Q. Code:943390

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE

EXAMINATIONS, MAY 2024

Sixth Semester

ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING

(Mechanical Engineering)

(Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Students will be able to differentiate between conventional design & CAD; Perform 2D & 3D transformations. Also, can write algorithms for lines.	**3**
CO 2	Students will be able to understand and select different curves and surfaces for applications.	**3**
CO 3	Students will be able to understand hidden lines, surfaces, solid removal algorithms and various techniques of colouring and shading.	**3**
CO 4	Students will be able to understand different graphic and data exchange standards.	**2**
CO 5	Students will be able to understand the principles of operations of CNC machines and develop CNC manual part programming using G-codes and M-codes for a given component.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Prepare the Concurrent workflow in the planning stage in concurrent engineering.	**1**	**3**
2.	Provide a scenario where clipping is essential in rendering realistic images.	**1**	**3**
3.	State the advantages of using B-spline curves over Bezier curves for surface modelling, particularly in terms of smoothness and local control.	**2**	**2**
4.	State the concept of Coons patching and how it differs from bicubic patching in surface modelling.	**2**	**2**
5.	Draw the RGB-based colour model that is used to generate primary colours.	**3**	**2**
6.	What are the different types of animations used to showcase product features, assembly processes, and functional capabilities?	**3**	**2**
7.	Draw a diagram of a neutral data exchange format.	**4**	**2**
8.	Expand the followings, (i) PHIGS (ii) NAPLPS	**4**	**2**

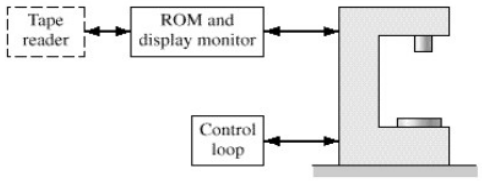
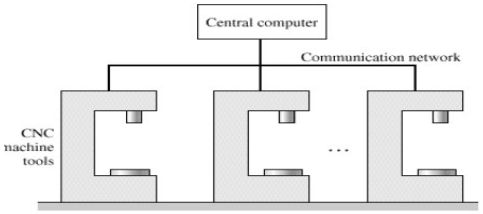
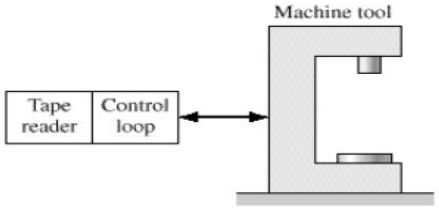
(iii) IGES

(iv) STEP

9. Match the following: **5** **2**

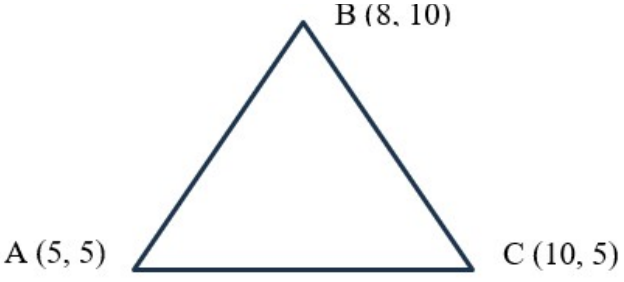
i) G02	a) Absolute Programming
ii) G03	b) Incremental Programming
iii) G90	c) Circular Interpolation Anticlockwise
iv) G91	d) Circular Interpolation Clockwise

10. Match the following: **5** **2**

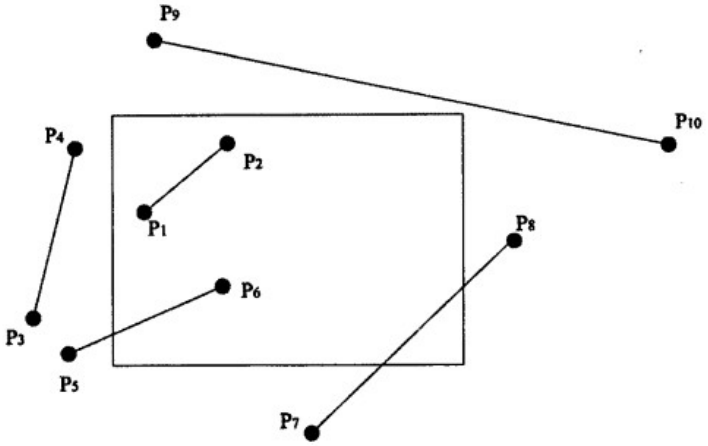
i) NC	a) 
ii) CNC	b) 
iii) DNC	c) 

