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SUBJECT CODE NO: YY-2345
FACULTY OF SCIENCE AND TECHNOLOGY
B. Sc. F.Y (Sem. I)
Examination May / June - 2023
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 marks.

Q1 A) Attempt any one:

a) Find the equation of the plane through the three non-collinear points **05**
$(x_1, y_1, z_1), (x_2, y_2, z_2), (x_3, y_3, z_3)$.

b) Find the perpendicular distance of the point $p = (x_1, y_1, z_1)$ from the plane $lx +$ **05**
$my + nz = p$.

B) Attempt any one:

c) Find the equation of the plane through the points (2,2,1) and (9,3,6) and perpendicular **05**
to the plane $2x + 6y + 6z = 9$.

d) Find the equation of the plane passing through the lines of intersection of the planes **05**
$2x - y = 0$ and $3z - y = 0$ are perpendicular to the plane $4x + 5y - 3z = 8$.

Q2 A) Attempt any one:

a) Transform the equations.   **05**
$ax + by + cz + d = 0$
$a_1 x + b_1 y + c_1 z + d_1 = 0$
of a line to the symmetrical form.

b) Find the conditions for the line.   **05**
$\frac{x - x_1}{l} = \frac{y - y_1}{m} = \frac{z - z_1}{n}$
to lie in the plane $ax + by + Cz + d = 0$.

B) Attempt any one:

c) Show that the lines   **05**
$\frac{x + 3}{2} = \frac{y + 5}{3} = \frac{z - 7}{-3}$, $\frac{x + 1}{4} = \frac{y + 1}{5} = \frac{z + 1}{-1}$
are coplanar and find the equation of the plane containing them.

d) Find k so that the lines   **05**
$\frac{x - 1}{-3} = \frac{y - 2}{2k} = \frac{z - 3}{2}$
$\frac{x - 1}{3k} = \frac{y - 5}{1} = \frac{z - 6}{-5}$
may be perpendicular to each other.

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Q3 A) Attempt any one:

a) Show that every section of a right circular cone by a plane perpendicular to its axis is   **05**
a circle.

b) Find equation to a sphere on line joining $(x_1, y_1, z_1), (x_2, y_2, z_2)$, as a diameter.   **05**

B) Attempt any one:

c) Find the equation of the sphere through the circle   **05**
$x^2 + y^2 + z^2 = 9, 2x + 3y + 4z = 5$ and the point (1,2,3).

d) Find the equation of the right circular cylinder of radius 2 whose axis is the line   **05**
$\frac{(x-1)}{2} = \frac{(y-2)}{2} = \frac{(z-2)}{2}$.

Q4 Choose the correct alternatives: **10**

i) Which of the following equations represents a plane?

a) $ax^2 + by^2 + cz^2 = d$ b) $ax + by + cz + d = 0$

c) $ax^2 + 2hxy + by^2 = 0$ d) $ax + by + c = 0$

ii) The equations to the x-axis are_____

a) $\frac{x}{0} = \frac{y}{1} = \frac{z}{1}$ b) $\frac{x}{2} = \frac{y}{0} = \frac{z}{1}$ c) $\frac{x}{1} = \frac{y}{1} = \frac{z}{0}$ d) $\frac{x}{1} = \frac{y}{0} = \frac{z}{0}$

iii) If two lines L_1 and L_2 intersect, then the shortest distance between them is_____

a) positive   b) negative   c) zero   d) infinity

iv) The centre of sphere $x^2 + y^2 - z^2 - 4x + 6y - 8z + 8 = 0$ is_____.

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

v) The length of the perpendicular from any point on a right circular Cylinder to its
axis is equal to its_____.

a) radius   b) diameter   c) chord   d) none of these.

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