B.Sc. DEGREE EXAMINATION, APRIL 2018.

II YEAR III SEMESTER

Core Major - Paper VI - THREE DIMENSIONAL GEOMETRY

Time : 3 Hours Max. Marks : 75

SECTION A – (10 × 2 = 20 marks)

Answer any *TEN* questions

1. Find the intercepts made by the plane $2x-3y+7z=4$ with the coordinate axes.
2. Write down the equation of the straight line passing through the point $(-1,-3,4)$ and having the direction ratios$1,7,-5$.
3. Write down the equation of the sphere whose centre is at $(-2,4,0)$and radius $7$ units.
4. Find the equation of the sphere having the line joining the points $(0,1,2)$ and $(4,5,-2)$ as diameter.
5. Define a homogeneous cone.
6. What is the condition for $ax^{2}+by^{2}+cz^{2}+2fyz+2gzx+2hxy$ split into two linear factors?
7. Define a right circular cone.
8. Write down the equation of the right circular cone with vertex at the origin.
9. Define a right circular cylinder.
10. Write down the equation of a right circular cylinder whose radius is $r$ and whose axis is $z-axis$.
11. Show that the planes $3x-7y-z=4$ and $6x-14y-2z=1$ are parallel to each other.
12. Find the equation of the straight line joining the points $(1,2,3)$ and$(2,4,6)$.

SECTION B – (5 × 5 = 25 marks)

Answer any *FIVE* questions

1. Find the equation of the plane passing through the points $\left(-6,0,-4\right), (3,-2,9)$ and perpendicular to the plane$2x-y+4z-8=0$.
2. Find the equation of the sphere which has its centre at the point $(6,-1,2)$ and touches the plane$2x-y+2z-2=0$.
3. Find the equation of the cone with vertex O and base curve, the conic in which the surface $ax^{2}+by^{2}+cz^{2}=1$ is cut by the plane$l\_{1}x+m\_{1}y+n\_{1}z=p$.
4. Show that the equation of a right circular cone whose vertex is O, axis OZ and semi-vertical angle $α$ is $x^{2}+y^{2}=z^{2}tan^{2}α$.
5. Find the equation of the cylinder whose generators are parallel to the plane $\frac{x}{l}=\frac{y}{m}=\frac{z}{n}$ and whose guiding curve is$f\left(x,y,z\right)=0$, $ax+by+cz+d=0$.
6. Transform the line $x+y+z+1=0$ and $4x+y-2z+2=0$ into symmetrical form.
7. Find the equation of the tangent plane to the sphere $x^{2}+y^{2}+z^{2}=16$at $(2,4,-7)$.

[P.T.O.]

SECTION C – (3 × 10 = 30 marks)

Answer any *THREE* questions

1. Find the image of the point $(1,-2,3)$ in the plane$2x-3y+2z+3=0$.
2. Find the equation of the sphere through the four points$(0,0,0)$, $\left(a,0,0\right),(0,b,0)$ and$(0,0,c)$.
3. Find the equation of the cone whose vertex is the point $\left(1,1,0\right)$ and whose base is the curve $y=0, x^{2}+z^{2}=4$.
4. Obtain the equation of a right circular cone.
5. Find the equation of the right circular cylinder of radius $3$ with axis as $\frac{x-1}{2}=\frac{y-3}{2}=\frac{z-5}{-1}$.