

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE PILANI

Second Semester 2022-23

Computer Aided Design and Manufacturing (MF F317)

Mid Semester Test (Open Book)

Date: 15-03-2023

Maximum Time: 90 min.

Maximum Marks: 60

Note: Be succinct, no credit will be given for ambiguous answers. All parts of a question must be answered together and in sequence. Answer of a question must be started from a fresh page.

Q1. There are two lines L_1 and L_2 lying in three dimensional coordinate system. The starting and ending points of L_1 and L_2 are $P_{1s}(3,4,7)$, $P_{1e}(5,6,1)$ and $P_{2s}(1,5,-2)$, $P_{2e}(2,9,0)$ respectively. a) Find the parametric equations of both lines L_1 and L_2 with the directions of parameterization. b) Find the tangent vectors for both lines and check whether these two lines are parallel or perpendicular based on tangent vectors. c) Find the coordinates of the intersection point of these two lines and the value of curve parameter. [10]

Q2. Transform a triangle ABC having coordinates A (0, 0); B (0, 5); C (5, 2.5) by translation of 2 units in X-direction and 4 units in Y-direction and then rotate it by 90° clockwise about origin followed by scaling of 2 units in both X and Y directions. Find out the new coordinates of the triangle. [10]

Q3. Find a parametric cubic curve that starts at $P_o(-1, 2)$, ends at $P_3(8, 4)$ and passes through two prescribed points $P_1(2, 4)$ and $P_2(6, 6)$. Also, plot the parametric cubic curve in XY coordinate system. [15]

Q4. Find out the various elements of the blending function matrix of a quintic Bezier curve. Also, write down the parametric equation of the quintic Bezier curve in matrix form. [25]

******Best of luck******