

DISCLAIMER

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22. Evaluate : $\tan 30^\circ \cdot \sec 45^\circ + \tan 60^\circ \cdot \sec 30^\circ$

OR

22. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, Prove that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.

23. PM is a tangent to a circle with centre O touching the circle at M. If $OP = 85\text{cm}$ and $PM = 77\text{cm}$, find radius of circle?

OR

23. A circle touches all four sides of a quadrilateral ABCD with $AB = 6\text{cm}$, $BC = 7\text{cm}$ and $CD = 4\text{cm}$. Find AD.

24. Consider the following information on the observed lifetime (in hours) of 225 electrical component.

| Life time (in hours) | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 |
|----------------------|------|-------|-------|-------|--------|---------|
| Frequency | 10 | 35 | 52 | 61 | 38 | 29 |

Determine the modal lifetime of component.

25. A girl of height 90cm is walking away from the base of lamp post at a speed of 1.2m/s. If the lamp is 3.6m above the ground, find the length of her shadow after 4 seconds.

26. Find the dimensions of the prayer hall whose carpet area is 300 square meters and whose length is 1 metre more than twice is breadth.

OR

26. Solve equation : $2x^2 - 5x + 3 = 0$ by completing the square.

[Section - C]

Answer the following questions briefly.

[3×8=24]

27. Find all the other zeros of the polynomial $p(x) = 2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its four zeros are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$

28. Find value of x : $x^2 + \frac{1}{x^2} = \frac{17}{4}$

29. The sum of 5th and 7th terms of an AP is 52 and the 10th term is 46. Find the common difference of the AP.

OR

29. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and common difference.

30. If the coordinates of the midpoint of sides of $\triangle ABC$ are $(1,1)$, $(2,-3)$ and $(3,4)$, find co-ordinate of vertices of $\triangle ABC$.

31. The mode of the following frequency distribution of 165 observations is 34.5:

| | | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|-------|
| Class | 5-14 | 14-23 | 23-32 | 32-41 | 41-50 | 50-59 | 59-68 |
| Frequency | 5 | 11 | A | 53 | B | 16 | 10 |

Find value of A and B

32. Prove that the parallelogram circumscribing a circle is rhombus.

33. A chord of a circle of radius 10cm subtends a right angle at centre. Find the area of corresponding :

1) minor segment 2) major sector (use $\pi = 3.14$)

34. A solid iron pole consist of a cylinder of height 220cm and base diameter 24cm, which is surmounted by another cylinder of height 60cm and radius 8cm. Find the mass of pole, given that 1cm³ of iron has approximately 8g mass (use $\pi = 3.14$)



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[Section – D]

Answer the following as required with calculation

[4×5=20]

35. Draw a line segment AB of length 7.6cm and divide it in ratio 5:8 by point C. measure the two parts. Write steps of construction.

OR

35. Draw a pair of tangents to circle of radius 5cm which are inclined to each other at an angle of 60° . Write steps of construction.

36. The sum of two digit number and the number formed by interchanging its digit is 110. If 10 is subtracted from first number, the new number is 4 more than 5 times the sum of digits in the first number. Find the first number.

37. The angles of depression of the top and bottom of an 8m tall building from the top of a multi-storeyed buildings are 30° and 45° , respectively. Find the height of the multi-storeyed building and distance between the two buildings.

38. A vessel is in form of inverted cone. Its height is 8cm and radius of its top, which is open is 5cm. It is filled with water up to brim when lead shots, each of which is a sphere of radius 0.5cm are dropped into vessel, one fourth of water flows out. Find the numbers of lead shots dropped in the vessel.

39. In two triangles, If the sides of one triangle are proportioned to (i.e. same ratio of) the sides of other triangles, then prove that their corresponding angles are equal and hence the two triangles are similar.

OR

39. Prove that sum of squares of a rhombus is equal to sum of squares of diagonals.

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[Section : A]

[16]

• State whether following statement are True or False.

- The degree of polynomial $p(x) = 3 + 5x + x^3 + x^2$ is 3.
- 3, 3, 3, 3 _____ is an Ap
- $\cos 45^\circ = \sqrt{2}$
- $\sqrt{(1 - \cos^2 \theta) \sec^2 \theta} = \tan \theta$

• Fill in the blanks.

- If the median of the observations arranged in the ascending orders as 6, 7, $x-2$, x , 17, 20 is 16 then $x =$ _____.
- Probability of queen from well shuffled pack of 52 cards is _____.
- If $P(A) : P(B) = 3:5$ then $P(A) =$ _____.
- Given that $\sin \theta = \frac{a}{b}$, then $\cos \theta =$ _____.

• Multiple choice question .

