Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Sc Non Medical (2018 Batch) (Sem.–1)

SOLID GEOMETRY

Subject Code : BSNM-106-18

Paper ID : [75747]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. a) Find the equation of plane passing through the point (2,2,4) and perpendicular to the planes $2x - 2y - 4z - 3 = 0$ and $3x + y + 6z - 4 = 0$.

b) What is the normal form of equation of plane?

c) Determine the value of k such that $x^2 + y^2 + z^2 + 2x - 4y + 6z + k = 0$

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

e) Find the coordinates of points in which the line $\frac{x+2}{4} = \frac{y+9}{3} = \frac{z-8}{-5}$ meets the sphere $x^2 + y^2 + z^2 = 49$.

f) Find the equation of cone with vertex at origin and generators touching the sphere $x^2 + y^2 + z^2 - 2x + 4z = 1$

g) Show that the line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$ where $2l^2 + 3m^2 - 4n^2 = 0$ is generator of the cone $2x^2 + 3y^2 - 4z^2 = 0$.

h) Define Right circular cone.

i) Find the equation to the right circular cylinder which passes through the circle $x^2 + y^2 + z^2 = 9, x - y + z = 3$.

j) Define Radical plane.

SECTION-B

2. Find the bisectors of angle between the planes $2x - y + 2z + 3 = 0$, $3x - 2y + 6z + 8 = 0$. Also find out which plane bisects the acute angle.

3. Find the equation of sphere which touches the plane $3x + 2y - z + 2 = 0$ at the point P(l,–2,1) and also cuts orthogonally the sphere $x^2 + y^2 + z^2 - 4x + 6y + 4 = 0$.

4. Find the condition that the plane $lx + my + nz = 0$ may touch the cone $2x^2 - 3y^2 + z^2 = 0$ and find the equation of reciprocal cone.

5. Show that the straight lines $x = 2y = 8z$, $x = y = 2z$, $4x = 7y = 7z$ lie on a circular cone of semi- vertical angle $\cos^{-1}\frac{11}{\sqrt{126}}$.

6. Find the equation of right circular cylinder whose axis is $x = 2y = -z$ and radius 4.

SECTION-C

7. The section of the cone whose vertex is P and guiding curve the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1, z=0$ by the Plane $x = 0$ is rectangular Hyperbola. Show that the locus of P is $\frac{x^2}{a^2}+\frac{y^2+z^2}{b^2}=1$,

8. Show that locus of points from which the tangents to three spheres $(x - 2)^2 + y^2 + z^2 = 1$, $x^2 + (y - 3)^2 + z^2 = 6$, $(x + 2)^2 + (y + 1)^2 + (z - 2)^2 = 6$ are all equal is the line $\frac{x}{3}=\frac{y}{2}=\frac{z}{7}$. Find the coordinates of point of this line from length of tangents to three spheres is also equal to that of tangents of sphere $(2x + 1)^2 + 4y^2 + (2z - 1)^2 = 6$

9. Define enveloping cylinder. Find the equation of enveloping cylinders of sphere $x^2 + y^2 + z^2 - 2x + 4z = 1$ having its generator parallel to the line $x = y = z$.