

**B.Sc. MATHEMATICS
SECOND SEMESTER
ANALYTICAL GEOMETRY
BSM – 921 IDMJ
[USE OMR FOR OBJECTIVE PART]**

**SET
A**

Duration: 1.30 hrs.

Full Marks: 35

Time: 15 min.

[PART-A: Objective]

Marks: 10

Choose the correct answer from the following:

1X10=10

- Number of transformation of coordinate axis are
 - Two
 - Four
 - Three
 - Five
- Translation formula are
 - $x = h - x'$
 - $x = h + x'$
 - $y = k - y'$
 - $y = k + y'$
 - $x' = h + x$
 - $x' = h - x$
 - $y' = k + y$
 - $y' = k - y$
- If the distance between two point $(x,0)$ and $(0,4)$ is 5, then the value of $x = ?$
 - $x = 9$
 - $x = -3$
 - $x = 3$
 - $x = -9$
- The standard form of pair of straight lines which passes through the origin is
 - $x^2 + 2hxy + y^2 = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy = 0$
 - $ax^2 + 2hxy + by^2 = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
- For the equation $ax^2 + 2hxy + by^2 = 0$, $m_1 + m_2 = ?$, $m_1 m_2 = ?$
 - $m_1 + m_2 = \frac{-h}{b}$, $m_1 m_2 = \frac{a}{b}$
 - $m_1 + m_2 = \frac{-2h}{b}$, $m_1 m_2 = \frac{a}{b}$
 - $m_1 + m_2 = \frac{h}{b}$, $m_1 m_2 = \frac{a}{b}$
 - $m_1 + m_2 = \frac{-2h}{b}$, $m_1 m_2 = \frac{c}{b}$

6. Two straight lines of the pair of straight lines $5x^2 + 6xy + y^2 = 0$ are
- $5x + y = 0, 5x + y = 0$
 - $5x + 5y = 0, x + y = 0$
 - $5x + y = 0, x + 5y = 0$
 - $5x + y = 0, x + y = 0$
7. If θ be the angle between pair of straight lines, then
- $\tan \theta = \left| \frac{2\sqrt{h^2 - ab}}{a + b} \right|$
 - $\tan \theta = \left| \frac{\sqrt{h^2 - ab}}{a + b} \right|$
 - $\tan \theta = \left| \frac{2\sqrt{h^2 - ab}}{a - b} \right|$
 - $\tan \theta = \left| \frac{2\sqrt{h^2 + ab}}{a + b} \right|$
8. Equation of bisector is
- $h(x^2 + y^2) = (a + b)xy$
 - $h(x^2 - y^2) = (a - b)xy$
 - $h(x^2 + y^2) = (a - b)xy$
 - $h(x^2 + y^2) = (a - b)$
9. General equation of second degree in x & y is
- $ax^2 + 2hxy + by^2 + 2gx + 2fy = 0$
 - $ax^2 + 2hxy + by^2 = 0$
 - $x^2 + 2hxy + y^2 = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
10. General form of equation of a conic section is
- $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$
 - $Ax^2 + Bxy + Cy^2 + Dx + Ey = 0$
 - $x^2 + Bxy + y^2 + Dx + Ey + F = 0$
 - $Ax^2 + 2Bxy + Cy^2 + Dx + Ey + F = 0$

(Descriptive)

Time : 1 hr. 15mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

1. What do you mean by transformation of axis? Prove that 1+4=5
 $x' = x \cos \theta + y \sin \theta$
 $y' = -x \sin \theta + y \cos \theta$

2. What is trace and discriminant. Show that t, Δ, H are invariant 2+8=10
when the equation of the curve $4x^2 + y^2 - 5x - 2y = 0$ is
transformed to another by shifting origin to the point $(1, -1)$
without changing the direction of axis.

3. Find the individual equation of straight line of pair of straight line 3+7=10
 $y^2 - (m_1 + m_2)xy + m_1m_2x^2 = 0$. Prove that the bisector of pair of
straight line represented by $ax^2 + 2hxy + by^2 = 0$ is $\frac{x^2 - y^2}{a - b} = \frac{xy}{h}$

4. Prove that 6+4=10

(i) $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

(ii) $m_1m_2 = \frac{a}{b}$

5. What do you mean by central and non central conic. Prove that 1+1+8=10
 $x^2 - 3xy + y^2 + 10x + 10y + 21 = 0$ is a central conic.

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