# SRR & CVR GOVT. DEGREE COLLEGE

**(Autonomous) NAAC 'B$^{+}$' Grade**

## DEPARTMENT OF MATHEMATICS

**SEMESTER – II, PAPER – II**

**THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY**

**MODEL QUESTION PAPER**

**Time : 3 Hrs.** **Max. Marks : 60**

**SECTION – A**

Answer any **Five** questions. Each question carries 04 Marks. 5 x 4 = 20 M

1. Find the equation of the plane through (4, 4, 0) and perpendicular to the Planes x+2y+2z=5 and 3x+3y+2z-8=0.
2. A variable plane is at a constant distance 3p from the origin and meets the coordinate axes in A, B, C. Show that the locus of the centroid of the triangle ABC is $x^{-2} + y^{-2} + z^{-2} = p^{-2}$
3. Find the foot of the perpendicular from (2, -2, 3) to the plane 2x-y-2z-9=0.
4. Find the image of the point (1, 3, 4) in the plane 2x-y+z+3=0.
5. Find the equation of spheres passing through the circle $x^2+y^2+z^2=4$, z=0 and is intersected by the plane x+2y+2z=0 in a circle of radius 3.
6. Find the pole of the plane x-y+5z-3=0 with respect to the sphere $x^2+y^2+z^2=9$.
7. Find the length of the Tangent line from the point (3, 1, -1) to the Sphere $x^2+y^2+z^2-3x+5y+7=0$.
8. Find the vertex of the cone $2x^2+2y^2+7z^2-10yz-10zx+2x+2y+26z-17=0$.
9. Find the Enveloping cone of sphere $x^2 + y^2 + z^2 + 2x - 2y = 2$ with its vertex (1, 1, 1).
10. Find the equation of right circular cone whose vertex is origin, axis as the line x=t, y=2t, z=3t and whose semi-vertical angle is $60^0$.

**SECTION – B**

Answer **ALL** questions. Each question carries 08 Marks. 5 x 8 = 40 M

11. (a). Find the equation to the plane through the intersection of the planes x+2y+3z+4=0, 4x+3y+3z+1=0 and perpendicular to the plane x+y+z+9=0.

(OR)

(b) Find the bisecting plane of the acute angle between the planes 3x-2y+6z+2=0, 2x-y+2z+2=0.

12. (a). Prove that the lines x+2y+3z-4 = 0 = 2x+3y+4z-5, 2x-3y+3z-5 = 0 = 3x-2y+4z-6 are coplanar & also find their point of intersection and the plane containing lines.

(OR)

(b). Find the S.D. between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$, $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ and also find the equation of S.D. between the lines.

13. (a). A plane passes through a fixed point (a, b, c) and cuts the axis in A, B, C. Show that the locus of centre of the sphere OABC is $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$.

(OR)

(b). Show that two circles $x^2 + y^2 + z^2$ - y + 2z = 0, x –y +z - 2 = 0 and $x^2 + y^2 + z^2 + x - 3y + z - 5 = 0,\ 2x - y + 4z - 1 = 0$ lies on the same sphere and find its equation.

14. (a). Find the limiting points of coaxal system of spheres $x^2 + y^2 + z^2$ + 4x -2y+2z + 6=0 and $x^2 + y^2 + z^2$ + 2x - 4y - 2z + 6 = 0.

(OR)

(b). If $\frac{x}{1} = \frac{y}{2} = \frac{z}{1}$ represents one of a set of three mutually perpendicular generators of the cone 11yz + 6zx – 14xy = 0, then find the equation of the other two.

15 (a). Find the equation of the tangent plan at the point (-3, 0, -1) of the cone $4x^2 - y^2 + 2z^2 + 2xy - 3yz + 12x - 11y + 6z + 4 = 0$.

(OR)

(b). Find the equation of the right circular cone whose vertex is (1, -2, -1), axis the line $\frac{x-1}{3} = \frac{y+2}{4} = \frac{z+1}{5}$ and the semi vertical angle $60^0$.