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**SUBJECT CODE NO:- B-2162**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.Sc. F.Y (Sem.-II) Examination OCT/NOV 2019**  
**Mathematics MAT - 202**  
**(Geometry)**

[Time: 1:30 Minutes]

[Max.Marks:50]

Please check whether you have got the right question paper.

- N.B
- i) Attempt all questions
  - ii) Figures to the right indicate full marks
- Q.1
- A) Attempt any one 08
- a) Prove that every equation of the first degree in x,y,z represents a plane.
  - b) Find the equations of the line passing through a given point A(x,y,z) and having direction cosines l,m,n.
- B) Attempt any one 07
- c) Obtain the equation of the plane through the intersection of the planes  $x + 2y + 3z + 4 = 0$  and  $4x + 3y + 2z + 1 = 0$  and the origin
  - d) Prove that the lines  $\frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+10}{8}$ ;  $\frac{x-4}{1} = \frac{y+3}{-4} = \frac{z+1}{7}$  intersect find also their point of intersection and the plane through them .
- Q.2
- A) Attempt any one 08
- a) Find the length of the perpendicular from a given point P (x, y, z) to given line  $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$
  - b) Prove that the plane section of a sphere is a circle.
- B) Attempt any one 07
- c) Find the magnitude and the equations of the line of shortest distance between the lines  $\frac{x-8}{3} = \frac{y+9}{-16} = \frac{z-10}{7}$  and  $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$

d) Find the equation of the sphere through the circle

$$\begin{aligned} x^2 + y^2 + z^2 + 2x + 3y + 6 &= 0 \\ x - 2y + 4z - q &= 0 \end{aligned}$$

And the centre of the sphere

$$x^2 + y^2 + z^2 - 2x + 4y - 6z + 5 = 0$$

Q.3 A) Attempt any one 05

- a) Show that every section of a right circular cone by a plane perpendicular to its axis is a circle.
- b) Find the points of intersection of the line

$$\frac{x - \alpha}{l} = \frac{y - \beta}{m} = \frac{z - \gamma}{n}$$

With the central conicoid

$$ax^2 + by^2 + cz^2 = 1$$

B) Attempt any one 05

- c) Find the equation of the right circular cylinder of radius 2 whose axis is the line

$$\frac{x - 1}{2} = \frac{y - 2}{1} = \frac{z - 3}{2}$$

- d) Find the equations to the tangent planes to

$$7x^2 - 3y^2 - z^2 + 21 = 0$$

Which pass through the line

$$7x - 6y + 9 = 0, z = 3$$

Q.4 Choose the correct alternatives and fill the blanks 10

- 1) The equation to a plane in normal form is -----

- a)  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$
- b)  $\frac{x}{l} + \frac{y}{m} + \frac{z}{n} = 1$
- c)  $ax + by + cz = p$
- d)  $lx + my + nz = p$

- 2) Two lines which do not lie in the same plane are called -----

- a) Parallel    b) intersecting    c) coincident    d) skew

- 3) The shortest distance between the lines  $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$  and  $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{4}$  is -----

- a)  $1/6$     b)  $(\sqrt[1]{6})$     c)  $(\sqrt[1]{3})$     d)  $1/3$

- 4) The radius of the sphere  $x^2 + y^2 + z^2 - 2x + 4y - 6z + 7 = 0$  is -----  
 a) 49                      b) 5                      c) -7                      d)  $\sqrt{7}$
- 5) If a right circular cone has mutually perpendicular generators then semi – vertical angle is -----  
 a)  $\tan^{-1}\sqrt{2}$                       b)  $\tan^{-1} 2$                       c)  $\pi/4$                       d)  $\pi/2$