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) If the first term of an AP is 3 , common difference is 2 then its $20^{\text {th }}$ term is
A) 39
B) 41
C) 42
D) 43
2) If $\sin \theta=\frac{5}{13}$ then the value of $\operatorname{cosec} \theta$ is
A) $\frac{12}{13}$
B) $\frac{5}{12}$
C) $\frac{13}{5}$
D) $\frac{13}{12}$
3) The distance between origin and a point $\mathrm{P}(\mathrm{x}, \mathrm{y})$ in a plane is
A) $\sqrt{x^{2}+y^{2}}$
B) $x^{2}+y^{2}$
C) $x+y$
D) $\sqrt{x+y}$
4) If the length of longest chord in a circle is 8 cm then the radius of circle is
A) 8
B) 4
C) 2
D) 16
5) In the figure, $P Q \| B C$ then the value of ' $x$ ' is

A) 4.2 మూనగఆు
B) 2.4 యూనగళు
C) 21.6 మొనగఆు
D) 1.6 మూసగఱు
6) The condition for parallelism of two straight lines represented by the equations $a_{1} x+b_{1} y+c_{1}=0$ and $a_{2} x+b_{2} y+c_{2}=0$ is
A) $\frac{\mathrm{a}_{1}}{\mathrm{a}_{2}}=\frac{\mathrm{b}_{1}}{\mathrm{~b}_{2}}=\frac{\mathrm{c}_{1}}{\mathrm{c}_{2}}$
B) $\frac{\mathrm{a}_{1}}{\mathrm{a}_{2}} \neq \frac{\mathrm{b}_{1}}{\mathrm{~b}_{2}}=\frac{\mathrm{c}_{1}}{\mathrm{c}_{2}}$
C) $\frac{\mathrm{a}_{1}}{\mathrm{a}_{2}} \neq \frac{\mathrm{b}_{1}}{\mathrm{~b}_{2}} \neq \frac{\mathrm{c}_{1}}{\mathrm{c}_{2}}$
D) $\frac{\mathrm{a}_{1}}{\mathrm{a}_{2}}=\frac{\mathrm{b}_{1}}{\mathrm{~b}_{2}} \neq \frac{\mathrm{c}_{1}}{\mathrm{c}_{2}}$
7) The prime factors of 120 are
A) $2^{3} \times 3 \times 5$
B) $2 \times 3^{2} \times 5$
C) $2 \times 3 \times 5^{3}$
D) $2^{2} \times 3^{2} \times 5^{2}$
8) The degree of quadratic polynomial is
A) 1
B) 2
C) 3
D) 4
II. Answer the following questions.
9) Write the formula to find the curved surface area of frustum of a cone.
10) The area of the base of a cylinder is $44 \mathrm{~cm}^{2}$ and its volume is $440 \mathrm{~cm}^{3}$. Find the height of cylinder.
11) Write the formula to find the area of sector in a circle which makes an angle ' $\theta$ ' at the centre.
12) Find the value of $\sin 30^{\circ} \cdot \cos 60^{\circ}-\tan ^{2} 45^{\circ}$
13) The total cost of 5 pencils and 7 pens is Rs.50. Write an equation involving two variables representing this statement.
14) What is the maximum number of zeroes of the polynomial $x^{3}+1$ ?
15) Find the zeroes of the polynomial $x^{2}+5 x+6$
16) State the fundamental principle of arithmetic.

## III. Answer the following questions.

17) Solve: $2 x+3 y=8,3 x+y=5$
18) Find the number of terms in the AP $7,13,19, \ldots 205$.

## OR

How many two digit natural numbers are divisible by 3 ?
19) Prove that $\sqrt{2}$ is an irrational number.

## OR

Find the HCF of 728 and 216 by using Euclid's division algorithm.
20) Find the roots by using the formula: $x^{2}+7 x+12=0$
21) Draw a circle of radius 3.5 cm . Construct two tangents to this circle from an external point 6 cm away from the centre.
22) In $\triangle A B C, \angle A$ is right angle. $A B, B C$ and $A C$ are the tangents to a circle of radius 2 cm as shown in the figure. If $A B=8 \mathrm{~cm}$ and $A C=6 \mathrm{~cm}$ find the area of shaded region.