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Consider a triangle ABC has coordinates A (5, 5), B (8, 10) and C (10, 5). Determine the new vertex positions if the triangle is. (a) rotated 60° clockwise about the Z axis. (b) scaled by 2 times in the X direction and 3 times in the Y direction about vertex A.	**(8)**	**1**	**3**



	(ii)	Consider the clipping window and lines shown in Figure 1.74. Find the region codes for each endpoint and identify whether the line is completely visible, partially visible, or completely invisible.	**(6)**	**1**	**3**



(OR)

(b)	**(i)**	Discuss how concurrent engineering principles are applied in the automotive industry during the design and development of a new vehicle.	**(7)**	**1**	**3**
	(ii)	Analyze how companies in the electronics sector strategically manage the entire product life cycle to maintain competitiveness and sustainability.	**(7)**	**1**	**3**
12. (a)		Discuss the process of creating Bezier curves based on control points and control polygons. Provide a case study where Bezier curves played a crucial role in optimizing the design.	**(14)**	**2**	**3**

(OR)

(b)		Differentiate between Constructive Solid Geometry (CSG) and Boundary Representation (B-rep) methods in solid modelling. Highlight a scenario where CSG is more suitable and explain why.	**(14)**	**2**	**3**
13. (a)		Provide a case study where a specific hidden surface removal algorithm was employed to enhance the visual quality of images.	**(14)**	**3**	**3**

(OR)

(b)		Provide a case study where engineering animation was utilized to promote a	**(14)**	**3**	**3**

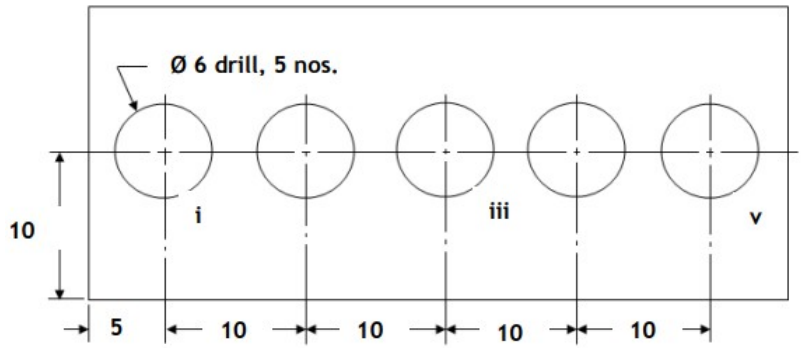
specific industrial product or machinery.

14. (a)	**(i)**	Explore how data exchange standards are utilized for sharing design data between different stakeholders and organizations.	**(10)**	**4**	**2**
	(ii)	Draw the flow diagram to communicate between two CAD systems using IGES.	**(4)**	**4**	**2**

(OR)

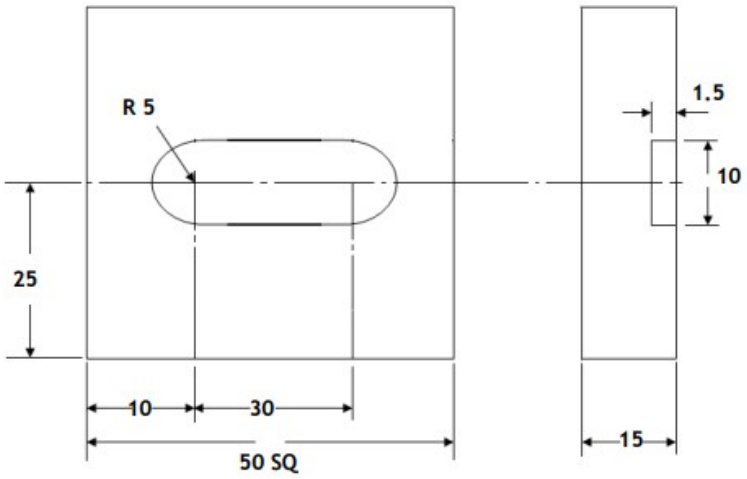
(b)		Elaborate in detail about the GKS standards and its testing.	**(14)**	**4**	**2**

15. (a)		Write an NC program using G codes and M-codes for the following figure.	**(14)**	**5**	**3**



(OR)

(b)		Write an NC program for the following figure.	**(14)**	**5**	**3**



PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.		Use Bresenham's algorithm to rasterise the line having endpoints of (3, 3) and (11, 7).	**(10)**	**1**	**3**

****