

Dec.-23-0494

ME-601 (Computer Aided Design and Manufacturing)  
[CAD/CAM]

B.Tech. 6th (CBCS)

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

**Note :** Attempt five questions in all selecting one question each from sections A, B, C and D. Section E is compulsory.

### SECTION - A

- (a) Explain the product development process from the CAD point of view. (5)  
(b) Write a note on the significance of CIMS in the design process. (5)
- (a) What are geometric transformations and what is their usefulness in CAD? (5)  
(b) What are the advantages and disadvantages of wireframe modelling? (5)

### SECTION - B

- Show that the following motion is a rotation.

$$x' = \frac{1}{6}x + \left(\frac{2}{\sqrt{6}} + \frac{1}{6}\right)y + \left(-\frac{1}{\sqrt{6}} + \frac{1}{3}\right)z,$$

$$y' = \left(-\frac{2}{\sqrt{6}} + \frac{1}{6}\right)x + \frac{1}{6}y + \left(\frac{1}{\sqrt{6}} + \frac{1}{3}\right)z$$

$$z' = \left(\frac{1}{\sqrt{6}} + \frac{1}{3}\right)x + \left(-\frac{1}{\sqrt{6}} + \frac{1}{3}\right)y + \frac{2}{3}z \quad (10)$$

- (a) What is concatenation in CAD and what is its significance? (5)  
(b) Why B-splines curves are preferred over cubic splines and Bezier curves? (5)

### SECTION - C

- (a) What are the advantages of solid modelling over wireframe modelling? (5)  
(b) Explain the use of G and M codes in automation via numerical control. (5)
- (a) What are primitive elements in CAD? Also, define primitive instancing? (5)  
(b) Briefly discuss the types of statements in APT language for numerical control. (5)

### SECTION - D

- (a) What are benefits of CAPP? (5)  
(b) What are the different types of machine cells in GT? (5)
- What is CAPP? How is it different from traditional planning and acts as a link between CAD and CAM? (10)

### SECTION - E (Compulsory)

- (a) Discuss the historical development of CAD.  
(b) Discuss the hidden line removal method in wireframe modelling.

- (c) Discuss the global control in the Bezier curve with an example.
- (d) What are the different types of axonometric projections?
- (e) Discuss Euler operation in B-Rep scheme of solid modelling.
- (f) Explain CIMS in terms of flexibility.
- (g) What is production flow analysis (PFA)?
- (h) Write a short note on the NC coordinate system.

(8×2½=20)

$$x = \left( \frac{1}{1} \right) x + \left( \frac{1}{1} \right) x$$