UNIVERSITY OF EDUCATION
"UExam" Semester-IV, 2019
BS Physics Session:2017-21
Course Code: MATH2116
Subject: Analytic Geometry

No. 35

Roll No. (in fig.)_____

Roll No. (in words)_____

Candidate's Signature.

Signature of Addl. Supdt.

SECTION: I (MCQ's)

Time Allowed: 20 Minutes **Max. Marks: 18**

NOTE: Encircle the correct/ best answer in each of the followings. Each Question carries 1 mark. Use of remover carries zero mark. Cutting and Overwriting is not allowed.

Q1.

- Analyze the conic represented by $29x^2 - 24xy + 36y^2 + 1185x - 24y - 55 = 0$
  a) Parabola b) Hyperbola c) Circle d) Ellipse
- The parametric eq. $x = cost, y = sint$, represents circle for the interval
  a) $0 \le t \le \pi$ b) $0 < t < \pi$ c) $0 \le t \le 2\pi$ d) $0 < t < 2\pi$
- A four petal rose of radius 1 formed with equation $r = acosn\theta$, if n=?
  a) 4 b) 2 c) 3 d) odd
- A polar curve $r = -2sin\theta$ is plotted as
  a) circle b) Limacon c) spiral d) Cardioid
- The equation of the parabola with focus (0, p) and directrix $y = -p$ is
  a) $y^2 = 4px$ b) $x^2 = 4py$ c) $y^2 = -4px$ d) $x^2 = -4py$
- The slope of the tangent line to the cur where curve $r = 2\sin\theta$ at $\frac{\pi}{6}$ is
  a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $1/\sqrt{3}$ d) 2
- The conic $r = \frac{8}{3-cos\theta}$ is.
  a) Parabola. b) Ellipse. c) Hyperbola d) Circle
- The unit vector in the direction of $v = (3,-1,7)$ is
  a) $\frac{1}{\sqrt{59}}v$ b) $\sqrt{59}\,v$ c) $59\,v$ d) 1
- Consider two points $A(3,4,0)$ and $B(0,0,5)$ then $|\overrightarrow{AB}|$ =?
  a) 50 b) $\sqrt{50}$ c) 5 d) 16
- If $u = (0,-3,0)$ then $\|u\|$ =?
  a) 9 b) -9 c) 3 d) 0
- If the initial point of $a = 3i - 2j$ is $(1,-2)$, what is the terminal point
  a) $(-4, 4)$ b) $(4,-4)$ c) $(2,-4)$ d) (4,0)
- $det|i \times (i + j + k)|$ =?
  a) $-j + k$ b) $-j \times k$ c) $j + k$ d) 1
- $z^2 = \frac{x^2}{a^2} + \frac{y^2}{b^2}$ represents
  a)Ellipsoid b) Ellipsoid Cone. c) Elliptic Parabola d) Hyperboloid.
- $r = 1 - 2cos\theta$ is the equation of
  a) Limacon. b) Cardioid c) 2 leafed rose d) Lemniscate.
- Equation of Rectangular hyperbola is
  a) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ b). $x^2 - y^2 = a^2$ c) $x^2 + y^2 = a^2$ d) $a^2x^2 - b^2y^2 = 1$
- If the terminal point of $v = 3i - 2j$ is $(4,-4)$, what is the initial point
  a) $(-4, 4)$ b) $(4,-4)$ c) $(2,-4)$ d). $(1,-2)$
- Centre of hyperbola $y^2 - x^2 - 10y + 6x = 0$ is
  a) (4, 4) b) (4,0) c) (2,4) d). (1,2)
- Focus of $x^2 + 6x - 8y + 17 = 0$ is
  a). $(-3, 3)$ b) $(0,-3)$ c) (1,3) d) (3,3)

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Max. Marks: 42

Time Allowed: 100 Minutes.

Section II (Short Answer)

Q.2- Write short answers of the following. **3x6 = 18**

(i) Analyze and graph the conic $xy = 1$.

(ii) Find the pedal equation of $r^m = a^m \sin m\theta$

(iii) Find the exact arc length of the curve over stated interval

$$x = 2\sin^{-1} t, y = \ln(1 - t^2), \qquad (0 \le t \le \frac{1}{2}).$$

(iv) Prove that the angle between a diagonal of a cube and one of its edge is 54.7°

(v) Sketch the graph of ellipse $x^2 + 2y^2 = 4$

(vi) Find the distance between point $(0, 1, 5)$ and plane $3x + 6y - 2z - 5 = 0$

Section III (Essay Type)

Answer the following Questions **6x4 = 24**

Q.3- Find the area of region in the first quadrant that is with-in the Cardiod $r = 1 - \cos\theta$

Q.4- Sketch the hyperbola, and label the vertices, foci and asymptotes for $9y^2 - x^2 = 36$

Q.5- Show that the curves

$$r^m = a^m \cos m\theta \quad \text{and} \quad r^m = a^m \sin m\theta$$

cut each other orthogonally.

Q.6- Find the equation of the plane through the points
$P(4, -1, 2)$, $Q(-3 - 2 - 1)$ and $R(4, -1, 3)$