

**Carmel College of Arts, Science and Commerce for Women,
Nuvem – Goa.**

July 2021

Semester – IV of B.Sc

Course Name: Analytical Geometry

Total Marks: 30

Date: 15/07/2021

Duration: 2 hours

Total number of pages : 1

I. Answer any five of the following

(2 x 5 = 10)

- 1) Find the equation of the line passing through the point C in R^2 which divides the segment joining points (3,4) and (6,7) internally in the ratio 2:1 and perpendicular to the line $2x + 3y = 4$.
- 2) Find the center and the radius of the circle $x^2 + y^2 + 14y - 12x - 32 = 0$
- 3) Identify the conic given by $2x^2 + 3y^2 + 12x + 12y + 35 = 0$. Find its foci, directrices, vertices and eccentricity if any.
- 4) Find the equation of a line making angles $\frac{\pi}{6}$, $\frac{\pi}{3}$ and $\frac{\pi}{3}$ with x, y, z axis respectively and passes through the point (1,2,1) in R^3
- 5) If, after rotation, the new x, y, z axes are along (0,0,-1), (-1,0,0), (0,1,0) respectively, then find the co-ordinates of the point (3,1,2) with respect to the new co-ordinate system.
- 6) Find the equation of the conic which has (1,2) as a focus, $x + 2y = 2$ as a directrix and has eccentricity $1/3$.
- 7) Find the equation of the circle $x^2 + (y-2)^2 = 4$ with respect to the co-ordinate system obtained by rotating the axes by an angle of $\frac{\pi}{3}$
- 8) Find the equation of a right circular cone with vertex (0,0,1) and making an angle of $\frac{\pi}{4}$ with the line $x = y = z-1$

II. Answer any four of the following

(4 x 5 = 20)

- 1) Reduce the equation of the conic $4x^2 + 9y^2 - 12xy - 72x - 48y + 168 = 0$ to its standard form. What kind of a conic does it represent?
- 2) Show that the equation of the tangent at the point (x_1, y_1) to the circle $x^2 + y^2 = r^2$ is given by $xx_1 + yy_1 = r^2$
- 3) Show that the equation of any parabola can be reduced to the form $y^2 = 4ax$.
- 4) Find the equation of a cylinder having $x^2 + (y-2)^2 = 4$; $z = 0$ as a guiding curve and the line $x = y = z/2$ as an axis.
- 5) Obtain the intersection of planes parallel to the co-ordinate planes with a standard hyperboloid of two sheets. What kind of curves do these intersections represent?
- 6) Find the plane passing through (3,4,1), (2,1,1) and (0,8,6). Also find
 - i. Its distance from the origin.
 - ii. Its intersection with the line $x-2 = y-3 = z/4$
