B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011

MECHANICAL ENGINEERING

SIXTH SEMESTER

ME 9354 – Computer Aided Design & Manufacture

(REGULATION 2008)
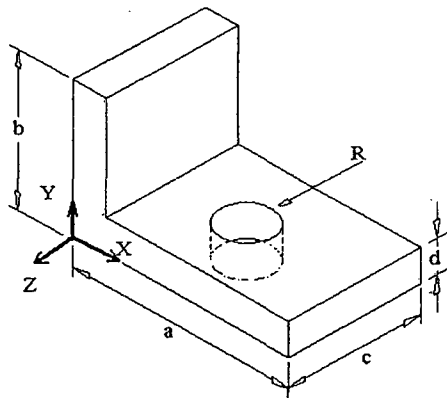
Time : 3 hr.   Max. Mark :100

Answer ALL Questions

Part A (10 x 2 = 20 Marks)

1   What are the applications of CAD and their benefits?

2   Create the CSG model of the solid shown in the figure below

3   A picture is to be translated through 5 and 10 units in X and Y directions respectively. Write the matrix in homogeneous co-ordinates for translation.

4   What are the advantages of Bezier Curves over Hermite cubic curves?

5   Describe the structure of an IGES file.

6   List how the computer networking facilitated planning operations in engineering manufacture.

7   What G code do you use to machine sharp corners?

8   What is the difference between absolute and incremental programming?

9   Distinguish between the dimensional and geometric tolerance.

10   Define lean production.

11   For the points $P_1(1, 1)$, $P_2(3, 1)$, $P_3(4, 2)$, $P_4(2, 3)$, that defines a 2-D polygon, develop a single transformation matrix that

(a) reflects about the line x = 0,

(b) translates by −1 in both x and y directions, and

(c) rotates about the z-axis by 180°   (16)

12a Given data points A(0, 0), B(1, 2), C(3, 2) and D(6, −1), elevate the degree of this cubic Bézier segment to four and show the new control polylines.

(16)

[OR]

12b A Mechanical component is shown in the Figure below along with dimensions. A CSG Representation is to be made. Define the minimum basic primitives to be used for constructing the component. Give Details of the CSG tree for the given component. Include details of primitives, transformation involved (scaling translation, rotation) and the Boolean operations.
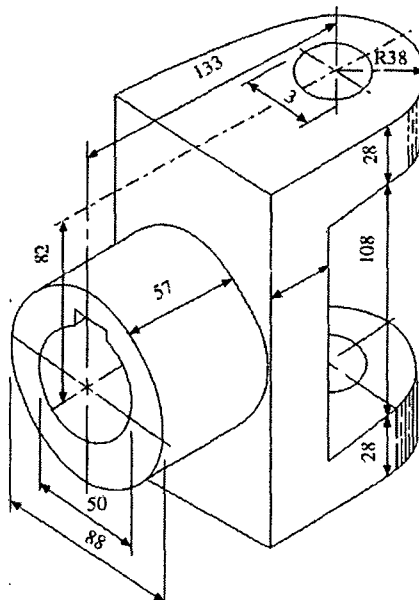
(16)

13a Write the importance of process planning in product development. What are the major modules of a process planning software and the databases required? State also the need for computer aided process planning and its advantages?

(16)

[OR]

13b (i) What are the objectives of computer aided quality control? Briefly write the important benefits of computer-aided-quality control. (8)

(ii) Describe the structure of an IGES file and briefly write the various data exchange systems currently in use. (8)

14a Define the process, plan the set up and fixtures, select the tools, prepare the operation sheets and write/create NC programs for the components given below:
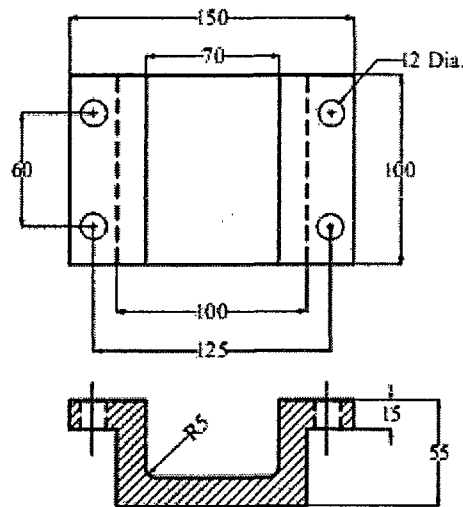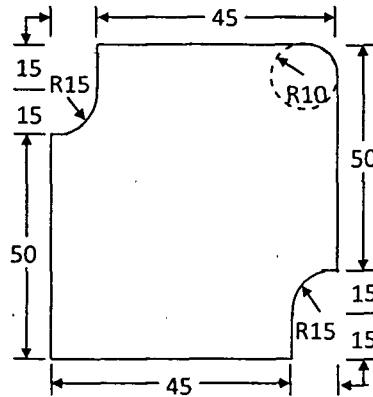
(16)

Material Aluminium
Machined from billet

14b Prepare NC program in APT for machining the contour shown in Figure below with two passes one with rough-cut and other with finish cut.

(16)

15a What do you understand by the terms product structure, configuration management, process management and digital mockup in the context of product data modeling? (16)

[OR]

15b (i) How does the JIT approach to manufacturing deal with the relationship between product and process variability? (8)

(ii) Define repetitive manufacturing. Show how KANBAN is used to control work flow in repetitive manufacturing environments. (8)