



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: Autumn-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.
--------------	--

Bloom's Taxonomy Domain Levels of the Questions

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

- | | | | | | Marks | CLOs | DLs |
|----|-----|---|--|--|-------|------|-----|
| 1. | a) | What is Transformation of Co-ordinates? Determine the equation of the curve $2x^2 + 3y^2 - 8x + 6y - 7 = 0$ when the origin is transferred to the point $(2, -1)$. | | | 4 | CLO1 | R&U |
| | b) | Show that the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel lines if $a:h = h:b = g:f$. Also show that the distance between them is $2\sqrt{\frac{g^2 - ac}{a(a+b)}}$. | | | 6 | CLO1 | U |
| 2. | a) | Find the angles between the lines represented by the homogeneous second degree equation in x, y i.e., $ax^2 + 2hxy + by^2 = 0$. | | | 4 | CLO1 | U |
| | b) | Find the value of λ so that the equation $\lambda x^2 + 4xy + y^2 - 4x - 2y - 3 = 0$ may represent pairs of straight lines. | | | 3 | CLO1 | U |
| | c) | Test the nature of the conic given by the equation $3x^2 - 8xy - 3y^2 + 10x - 13y + 8 = 0$. | | | 3 | CLO1 | U |
| 3. | a) | Define direction cosine and direction ratio of a line. Find the angles between the four diagonals of a cube. | | | 5 | CLO1 | R&U |
| | Or. | Define Plane. Determine the constant k so that the planes $x - 2y + kz = 0$ and $2x + 5y - z = 0$ are at right angle. Also find the equation of the plane which passes through the point $(1, -1, -1)$ and perpendicular to the both of the given planes. | | | | | |
| | b) | Define Shortest Distance. Show the lines $\frac{x+3}{2} = \frac{y+5}{3} = \frac{z-7}{-3}$ and $\frac{x+1}{4} = \frac{y+1}{5} = \frac{z+1}{-1}$ are coplanar. Also find the equation of the plane containing them. | | | 5 | CLO1 | R&U |
| | Or. | Define Sphere and Great Circle. Find the equation of the sphere with its center is at $(-4, 2, 3)$ and tangent to the plane $2x - y - 2z + 7 = 0$. | | | | | |