



International Islamic University Chittagong (IIUC)
Department of Computer Science and Engineering (CSE)
Mid Term Examination

Program: B. Sc. in CSE
Course Code: MATH-1207
Time: 1:30 hours

Semester: Spring-2023
Course Title: Mathematics-II
Total Marks: 30

- (i) Answer all the questions. The figures in the right-hand margin indicate full marks.
- (ii) Please answer the several parts of a question sequentially.
- (iii) Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns.

Course Learning Outcomes (CLOs) of the Questions

CLO1:	Demonstrate knowledge of geometry and its applications in the real life contexts as well as into complex engineering problems.
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Bloom's Taxonomy Domain Levels of the Questions

Letter Symbols	R	U	Ap	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

	Marks	CLO	DL
1. a) What is Transformation of Co-ordinates? Determine the equation of parabola, $x^2 - 2xy + y^2 + 2x - 4y + 3 = 0$ after rotating of axes through 45°	5	CLO1	R&U
b) Find the bisectors of the angles between the lines represented by the homogeneous second degree equation, $ax^2 + 2hxy + by^2 = 0$	5	CLO1	U
2. a) Find the value of c so that the following equation may represent pairs of straight lines, $2x^2 - y^2 + xy - 2x - 5y + c = 0$	3	CLO1	U
b) Test the nature of the conic given by the equation, $6x^2 + 5xy - 6y^2 - 4x + 7y + 11 = 0$	3	CLO1	U
c) Define direction cosine and direction ratio. If a line equally inclined to the axes then show that $\sin \theta = \pm \sqrt{\frac{2}{3}}$	4	CLO1	U

3. a) Define Plane. Find the equation of the plane through the points (2, 2, 1) and (9, 3, 6) and perpendicular to the plane, $2x + 6y + 6z - 9 = 0$ 5 CLO1 R&U

Or. Define Tetrahedron. Find the volume of tetrahedron formed by the four planes, $by + cz = 0$, $cz + ax = 0$, $ax + by = 0$ and $ax + by + cz = r$

b) Define Shortest Distance. Find the shortest distance between the lines 5 CLO1 R&U
$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} \text{ and } \frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$$

Or. Define Sphere and Great Circle. Find the equation of the sphere whose centre is (2, -3, 2) and tangent to the plane $6x - 3y + 2z = 8$