[5254]-532

B. E. (Mechanical Engineering) (Semester - I)
CAD/CAM AND AUTOMATION
(2012 Pattern)

Time : 2½ Hours]   *[Max. Marks : 70*
Instructions to the candidates:

1) *Answer Q. No.1 OR Q. No. 2, Q. No.3 OR Q. No. 4, Q. No.5 OR Q. No. 6, Q. No.7 OR Q. No. 8, Q. No.9 OR Q. No. 10.*
2) *Figures to the right indicate full marks.*
3) *Use of Electronic pocket calculator is allowed.*
4) *Assume suitable data, if necessary.*

Q1) a) An object is to be rotated about point A (-10,-10) by 90° in counterclockwise direction. Calculate concatenated (CT) transformation matrix. **[6]**

b) Explain with neat sketch a constructive solid geometry (CSG) technique of modeling. State its two main advantages. **[6]**

OR

Q2) a) Write a short note on Bezier Curves. State its two main limitations. **[4]**

b) Find stresses in step bar due to forces 10KN and 5 KN. Refer fig.1. Modulus of elasticity: E1 = 200Gpa & E2=70 Gpa, Area: A1 = 150mm^2 & A2=100 mm^2: **[8]**
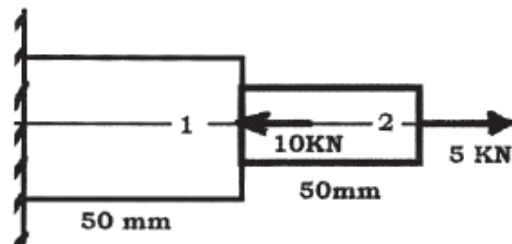

Fig.1

Q3) a) A point P having coordinates (3, 3) is mirrored about X and Y axis (i.e. about origin). Find new coordinates. **[4]**

b) Explain linear shape functions in FEM. **[4]**

OR

Q4) a) State advantages of Solid model over Surface model. **[4]**

b) Derive Element Stiffness Matrix for 1-D by any method. **[4]**

Q5) a) Explain tool length and tool radius compensations with example. **[8]**

b) Write a CNC program using G and M codes for contouring a component of thickness 10 mm. Also make drill of 16 mm diameter hole, as shown in fig.2. **[10]**
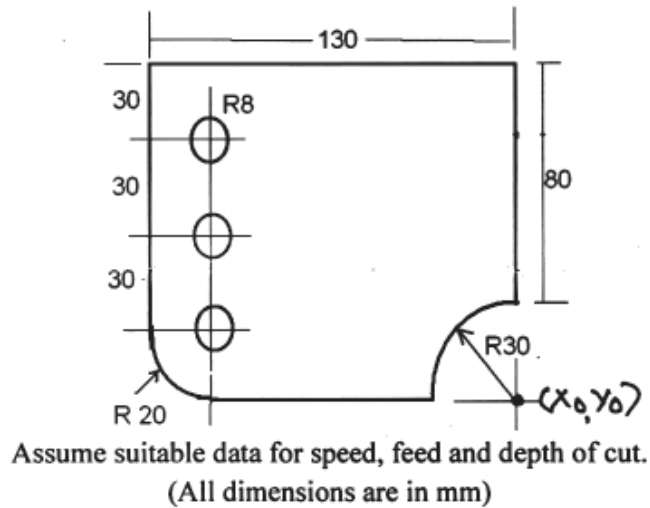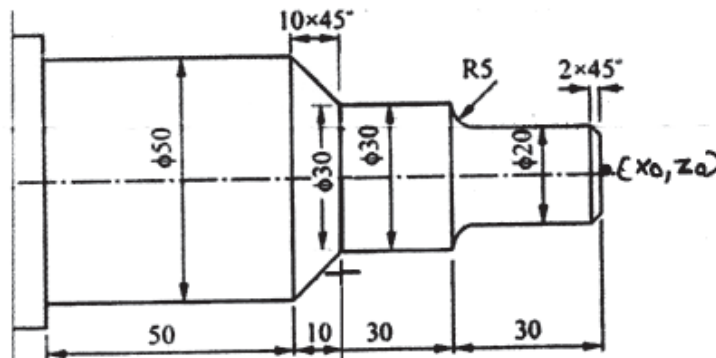

Assume suitable data for speed, feed and depth of cut.
(All dimensions are in mm)
Fig.2

OR

Q6) a) Write a CNC program using G and M codes to turn a component shown in fig.3. Assume suitable data for speed and feed and.Use rough and finish cycles. **[10]**

(All dimensions are in mm)
Fig.3

b) Explain with neat sketch various origins used in CNC machine: *Machine Origin, Work piece or Part Origin and Program Origin.* **[8]**

Q7) a) Explain Selective Laser Sintering (SLS) in detail with neat sketch. State it's advantages. **[8]**

b) Explain 3D printing in detail with neat sketch. State its advantages and applications. **[8]**

OR

Q8) a) Explain Rapid Tolling and STL format. **[8]**

b) Explain Fused Deposition Modeling. State its for applications. **[8]**

Q9) a) Explain vacuum and magnetic gripper with neat sketch. State their advantages. **[8]**

b) Define Automation. Compare fixed, programmable and flexible automation systems. **[8]**

OR

Q10) a) Explain Wrist Configurations: Roll, Pitch and Yaw with neat sketch. Also explain meaning of Link 0 and Link 2. **[8]**

b) Explain computer integrated manufacturing (CIM). What are various functional areas of CIM? State benefits of CIM. **[8]**

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