SAR

10) Vertices of the Ellipse $\frac{x^2}{16}+\frac{y^2}{25}=1$ are

(A) $(0,\pm 5)$ (B) $(\pm 5,0)$ (C) $(\pm 4,0)$ (D) $(0,\pm 4)$

11) If "α" is the direction angle of a vector, then

(A) $0<\alpha<\pi$ (B) $0\le\alpha\le\pi$ (C) $0<\alpha\le\pi$ (D) $0\le\alpha<\pi$

12) If $\underline{a}$ and $\underline{b}$ are two non zero vectors then angle between $\underline{a}$ and $\underline{a}\times\underline{b}$ is always

(A) 0 (B) 30^o (C) 90^o (D) 60^o

13) $\int\frac{1+x}{x}\cdot dx=$

(A) $\log_e|x|+c$ (B) $1+\log_e|x|+c$ (C) $\log_e|1+x|+c$ (D) $x+\log_e|x|+c$

14) Distance of a point P(x,y) from x-axis is

(A) x (B) y (C) |x| (D) |y|

15) Centroid of the triangle with vertices A(2 , 1) , B(-1 , 3) , C(-1 , -4) is

(A) (3 , 1) (B) (0 , 0) (C) (2 , 2) (D) (-2 , -5)

16) The line ax + by + c = 0 is parallel to y-axis if

(A) c = 0 (B) a = 0 (C) a = b (D) b = 0

17) Equation of a line passing through (-2 , 5) having slope O is

(A) y = -5 (B) y = 5 (C) x = -2 (D) x = 2

18) x = 0 is not in the solution of inequality

(A) 2x + 3 > 0 (B) x + 4 > 0 (C) x + 5 > 0 (D) 2x + 3 < 0

19) Length of the diameter of the Circle $(x-5)^2+(y-3)^2=8$ is

(A) 64 (B) 16 (C) $2\sqrt{2}$ (D) $4\sqrt{2}$

20) The line $y=mx+c$ will be tangent to the circle $x^2+y^2=a^2$ if

(A) $c=\frac{a}{m}$ (B) $c=\pm a\sqrt{1-m^2}$ (C) $c=\pm a\sqrt{1+m^2}$ (D) $c=\pm a\sqrt{m^2-1}$

SAR

4. Answer briefly any Nine parts from the followings:- $9 \times 2 = 18$

(i) Show that the points A(-1,2) , B(7,5) and C(2,-6) are vertices of a right triangle.

(ii) Find the points trisecting the join of A(-1 , 4) and B(6 , 2)

(iii) Find equation of the perpendicular bisector of the segment joining the points A(3,5) , and B(9,8)

(iv) Show that lines $3x - 4y - 3 = 0$ $5x + 12y + 1 = 0$, $32x + 4y - 17 = 0$ are concurrent.

(v) Find the distance from the point (6 , -1) to the line $6x - 4y + 9 = 0$

(vi) Find focus and vertex of the parabola $y^2 = 8x$

(vii) Find equation of parabola with focus (-3,1) and directrix $x = 3$

(viii) Find foci and eccentricity of the ellipse $9x^2 + y^2 = 18$

(ix) Find equation of the ellipse with vertices $(0,\pm 5)$ and eccentricity $\frac{3}{5}$

(x) Find "α" so that $|\alpha \underline{i} + (\alpha + 1)\underline{j} + 2\underline{k}| = 3$

(xi) Find the direction cosines for the vector $\underline{v} = 3\underline{i} - \underline{j} + 2\underline{k}$

(xii) Find real number "α" so that vectors $\underline{u} = 2\alpha \underline{i} + \underline{j} - \underline{k}$ and $\underline{v} = \underline{i} + \alpha \underline{j} + 4\underline{k}$ are perpendicular

(xiii) Find the volume of parallelepiped determined by $\underline{u} = \underline{i} + 2\underline{j} - \underline{k}$, $\underline{v} = \underline{i} - 2\underline{j} + 3\underline{k}$, $\underline{w} = \underline{i} - 7\underline{j} - 4\underline{k}$

Section ---------- II

Note: Attempt any three questions. **(10 × 3 = 30)**

5 -(a) Discuss the continuity of function f(x) at x = 3 if $f(x) = \begin{cases} \frac{x^2 - 9}{x - 3} & if \quad x \neq 3 \\ 6 & if \quad x = 3 \end{cases}$

(b) If y = a Cos (ln x) + b Sin (ln x) prove that $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 0$

6 -(a) Evaluate the indefinite integral using partial fraction $\int \frac{1}{6x^2 + 5x - 4}\, dx$

(b) Find the area of region bounded by $10x^2 - xy - 21y^2 = 0$ and $x + y + 1 = 0$

7 -(a) Evaluate the integral $\int_0^{\pi/4} \frac{\cos\theta + \sin\theta}{2\cos^2\theta}\, d\theta$

(b) Maximize f(x,y) = x + 3y subject to the constraints $2x + 5y \leq 30$; $5x + 4y \leq 20$; $x \geq 0$; $y \geq 0$

8 -(a) Write an equation of circle that passes through A(4,5) , B(-4,-3) , C(8,-3)

(b) Prove that the line segments joining the mid points of the sides of a quadrilateral taken in order form a parallelogram.

9 -(a) Find the centre, foci eccentricity and equations of directrices of the Hyperbola $\frac{x^2}{4} - \frac{y^2}{9} = 1$

(b) Find a unit vector perpendicular to the plane containing vectors $\underline{a} = 2\underline{i} - 2\underline{j} + 4\underline{k}$ and $\underline{b} = -\underline{i} + \underline{j} - 2\underline{k}$ also find the "Sine" of the angle between them.