

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 LCM of 24 and 48 is $10m + 8$, then value of m is
a) 1 b) 2 c) 4 d) 8
2. For a grouped data, if $\sum f_l = 20$, $\sum f_l x_l = 2p + 20$ and mean of distribution is 12, then the value of p is :
a) 110 b) 100 c) 90 d) 120
3. The difference between the circumference and radius of a circle is 37 cm. The area of circle is:
a) 149 sq cm b) 154 sq cm c) 121 sq cm d) 169 sq cm
4. The point P which divides the line segment joining the points A(2,-5) and B(5, 2) in the ratio 2 : 3 lies in the quadrant
a) I b) II c) III d) IV
5. If distance between two parallel tangents of a circle is 14cm then radius of circle is:
a) 14 b) 4 c) 7 d) None of these
6. In a right triangle ABC, right angled at C, if $\tan A = 1$, then the value of $2 \sin A \cos A$ is
a) 0 b) 0.5 c) 1 d) 2
7. If $\frac{1}{2}$ is a root of equation $x^2 + kx - \frac{5}{4} = 0$, then k is
a) 2 b) -2 c) $\frac{1}{4}$ d) $\frac{1}{2}$
8. If first three terms of an AP are $x - 1, x + 1, 2x + 3$, then the value of x is:
a) 0 b) 1 c) 2 d) -1
9. A tower stands near an airport. The angle of elevation θ of the tower from a point on the ground is such that $\tan \theta = \frac{5}{12}$. If the distance of the observer from the tower is 120 m then height of tower is
a) 60 m b) 50 m c) 40 m d) None of these
10. The sum of the powers of each prime factor of 98 is:
a) 2 b) 7 c) 3 d) 4
11. If the pair of linear equations $x + y = \sqrt{2}$ and $x \sin \theta + y \cos \theta = 1$ has infinite many solutions, then θ is equal to
a) 30° b) 45° c) 60° d) 90°
12. In $\triangle ABC$ and $\triangle DEF$ if $\angle A = 80^\circ$, $\angle B = 60^\circ$, $AB = 3.8$ cm, $BC = 6$ cm, $AC = 3\sqrt{3}$ cm, $EF = 12$ cm, $DE = 6\sqrt{3}$ cm, and $DF = 7.6$ cm, then the measure of $\angle F$ is
a) 80° b) 30° c) 40° d) 60°

13. If the difference of Mode and Median of a data is 24, then the difference of median and Mean is:
 a) 8 b) 12 c) 24 d) 36
14. In tossing 3 coins, the probability of getting at least 2 heads is:
 a) $\frac{1}{2}$ b) $\frac{2}{3}$ c) $\frac{1}{3}$ d) $\frac{1}{4}$
15. From a solid circular cylinder with height 10 cm and radius of base 6 cm, a right circular cone of same height and same radius is removed, the volume of remaining solid in cu.cm is:
 a) 280π b) 330π c) 240π d) 440π
16. If $\tan\theta + \cot\theta = 2$, then $\tan^4\theta + \cot^4\theta =$
 a) 1 b) 2 c) 20 d) 2^{20}
17. If a sector of a circle has area 100 sq cm, then the perimeter of the sector is :
 a) $r + \frac{200}{r}$ b) $2r + \frac{200}{r}$ c) $r + \frac{100}{r}$ d) $3r + \frac{200}{r}$
18. If a pair of linear equations in two variables is non-intersecting then which if the following statement is true:
 a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
 c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ d) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

ASSERTION-REASONING BASED QUESTION

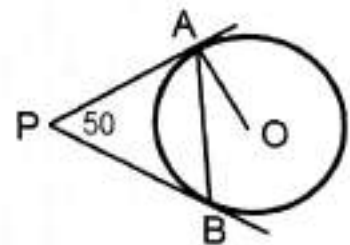
In the following question, each question contains statement I (Assertion) and statement II (Reason). Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct. The choices are:

- 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(Assertion):** $5x^2 + 14x + 10 = 0$ has no real roots.
Statement 2(Reason): $ax^2 + bx + c = 0$ has no real roots if $b^2 < 4ac$
20. **Statement 1(Assertion):** Class mark of the interval 15 - 35 is 20
Statement 2(Reason): The class mark is the mean of upper limit and lower limit of a class.

SECTION B

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

21. Find the roots of the equation $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$. Where $x \neq -4, 7$
22. In figure, PA and PB are tangents to the circle with centre O, such that $\angle APB = 50^\circ$, then find the measure of $\angle OAB$.
23. If the 3rd and 9th term of an AP are 4 and -8 respectively, then which term of the AP is zero?
24. 8 chairs and 5 tables for a class costs Rs. 10500, while 5 chairs and 3 tables costs Rs.6450. Find cost of each of the chair and table.



