

Ex. Seat No. _____

GANPAT UNIVERSITY
M.Tech. Sem. Ist Mechanical (CAD-CAM)
Regular Examination Jan. 2012
3ME 113 Computer Aided Design

Time: 3 Hrs

Marks: 70

Instructions:

- (i) All questions are compulsory.
- (ii) Answers to two sections must be written in separate answer books.
- (iii) Assume suitable data if required but state them clearly in your answer-books.
- (iv) Figure to the right indicates full marks.

SECTION – I

- Q1** Answer the following Questions. 12
- (a) What is scan conversion? Draw a flow chart to scan converted slope method of line.
 - (b) Discuss in brief “B-rap” technique of solid modeling.
 - (c) End point of line are (10, 20) and (20, 28). Find pixels by using DDA algorithm.
- OR**
- Q1(a)** Define i) feature ii) Primitives iii) Homogeneous coordinate 12
- (b) Write short notes on “NURBS”.
 - (c) Following are given data points of Bezier curve $P_0[3 \ 3 \ 0]$, $P_1[4 \ 5 \ 0]$, $P_2[5 \ 2 \ 0]$, $P_3[5 \ 6 \ 0]$. Find out point at $u=0.25, 0.5, 0.75$.
- Q2(a)** $P_0[10 \ 8 \ 0]$, $P_1[18 \ 6 \ 0]$, are data point of cubic curve and $P_0'[2 \ 2 \ 0]$, $P_1'[5 \ 2 \ 0]$ are tangent 12
- vector of end points. Find out intermediate three points.
- (b) Continuity of cubic curve and its necessary condition.
 - (c) Explain in Brief GKS.
- OR**
- Q2(a)** Differentiate curve fairing and curve fitting techniques. 12
- (b) Explain Bspine surfaces and it's characteristics.
 - (c) Write program in for trigonometric ellipse.
- Q3** Answer the following Questions.(Any Three) 11
- (a) Explain Graphics standard STEP.
 - (b) “Revolve Surface” explain in brief.
 - (c) What are the requirements of geometric modeling?
 - (d) Classify the modeling process and define geometry and topology with example.

SECTION – II

- Q4** Answer the following Questions. 12
- (a) Obtain parametric equation for sweep surfaces.
 - (b) For triangle ABC having co-ordinates A(4,4), B(7,4) and C(4,9). Determine new vertex position if it is reflected about a line $Y = 5X + 3$.
 - (c) Obtain parametric equation of (i) Sphere Surface (ii) Ellipsoid Surfaces (iii) parboiled surface.

OR

- Q4(a) Derive composite matrix for object mirror about any arbitrary plane in space. 12
- (b) Show that transformation matrix for reflection about the line $Y = X$ is equivalent to reflection relative to X axis followed by an anticlockwise rotation of 90° .
- Q5(a) What is number synthesis? Explain it's importance enumerate all chain possible with $n=6$ and one degree of freedom. 12
- (b) A mechanism is to be designed to generate the function $Y = X^{0.8}$ for the range $1 \leq X \leq 3$, using three precision points. Find the three values of X and Y .

OR

- Q5(a) Discuss the method of determining the angles for input and output link in a four bar mechanism for function generation. 12
- (b) Synthesize a four bar mechanism to generate the function $y = \log x$, where x varies between 1 and 10, use three accuracy points with chebyshev's spacing. Assume $\theta_s = 45^\circ$, $\theta_F = 105^\circ$, $\phi_s = 135^\circ$ and $\phi_F = 225^\circ$. Take the length of the smallest link equal to 50 mm.
- Q6 It the input link O_2A of the four bar mechanism shown in fig. 1 rotates with an angular velocity of 10 rad/ sec in the counter clock wise direction and an angular acceleration of 50 rad/ sec² in the clockwise direction. Find the acceleration of point C. 11
- $L_1 = 75$ cm, $L_2 = 25$ cm, $L_3 = 55$ cm, $L_4 = 40$ cm, $\theta_2 = 120^\circ$, $BC = 17$ cm,

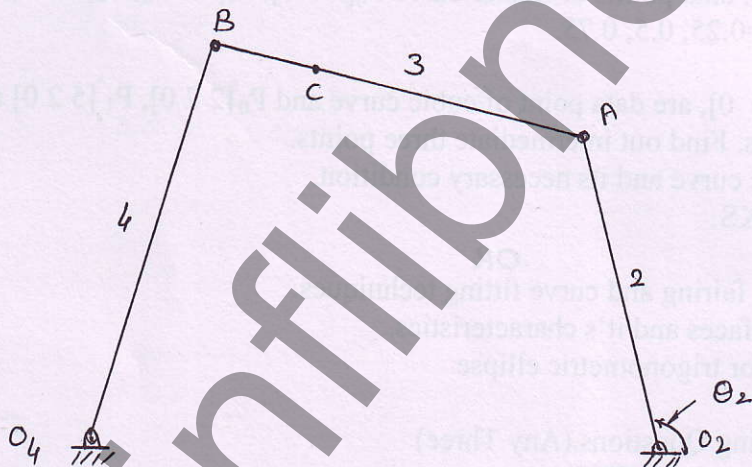


Fig. 1 Que. 6