:  
 a) 2      b) 1      c) infinite      d) zero
15. A card is drawn from a well shuffled deck of 52 playing cards. The probability that the card will not be an Ace, is::  
 a)  $\frac{1}{13}$       b) 1      c)  $\frac{12}{13}$       d) 0
16. The integers 1 to 30 are written on cards and these cards are well shuffled and put in a box. One card is picked at random. The probability of getting an even numbered card is:  
 a)  $\frac{1}{6}$       b)  $\frac{1}{2}$       c)  $\frac{2}{3}$       d)  $\frac{1}{3}$
17. If  $u_i = \frac{x_i - 25}{10}$ ,  $\sum f_i u_i = 20$  and  $\sum f_i = 100$ , then mean is;  
 a) 27      b) 25      c) 23      d) 30

18. The hour hand of a clock is 8 cm long. The angle swept by the hour hand between 9:20am and 9:50 am is:

- a)  $15^\circ$       b)  $30^\circ$       c)  $90^\circ$       d)  $180^\circ$

### ASSERTION-REASONING BASED QUESTION

In the following question, each question contains statement I (Assertion) and statement II (Reason). Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct. The choices are:

- a) Both statement I and statement II are true, and statement II is the correct explanation for statement I.  
b) Both statement I and statement II are true, but statement II is not the correct explanation for statement I.  
c) Statement I is true, but statement II is false.  
d) Statement I is false, but statement II is true.

19. **Statement 1(A):** the  $n$ th term of a pattern is given by  $3n^2 + 1$ . This pattern form an AP.

**Statement 2(R):**  $n$ th term of an AP is given by formula  $a_n = a + (n - 1)d$ .

20. **Statement 1(A):** The probability of wining a game is 0.70, then probability of loosing the game is 0.30.

**Statement 2(R):** Sum of the probability of an event  $P(E)$  and its not event  $P(\bar{E})$  is 1.

### SECTION B

This section comprises of very short answer type- question (VSA) of 2 marks each

21. By using prime factorisation method find HCF of 648 and 8 and hence find their LCM.  
22. The value of  $k$  for which the equation  $2x^2 - (k - 1)x + 8 = 0$  will have real and equal roots..  
23. If  $3 \sin \theta = \sqrt{3} \tan \theta$ , the find the value of  $\sin^2 \theta - \cos^2 \theta$

OR

If  $\sin(A - B) = \frac{1}{2}$  and  $\cos(A + B) = \frac{1}{2}$ , then find the value of A and B.

24. Show that the points  $(-2, 3)$ ,  $(8, 3)$  and  $(6, 7)$  are the vertices of a right angled triangle.

OR

Find the value/s of  $x$  such that  $PQ = QR$ , where the coordinates of P, Q and R are  $(6, -1)$ ,  $(1, 3)$  and  $(x, 8)$  respectively.

25. Find Mode of following data:

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	10	10	16	12	6	7

### SECTION C

This section comprises of short answer type questions (SA) of 3 marks each

26. Prove that  $\sqrt{3}$  is irrational.

27. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and total height of the vessel is 13 cm. Find capacity of the vessel in litres.

OR

A wooden article was made by scooping out a <sup>cone</sup> hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm and base radius of cylinder and cone is 3.5 cm each. Find the total surface area of the article.

28. A circle touches all the four sides of a quadrilateral ABCD. Prove that  $AB + CD = BC + DA$ .

29. Which term of the A.P. 6, 13, 20, 27, .... is 105 more than its 25<sup>th</sup> term?

OR

If the sum of first 'n' terms of an A.P is 'm' and the sum of first 'm' terms is 'n'. Prove that sum of its (m + n) terms is -(m + n)

30. Prove that  $\frac{\tan A}{\sec A - 1} + \frac{\tan A}{\sec A + 1} = 2 \operatorname{cosec} A$

31. If AD and PM are medians of triangles ABC and PQR, respectively where  $\Delta ABC \sim \Delta PQR$ . Prove that  $\frac{AB}{PQ} = \frac{AD}{PM}$

### SECTION D

This section comprises of long answer type questions (LA) of 5 marks each

32. Following tables gives the state-wise teacher-student ratio in secondary school in India

Number of students per teacher	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. Of states/U.T	3	8	9	10	3	0	0	2

Find Mean and median of this data.

Handwritten calculations on the left margin:

$$\begin{array}{r} 3250 \\ 50 \\ \hline 3200 \\ 250 \\ \hline 3450 \\ 150 \\ 35 \\ \hline 3500 \\ 150 \\ \hline 3650 \\ 150 \\ \hline 3800 \\ 150 \\ \hline 3950 \end{array}$$

33. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The diameter of each of depression is 1 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand.

34. A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point the angle of elevation of the top of pedestal is  $45^\circ$ . Find the height of pedestal. (use  $\sqrt{3} = 1.73$ )

OR

From the top of a tower 150 m high, a man observes two cars on the opposite sides of the tower with angles of depression  $30^\circ$  and  $45^\circ$  respectively. Find the distance between two cars. (use  $\sqrt{3} = 1.73$ )

35. (i) State and Prove Basic Proportionality Theorem. (3)

(ii) Prove that diagonals of a trapezium are proportional. (2)

### SECTION E

This section comprises of 3 case-study/passage-based questions of 4 marks each with two sub-parts. First two case study questions have three sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively. The third case study question has two sub-parts of 2 marks each.

36. Sushil has only Rs.50 and Rs.100 notes with him. The total number of notes that he has is 65 and amount of money he has with him is Rs. 5250.

Based on the given information answer the followings:

(i) Write the pair of linear equations in two variables

(ii) Find the number of notes of denominations Rs.50 and Rs.100.

(iii) If  $3x + 2ky = 2$  and  $2x + 5y + 1 = 0$  has No solutions, then find the value of k.

OR

Write condition for pair of linear equations in two variables to be consistent.

37. Students of class 10 are asked to prepare campaign banners in the shape of triangle to raise social awareness about hazards of smoking. The vertices of one of the triangle formed are  $A(-2, -1)$ ,  $B(3, 4)$  and  $C(-3, 4)$ .

Based on the given information answer the followings:

(i) Find the coordinates of the mid points of BC.

(ii) Find the length of median through A

(iii) Find a point on AC which divides AC in 2 : 3.

OR

What type of triangle ABC is, Justify your answer.

38. A brooch is a small piece of jewellery to fasten on dress. A brooch is made of silver wire in the shape of a circle with diameter 28 mm. The wire is used for making 4 diameters which divides the circle in 8 equal parts.

Based on the above information, answer the following questions:

- (i) Find the circumference of the circle of brooch.
- (ii) Find the length of silver wire used to make brooch.
- (iii) Find area of each part (sector) in the brooch

OR

Find perimeter of one sector formed in the brooch.