OR

Find the value of $\frac{x}{y}$, if $2x + y = 7$ and $3x + 2y = 12$

25. Prove that $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

SECTION C

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

26. There are 156, 208 and 260 students in groups A, B and C respectively. Find the minimum numbers of buses required to take them to a field trip if same number of students of a group are to be accommodated in each bus.

OR

Prove that $3 - \sqrt{2}$ is irrational. It is given that $\sqrt{2}$ is irrational.

27. If α and β are the zeroes of $x^2 - x - 2$, then form a quadratic polynomial whose zeroes are $2\alpha + 1$ and $2\beta + 1$.
28. The x-coordinate of a point P is twice its y-coordinate. If P is equidistant from Q(2, -5) and R(-3,6), find the coordinates of P.

OR

Three players are standing on the circle at points A(-5, 0), B(1, 0) and C(3, 4). A ball is placed at a point that is equidistant from all 3 player. What are the coordinates of the place of ball?

29. Two poles of equal heights are standing opposite to each other on either side of a road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles.
30. The following table shows the age distribution of cases of a certain disease admitted during a year in a particular hospital.

Age (years)	5-14	15-24	25-34	35-44	45-54	55-64
Number of cases	6	11	21	23	14	5

Find the Modal Age.

31. From a pack of 52 playing cards, a card is drawn at random. Find the probability of:

- (a) A red face card
 (b) a King or a diamond
 (c) a card of black color or an Ace

Handwritten calculations for Q31:

$$30 = 20 + \frac{30 - 5 \times 2 + 1}{2} + 1$$

$$10 \times 2 = 30$$

$$20 - 30 = -10$$

$$\frac{-10 + 1}{2} = -\frac{9}{2}$$

$$179 \sqrt{146}$$

$$\frac{146}{2} = 73$$

SECTION D

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

32. A ^{Soln} consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and height is 180 cm.

33. The median of the following distribution given below is 30, find the value of x and y

Class Intervals	0-10	10-20	20-30	30-40	40-50	50-60	Total
frequency	5	x	20	15	y	5	60

30

34. State and Prove Basic Proportionality Theorem.

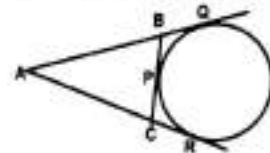
Use the theorem to solve following:

ABC is a triangle with $PQ \parallel BC$, $AP = x$, $PB = x-2$, $AQ = x+2$ and $QC = x-1$, find value of $3x-5$

35. Prove that the lengths of the tangents drawn from an external point to a circle are equal.

Use the theorem to prove the following:

If a circle touches the side BC of a triangle ABC at P and extended sides AB and AC at Q and R respectively, prove that $AQ = \frac{1}{2}(AB+BC+AC)$



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.

36. A wooden article was made by scooping out a hemisphere from one end of a cylinder and cone from the other end. If the height of the cylinder is 40 cm, radius of cylinder is 7 cm and height of the cone is 24 cm.

(i) What will be surface area of wooden article?

(ii) What will be cost of polishing the article at Rs.12 per sq cm.

(iii) What will be volume of wooden article

OR

What will be mass of the wooden article if density of wood is 0.9 gm/cm^3 .

Q37. Radhika went to a fair in her village. She wanted to enjoy rides on the giant wheel and play hoopla. The number of times she played hoopla is half the number of times she rode the giant wheel. Each ride of giant wheel cost Rs.3 and a game of hoopla costs Rs.4 and she spent Rs.20 in the fair.



On the basis of above information answer the following

(i) What is representation of given statement algebraically in two variables?

(ii) Find the number of times she played hoopla and number of times she rode giant wheel?

(iii) Draw graph of equations so obtained.

OR

Write the conditions for a system of linear equations in two variables to be consistent.

38. Amit Kapoor started a bakery shop. To display the cakes he puts 3 cakes in 1st row, 5 cakes in 2nd row, 7 cakes in 3rd row and so on.

On the basis of above information answer the following

(i) Find the difference of number of cakes in 17th row and 10th row.

(ii) Find number of cakes in 15th row

(iii) If he has to put a total of 120 cakes, then how many rows are required?.

OR

Find total number of cakes required to display cakes in 11 rows.

Handwritten notes for Q37:

$$20 + 30 - 5x$$

$$10 \times 20 = 20 - 25x + 10$$

$$20 + 25 = x$$