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SUBJECT CODE NO: -BB-2315
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (CBCGS) (Pattern 2022) F.Y SEM I
Examination November / December 2025
Mathematics -I Geometry

[Time: 1:30 Hours]

[Max. Marks: 40]

Please check whether you have got the right question paper

N. B

- 1) Attempt all questions
- 2) Figures to the right indicate full mark

Q1

A) Attempt any one

05

- a) Prove that every equation of the first degree in x, y, z represents plane
- b) Find the equation of the line passing through a given point $A(x, y, z)$ and having a direction cosines l, m, n

B) Attempt any one

05

- c) Find the equation of the plane through the points $P(2, 2, -1)$, $Q(3, 4, 2)$, $R(7, 0, 6)$
- d) Find the image of the point $P(1, 3, 4)$ in the plane
 $2x - y + z + 3 = 0$

Q2

A) Attempt any one

05

- a) Transform the equations $ax + by + cz + d = 0$, $a_1x + b_1y + c_1z + d_1 = 0$ of a line to the symmetrical form
- b) Find the length of the perpendicular from a given point $P(x_1, y_1, z_1)$ to a given line

$$\frac{x - \alpha}{l} = \frac{y - \beta}{m} = \frac{z - \gamma}{n}$$

B) Attempt any one

05

- c) Find the equation of the line through the point $(-2, 3, 4)$ and parallel to the planes $2x + 3y + 4z = 5$ and $3x + 4y + 5z = 6$
- d) Find the equation of the sphere through the points $(0, 0, 0)$, $(0, 1, -1)$, $(-1, 2, 0)$, $(1, 2, 3)$

Q3 A) Attempt any one

05

- a) Find the points of intersection of a sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ and the line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$
- b) Show that every section of right circular cone by a plane perpendicular to its axis is circle

B) Attempt any one

05

- c) Find the points of intersection of the line $\frac{x+1}{1} = \frac{y+3}{3} = \frac{z-2}{-2}$ with the plane $3x+4y+5z=5$
- d) Find the equation of right circular cone with its vertex at the origin axis along z-axis and semi-vertical angle α

Q4 Choose the correct alternatives

10

1) The equation of a plane in normal form is -----

- a) $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$ b) $\frac{x}{l} + \frac{y}{m} + \frac{z}{n} = 1$
- c) $ax + by + cz = p$ d) $lx + my + nz = p$

2) Any point on the line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$ is given by -----

- a) (α, β, γ) b) $(l\alpha, m\beta, n\gamma)$
- c) $(\alpha + lr, \beta + mr, \gamma + nr)$ d) None of these

3) Center of sphere $x^2 + y^2 + z^2 - 4x + 6y - 8z + 8 = 0$ will be ----

- a) (2,-3,4) b) (2,3,4) c) (-2,-3,-4) d) (1,2,3)

4) The equation $yz + zx + xy = 0$ represents -----

- a) A pair of planes b) a sphere c) a cone d) a cylinder

5) The co-ordinates of the point of intersection of the line

 $\frac{x+1}{1} = \frac{y+3}{3} = \frac{z-2}{-2}$ with the plane $3x + 4y + 5z = 5$ are -----

- a) (-1,2,-3) b) (1,3,-2) c) (-1,-2,3) d) (1,-3,2)