Total No. of Questions : 10] **SEAT No. :**

P3586 **[Total No. of Pages : 3**

[4959]-1057

B.E. (Mechanical Engineering Sandwich)

CAD/CAM AND AUTOMATION

(2012 Pattern) (Elective - I(d))

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) A square PQRS of side 40 mm is having its point P is at origin with PQ parallel to X axis. Find the new vertices if it is rotated about A by 90º in counter-clockwise direction. **[6]**

b) Compare with neat sketch, Bezier, B spline and Cubic curves. **[6]**

OR

Q2) a) Write a short note on boundary representation techniques. **[4]**

b) Figure 1 shows cluster of four springs. Calculate deflections of each spring when a force of 2000 N is applied. Model the springs as 1D element. **[8]**

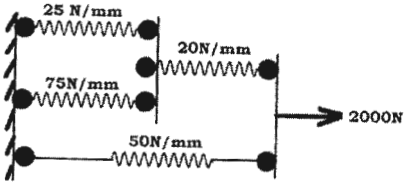


Fig.1

Q3) a) A line AB having vertices A (5, 5) and B (20, 5) is mirrored about Y -axis. Find new vertices. **[4]**

b) Explain relation between Intrinsic and Global coordinate systems in FEM. **[4]**

OR

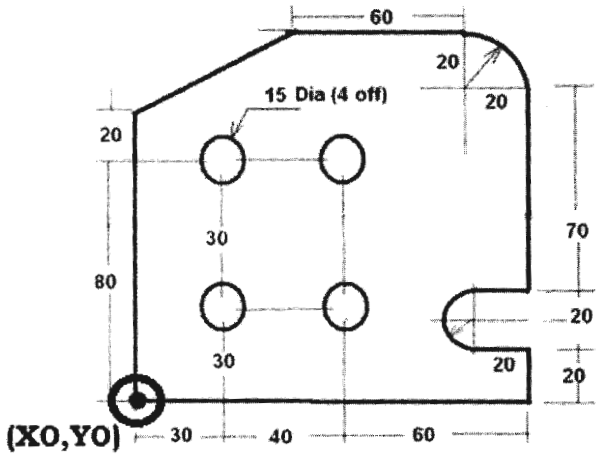
P.T.O.

Q4) a) Explain rotational and translational sweeping of modeling. Give their examples. **[4]**

b) Write a short note Isoparametric representation in FEM. **[4]**

Q5) a) Classify CNC machine tools. Explain Open loop and Closed loop systems with neat sketch. **[8]**

b) Write a CNC program using G and M codes for contouring a component. Also make peck drill of 15 mm diameter hole, as shown in fig 2. Assume suitable data for speed, feed and depth of cut. **[10]**

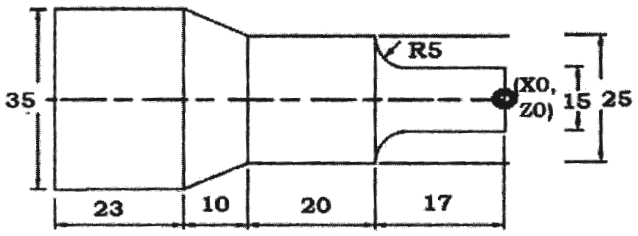


(All dimensions are in mm)

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, feed and depth of cut. Use only Canned rough turn and finish cycles. Billet Size: Dia: 35mm L:70 mm. **[10]**



(All dimensions are in mm)

Fig.3

b) Write G codes for : **[8]**

i) X-Y plane selection
ii) Feed Per Minute
iii) Feed Per Revolution
iv) Cancel Canned Cycle

Write M codes for :

i) Coolant on
ii) End of program
iii) Tool change
iv) Spindle stop

Q7) a) Explain Laminated Object Manufacturing (LOM) in detail with neat sketch. State its advantages and applications. **[8]**

b) Explain selective Laser Sintering (SLS) in detail with neat sketch. State it's a limitation and applications. **[8]**

OR

Q8) a) Explain Stereo Lithography technique in detail with neat sketch. State its advantages. **[8]**

b) Explain Rapid Prototyping Systems step-by-step. State challenges in using RP in India and Global. **[8]**

Q9) a) Define Robot as per RIA. State guidelines for selection of grippers. Explain magnetic gripper with neat sketch. **[8]**

b) Define Automation. State importance of automation. Compare different types of automation systems. **[8]**

OR

Q10) a) Explain the Robot work envelope. List various work volumes. Explain Cartesian configuration. **[8]**

b) How does FMS give flexibility in Manufacturing? State advantages and disadvantages of FMS. **[8]**