MATHEMATICS MODEL PAPER

SRI A.S.N.M. GOVERNMENT COLLEGE(A), PALAKOL. W.G.DT

(Affiliated to Adikavi Nannaya University, Rajahmahendravaram)

SECOND SEMESTER – SOLID GEOMETRY

Time: 3 hours Max. Marks: 75

SECTION A

Answer any **FIVE** questions. Each question carries FIVE marks 5 X 5 = 25

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. Find the image of a point (2,-1,3) in the plane 3x-2y+z=9.
3. Find the equation of the plane through the origin and containing the line x-3y+2z+3 =0=3x-y+2z-5.
4. Find the length of the perpendicular from the point (1,2,3) to the line through the point (6,7,7) whose d.r.s are 3,2,-2.
5. Find the equation to the sphere through O=(0,0,0) and making intercepts a, b, c on the axis.
6. Find the polar line of x-1 = y-2 =z-2 w.r.t the sphere $x^2+y^2+z^2=16$.
7. Find the equation to the cone which passes through the three coordinate axes as well as the three lines x = y = -z , x = y = z , x = y = z .
8. Find the enveloping cone of the sphere $x^2+y^2+z^2+2x-2y=2$ with its vertex at (1,1,1).

SECTION - B

Answer any **FIVE** questions **at least two** from each part. Each question carries Ten marks: 5 X 10 = 50 M

PART – I

9. A variable plane is at a constant distance 'p' from the origin and meets the coordinate axes in A,B,C. show that the Locus of the centroid of the tetrahedron OABC is $x^{-2}+y^{-2}+z^{-2}=16p^{-2}$
10. Find the bisecting plane of the acute angle between the planes 3x-2y+6z=0, -2x+y-2z-2=0.

11. Find the S.D between the lines $\frac{x-3}{} = \frac{y-8}{} = \frac{z-3}{}$, $\frac{x+3}{} = \frac{y+7}{} = \frac{z-6}{}$. Find also the equations and the points in which the S.D meets the given lines.
12. Prove that the lines $\frac{x-1}{} = \frac{y-2}{} = \frac{z-3}{}$, $\frac{x-2}{} = \frac{y-3}{} = \frac{z-4}{}$ are coplanar. Also find their point of intersection.
13. Find the equation of the 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.

PART – II

14. Show that the spheres $x^2+y^2+z^2-2x-4y-6z-50=0$, $x^2+y^2+z^2-10x+2y+18z+82=0$ touch externally at the point $(\frac{45}{}, \frac{2}{}, \frac{-57}{})$.
15. Find the limiting points of the coaxal system defined by spheres
    $x^2+y^2+z^2+4x-2y+2z+6=0$, $x^2+y^2+z^2+2x-4y-2z+6=0$.
16. Find the equation of the lines of intersection of the plane $2x+y+z=0$ and the cone $4x^2-y^2+3z^2=0$
17. Find the equation to the right circular cone whose vertex is P(2,-3,5), axis PQ which makes equal angles with the axis and which passes through A(1,-2,3).

Find the equation of the tangent planes to the cone $9x^2-4y^2+16z^2=0$ which contains the line $\frac{x}{} = \frac{y}{} = \frac{z}{}$