S.E. Sem IV Mechanical C scheme, R-2019) Dec 2023.

2023

Duration: 3 Hours **Max. Marks: 80**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Attempt any FOUR **[20]**

1 a What are 2D transformation matrices for i) Translation ii) Rotation iii) Scaling iv) Mirroring v) Shearing.

b Differentiate between Augmented reality and Virtual reality

c Write difference between Wireframe, Solid and surface Modeling

d List and explain the part CNC programming codes for the following:
i)Rapid travel/positioning of the tool, ii) Homing iii) material cutting in circular fashion iv) Spindle off v) Absolute dimensioning system

e What are the feedback devices used in NC/CNC machines

f Differentiate between SLA and SLS.

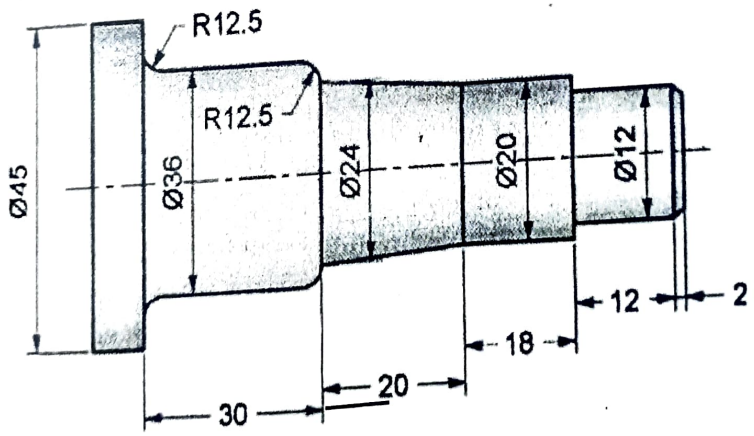
2 a A triangle PQR with vertices **P (2, 5), Q (6, 7)** and **R (2, 7)** is to be reflected about the line **y = x+2**.Determine (i) the concatenated transformation matrix and (ii) coordinates of the vertices for the reflected triangle. **[10]**

b Explain Fused Deposition modeling with its advantages, disadvantages and applications. **[10]**

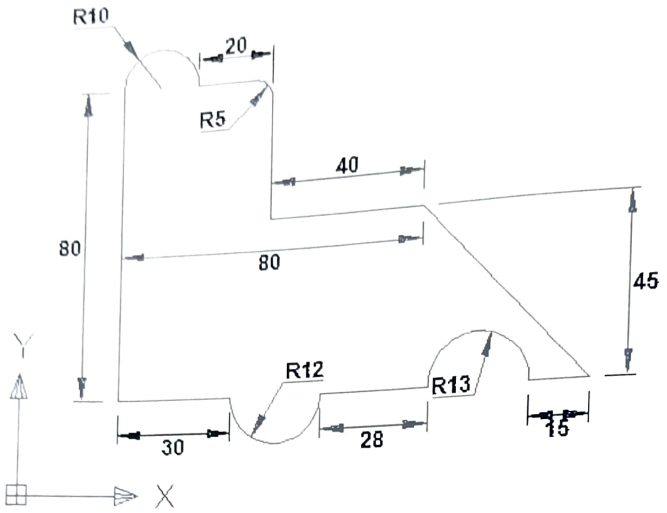
3 a Write comparison between X-ray, CT scan, and MRI Scan **[10]**

b Explain the characteristics of the Bezier curve and plot a Bezier curve having control points as P_0 **(1, 2),** P_1 **(3, 4),** P_2 **(6, -6) and** P_3 **(10, 8)**. Take a step size of 0.1. **[10]**

4 a Write a part program for the following component as shown in figure assuming raw billet size of diameter 45 mm and length 82 mm for finished turning operation. Assume suitable data if any needed. **[10]**



b Write a CNC part program using G and M codes for contouring a component as shown in following figure having thickness 5mm. Assume cutter speed as 15m/min and feed rate as 0.2 mm/rev. Assume suitable data if needed. [10]



5 a **Write short note on** [10]
i. Point cloud data ii. DICOM

b Explain Selective Laser Sintering in detail with neat and clean diagram. [10]

6 a Write classification of RP Process, its advantages, disadvantages with its applications in Design. [10]

b Explain the process of obtaining Cad solid model of body parts using CT output data. [10]

46868BCD69DFAC2CAE55E5C167C6871C