23) A pole of height 6 m casts a shadow of 4 m on the ground. At the same time, if a building casts a shadow of 28 m find the height of building.
24) The angle of elevation to the top of a tower from a point 30 m away from the foot of tower on the ground is $30^{\circ}$. Find the height of tower.

## IV. Answer the following questions.

 $09 \times 03=27$25)Prove that $(\sin A+\operatorname{cosec} A)^{2}+(\cos A+\sec A)^{2}=7+\tan ^{2} A+\cot ^{2} A$
26)In an AP, if the 2 nd and 3rd terms are 14 and 18 respectively, find the sum of first 51 terms.
27)Divide $p(x)=x^{3}+6 x^{2}-5 x+3$ by $g(x)=x+2$ and verify the relation $\mathrm{p}(\mathrm{x})=\mathrm{g}(\mathrm{x}) \times \mathrm{q}(\mathrm{x})+\mathrm{r}(\mathrm{x})$

## OR

Find the sum and product of zeroes of the polynomial $2 x^{2}-x-1$ and verify the relation with the coefficients.
28)A girl of height 90 cm walks away from the foot of a lamp post at $1.2 \mathrm{~m} / \mathrm{s}$. If the lamp is at a height of 3.6 m from the ground find the length of shadow of girl after 4 seconds.

## OR

An aeroplane starts from an airport and moves towards north with a speed of $1000 \mathrm{~km} / \mathrm{h}$. At the same time another aeroplane moves towards west with the speed $1200 \mathrm{~km} / \mathrm{h}$. What is distance between the two aeroplanes after $1 \frac{1}{2}$ hour? 29)Prove that a tangent drawn at any point on a circle is perpendicular to the radius at the point of contact.

## OR

Prove that the lengths of tangents drawn to a circle from an external point are equal.
30)The weights of 35 pupils in a class are given below. Draw an ogive to this data

| Weight (in kg) | Number of pupils |
| :---: | :---: |
| Less than 38 | 0 |
| Less than 40 | 3 |
| Less than 42 | 5 |
| Less than 44 | 9 |
| Less than 46 | 14 |
| Less than 48 | 28 |
| Less than 50 | 32 |
| Less than 52 | 35 |

31)The chits numbered from 2 to 101 are mixed and put into a box. If a chit is drawn randomly then find the probability of the following.
a) Getting an even number
b) Getting a perfect square number
32)Construct a triangle with sides $5 \mathrm{~cm}, 6 \mathrm{~cm}$ and 7 cm . Then construct another triangle similar to the first triangle such that the sides of this triangle are $1 \frac{2}{5}$ the sides of first triangle.
33)Calculate the mean of the following data.

| Class Interval | Frequency |
| :---: | :---: |
| $10-25$ | 2 |
| $25-40$ | 3 |
| $40-55$ | 7 |
| $55-70$ | 6 |
| $70-85$ | 6 |
| $85-100$ | 6 |
| OR |  |

Calculate the mode of the following data.

| Class Interval | Frequency |
| :---: | :---: |
| $1-3$ | 7 |
| $3-5$ | 8 |
| $5-7$ | 2 |
| $7-9$ | 2 |
| $9-11$ | 1 |

V. Answer the following questions.
$04 \times 04=16$
34)An aeroplane covers a distance of 720 km with a uniform speed. If its speed is increased by $10 \mathrm{~km} / \mathrm{h}$ it would have taken 1 hour less to cover the same distance. Find the speed of aeroplane.

## OR

Area of a rectangular garden is $400 \mathrm{~cm}^{2}$. If its length is twice the breadth find the dimensions of garden.
35)State and prove Thale's theorem.
36)If $A(-5,7), B(-4,-5), C(-1,-6)$ and $D(4,5)$ are the vértices of a parallelogram $A B C D$ find its area.
37)Solve graphically: $2 x+y=7,2 x-y=1$

## VI. Answer the following questions.

$01 \times 05=05$
38)A hemisphere of radius 60 cm is surmounted by a cone of height 120 cm and radius 60 cm . This solid is immersed in a cylinder containing water such that it touches the bottom of cylinder as shown in the figure. If the radius of cylinder is 60 cm and the height is 180 cm find the volume of remaining water.


