No. of questions: 38
Time: 3 hours
Subject Code: 81E
Max. Marks : 80
I.Four alternatives are given to the following questions or incomplete statements. Choose the correct from them and write it along with serial letter. $08 \times 01=08$

1) Which of the following is not an irrational number?
A) $\sqrt{2}$
B) $\sqrt{3}$
C) $\sqrt{9}$
D) $\sqrt{7}$
2) Common difference of the AP $3,6,9,12, \ldots \ldots \ldots$ is
A) 3
B) -3
C) 6
D) 9
3) If the linear equations of the form $a_{1} x+b_{1} y+c_{1}=0$ and $a_{2} x+b_{2} y+c_{2}=0$ have unique solution then the correct relation in the following is
A) $\frac{a_{1}}{a_{2}}=\frac{b_{1}}{b_{2}}=\frac{c_{1}}{c_{2}}$
B) $\frac{a_{1}}{a_{2}}=\frac{b_{1}}{b_{2}} \neq \frac{c_{1}}{c_{2}}$
C) $\frac{a_{1}}{a_{2}}=\frac{b_{1}}{b_{2}}$
D) $\frac{a_{1}}{a_{2}} \neq \frac{b_{1}}{b_{2}}$
4) The value of discriminant of the quadratic equation $x^{2}+5 x+5=0$ is
A) 5
B) -5
C) $\frac{5}{2}$
D) $\frac{-5}{2}$
5) The distance between $p(x, y)$ and the origin is
A) $\sqrt{x+y}$
B) $\sqrt{x^{2}-y^{2}}$
C) $\sqrt{x-y}$
D) $\sqrt{x^{2}+y^{2}}$
6) The maximum value of $\sin \theta$ is
A) $\frac{2}{\sqrt{3}}$
B) $\frac{\sqrt{3}}{2}$
C) 1
D) $\sqrt{2}$
7) In $\triangle A B C, \angle B=90^{\circ}, B D$ is the perpendicular bisector of $A C$. The ratio of areas of $\triangle A D B$ and $\triangle A B C$ is

A) $1: 1$
B) $1: 2$
C) $2: 1$
D) $1: 4$
8) A solid sphere is converted into a solid cylinder. Then the quantity that does change is
A) Shape
B) Total surface area
C) Curved surface area
D) Volume
II. Answer the following questions.
9) Express 210 as the product of prime factors.
10) In an AP, if $a_{n}=2 n+3$ find $a_{3}$
11) What is the degree of the polynomial $8 x^{2}+4 x^{3}-5 x+3$ ?
12) Find the sum of zeroes of the polynomial $x^{2}+5 x+6$.
13) Find the value of ' $\theta$ ' in the given figure.

14) Find the coordinates of the midpoint of the line joining the points $P(3,4)$ and $Q(5,2)$.
15) Write the formula to find the volume of hemisphere.
16) Write the standard form of quadratic equation.

## III. Answer the following questions.

$08 \times 02=16$
17) Prove that $2+\sqrt{3}$ is an irrational number.
18) Solve : $x+y=5,2 x-3 y=5$
19) Solve the quadratic equation $3 x^{2}-5 x+2=0$ by using formula.
20) In the figure, $L M \| C B$ and $L N \| C D$. Prove that $\frac{A M}{A B}=\frac{A N}{A D}$


OR
In trapezium $A B C D, A B \| C D$. If the diagonals intersect at $O$ prove that $\frac{A O}{B O}=\frac{C O}{D O}$

21) If the sum of two numbers is 36 and their product is 315 , find the numbers.

OR
The length of a rectangle is 2 m more than its breadth. If the area of rectangle is $120 \mathrm{~cm}^{2}$ find the length and breadth.
22) An unbiased dice is rolled once. Find the probability of getting a) a prime number $b$ ) a number between 2 and 6
23) Draw a circle of radius 3 cm . Construct a pair of tangents to the circle from a point 8 cm away from the centre of circle.
24) A cuboid is formed by joining two identical cubes of volume $64 \mathrm{~cm}^{3}$ each. Find the total surface area of cuboid.

## IV. Answer the following questions.

$09 \times 03=27$
25) Solve by using graph : $x+y=10, x-y=4$
26) The sum of numerator and denominator of a fraction is 8 . If 3 is added to both numerator and denominator it becomes $\frac{3}{4}$. Find the fraction.

## OR

Ten years ago the age of father is 12 times the age of son. After ten years the age of father is twice the age of son. Find their present ages.
27) Two zeroes of the polynomial $x^{3}+5 x^{2}+7 x+3$ are -1 and -3 . Find the third zero of the polynomial.
28) If the points $A(2,3), B(4, k)$ and $C(6,-3)$ are collinear find the value of $k$.

## OR

Verify that the points $(5,-2),(6,4)$ and $(7,-2)$ are the vertices of triangle or not
29) Prove that the tangent drawn at any point on the circle is perpendicular to the radius at that point.
30) In the figure $A B C D$ is a square of side 10 cm . Find the area of shaded region.

31) A toy is made by joining a cone on a hemisphere as shown in the figure. If the radius of cone and hemisphere is 3.5 cm each and the height of cone is 5 cm , find the volume of toy.


A metallic solid sphere of radius 10.5 cm is melted and recast into small cones of radius 3.5 cm and height 3 cm . Find the number of cones so formed.
32) In the figure, if $A D=7 \sqrt{3} \mathrm{~m}$ find the length of $B C$.


## OR

From a point $60 \sqrt{3} \mathrm{~m}$ away from the foot of a tower, the angle of elevation to the top of tower is $30^{\circ}$. Find the height of tower.
33) The following distribution shows the daily income of 50 workers in a factory.

| Daily <br> Income (in <br> Rs.) | $100-120$ | $120-140$ | $140-160$ | $160-180$ | $180-200$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| No. of <br> workers | 12 | 14 | 8 | 6 | 10 |

Draw a less than type ogive for this distribution.

## V. Answer the following questions.

$04 \times 04=16$
34)In an AP, $3^{\text {rd }}$ term is 7 and the $7^{\text {th }}$ term is 2 more than three times the third term. Find the sum of first 20 terms of the AP.

OR
Tenth term of an AP is 21 and the sum of its first 10 terms is 120 . Find the $20^{\text {th }}$ term of AP.
35)Prove that $(\sec A+\tan A)^{2}=\frac{\operatorname{cosec} A+1}{\operatorname{cosec} A-1}$
36) Construct a triangle of sides $4 \mathrm{~cm}, 5 \mathrm{~cm}$ and 6 cm . Then construct another triangle similar to the first triangle such that the sides of this triangle are $\frac{2}{3}$ the sides of first triangle.
37)Find the mean and mode for the following data.

| Class Interval | Frequency |
| :---: | :---: |
| $0-6$ | 1 |
| $6-12$ | 4 |
| $12-18$ | 9 |
| $18-24$ | 3 |
| $24-30$ | 3 |

VI. Answer the following questions.
$01 \times 05=05$
38)State and prove Pythagoras theorem.