- If (1,0) is a solution of equation $8x + 5k = 18$, then $k =$ _____
A) 0 B) 1 C) 2 D) 3
- The distance between the points (2,3) and (4,1) is _____.
A) $\sqrt{2}$ B) $2\sqrt{2}$ C) 2 D) 3
- $\tan^2 \theta - \sec^2 \theta =$ _____
A) 1 B) 0 C) -1 D) $\sqrt{2}$
- Point p lies exterior of a circle with centre O. Tangents through p touch the circle A and B. If angle formed by PA and PB is 80° , then $\angle POA =$ _____.
A) 0° B) 25° C) 50° D) 75°

• Answer in one word or sentence.

- Find volume of hemisphere with radius 7 cm.
- Find probability of receiving a prime number in experiment of throwing a balanced dice once.
- If $17x + 23y = 40$ and $23x + 17y = 80$, then value of $x+y$ is?
- Probability that Ramesh wins a match is 0.48. Find probability that Ramesh does not win the match.

Section : B

[20]

• Solve the following .(Each question carry 2 marks)

- Prove that $3 + \sqrt{2}$ is an irrational number.
- Find HCF and LCM of 12, 72 and 120 by prime factorization method.
- Find a quadratic polynomial with sum of its zeroes being $-\frac{1}{4}$ and the product of its zeroes being $\frac{1}{4}$
- Solve the pair of linear equation by method of substitution:-
 $7x - 15y = 2$ and $x + 2y - 3 = 0$

OR

- Solve by cross multiplication method.
 $x + y = 5$ and $2x - 3y = 4$
- If $\sec \theta = \frac{13}{12}$, find $\tan \theta$ and $\cos \theta$.
- If $\sin \theta + \sin^2 \theta = 1$, Prove that $\cos^2 \theta + \cos^4 \theta = 1$.

OR

- Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cdot \operatorname{cosec} \theta$.
- Point p lies on a circle with centre O and radius 5 cm. A line through centre O intersects the tangent through P at Q. If $OQ = 13$ cm. Find length of PQ.

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OR

23. Quadrilateral ABCD circumscribes a circle. Prove that $AB + CD = AD + BC$.

24. Consider the following distribution of daily wages of 50 workers of a factory.

| | | | | | |
|------------------|---------|---------|---------|---------|---------|
| Daily wages | 500-520 | 520-540 | 540-560 | 560-580 | 580-600 |
| Number of worker | 12 | 14 | 8 | 6 | 10 |

Find the mean daily wages of workers of factory by using an appropriate method.

25. A Ladder is placed against a wall such that its foot remains at a distance of 2.5 m from the wall and its top reaches a window 6 m above ground. Find length of ladder in cm.

26. A two digit number is such that the product of its digit is 20. If 9 is subtracted from the number. The digits interchange their places. Find the number.

OR

26. Find the roots of the following quadratic equation
 $\frac{1}{2}x^2 - \sqrt{11}x + 1 = 0$

Section : C

• Solve the following. (Each question 3 marks) [24]

27. Divide $3x^2 + x^2 + 2x + 5$ by $x^2 + 1 + 2x$

28. Solve the pair of equations as :
 $\frac{2}{x} + \frac{3}{y} = 13$, $\frac{5}{x} - \frac{4}{y} = -2$.

29. For an A.P. if $a_n = 4$, $d = 2$ and $S_n = -14$, find n and a

OR

29. Find 31th term of an A.P whose 11th term is 38 and the 16th term is 73.

30. If A and B are (-2, -2) and (2, -4) respectively, find the coordinates of P such that $AP = \frac{2}{3} AB$ and P lies on line segment AB.

31. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is Rs. 18. Find missing frequently f.

| | | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Daily pocket allowance | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 |
| No. of children | 7 | 6 | 9 | 13 | f | 5 | 4 |

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

33. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of corresponding
 i) minor segment ii) major sector (Use $\pi = 3.14$)

34. Metallic spheres of radius 6 cm, 8 cm and 10 cm respectively are melted to form a single solid sphere. Find radius of resulting sphere.

OR

34. The sum of radius of base and height of a solid right circular cylinder is 37 cm. Its total surface area is 1628 cm^2 . Find its volume.

[Section : D] [20]

• Solve the following. (Each carries 04 marks)

35. Draw line segment of length 6.5cm. and divide it in ratio 3:4. Measure the parts and write steps of construction.

36. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40km upstream and 55km down stream. Determine the speed of stream and that of boat in still water.

37. The angle of elevation of top of tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. prove that height of tower is 6m.

38. How many Silver coins, 1.75cm in diameter and of thickness 2mm, must be melted to form a cuboid of dimensions 5.5 cm \times 10cm \times 3.5cm²?

39. If a line is drawn parallel to one side of a triangle to intersect the other two sides in the same ratio.

OR

39. In a right triangle, the square of the hypotenuse is equal to the sum of the square of other 2 sides.

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