MODEL PAPER

CHOICE BASED CREDIT SYSTEM

SECOND SEMESTER

Part – II : Mathematics

Paper – I : Solid Geometry

(New Syllabus w.e.f 2016-2017)

(Common to B.A/B.Sc.)

Time : 3 Hours Max . Marks : 75

SECTION – A

Answer any Five of the following. Each Question carries 5 marks

(5 × 5 = 25 Marks)

1. Find the equation of the two planes which pass through the points (0, 4, -3) and (6, -4, 3) and which cut off from the axes intercepts whose sum is zero.
2. Find the equation of the plane passing through (1, 0, -2) and perpendicular to the planes $2x + y - z = 2$ and $x - y - z = 3$.
3. Find the point of intersection of the lines $\frac{x-1}{-3}=\frac{y-2}{2}=\frac{y-3}{2}$ and $\frac{x-1}{3}=\frac{y-5}{1}=\frac{z}{-5}$
4. Find the enveloping cone of the sphere $x^2 + y^2 + z^2 + 2x - 4y = 0$ with its vertex at (1, 1, 1)
5. Show that the line Joining points (6, -4, 4), (0, 0, -4) intersects the line Joining the point (-1, -2, -3) and (1, 2, -5).
6. Find the equation of the tangent plane at (1, 2, 3) to the sphere $3(x^2 + y^2 + z^2) - 2x - 3y - 4z - 22 = 0$
7. Find the equation of the cone with vertex (1, 1, 0) and guiding curve $x^2 + z2 = 4, y = 0$

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8. Find the equation of the cylinder whose generators are parallel to $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$ and which cuts the curve $x^2 + y^2 = 16,\ z = 0.$

SECTION – B

Answer any Five of the following. Each Question carries 10 marks

(5 × 10 = 50 Marks)

9. **a)** A Variable plane is at a constant distance p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of the tetrahectron OABC is $x^2 + y^{-2} + z^{-2} = 16p^{-2}$

   b) Find the length of shortest distance between the lines $\frac{x}{2} = \frac{y}{-3} = \frac{z}{1}$ and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$

10. **a)** Find the centre and Radius of the circle $x^2 + y^2 + z^2 = 25,$ $2x + 3y + 2z = 9.$

    b) Find the limiting points of the coaxial system defined by the spheres $x^2 + y^2 + z^2 + 4x - 2y + 2z + 6 = 0$ and $x^2 + y^2 + z^2 + 2x - 4y - 2z + 6 = 0.$

11. **a)** Find the equation of the sphere which touches the planes $3x + 2y - z + 2 = 0$ at (1, -2, 1) and cuts orthogonally the sphere $x^2 + y^2 + z^2 - 4x + 6y + 4 = 0$

    b) Examine the nature of the intersection of the plane $4x - y - 2z - 2 = 0$

12. **a)** Find the equation of the enveloping cylinder of the sphere $x^2 + y^2 + z^2 - 2x + 4y - 1 = 0$ having its generators parallel to the line $x = y = z.$

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b) Find the angle between the lines of intersection of the planes $x - 3y + z = 0$ and the cone $x^2 - 5y^2 + z^2 = 0$.

13. a) Find the equation of the lines in which the plane $2x + y - z = 0$ intersects the cone $4x^2 - y^2 + 3z^2 = 0$. Also find the acute angle between these lines.

b) Find the equation the right circular cone with vertex P(2,-3,5), axis PQ making equal angles with the axes and which passes through A (1, -2, 3).

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