**L. E. College, Morbi**
**Mechanical Engineering Department**
**B. E. Sem 6 Mechanical**
**Computer Aided Manufacturing (3161917)**

**Assignment 1 (CO1)**

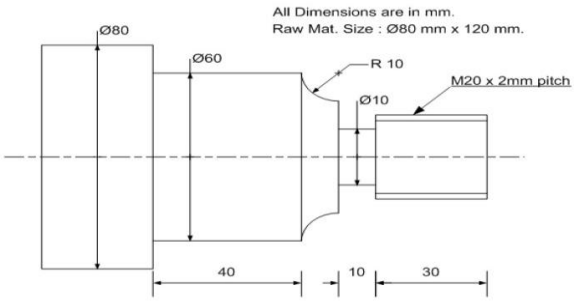
## Computer Aided Manufacturing.

1. Describe the different manufacturing systems along with their relevance in terms of productivity using a sketch.
2. What are the objectives of CIM? Which major functional areas of the manufacturing enterprise considered for achieving CIM objectives?
3. What is CIM? Explain Components of CIM.
4. What are the different types of manufacturing? Make an assessment of the extent of computer control in specific cases of each types of manufacturing.
5. Justify the need of CAM in today's era.
6. Describe the basic activities that must be carried out in a factory to convert raw material into finished product.
7. Explain role of management in CAM
8. Explain the benefits and demerits of of Computer Aided Manufacturing.
9. Draw sketch of CIM enterprise wheel and compare with CIM wheel

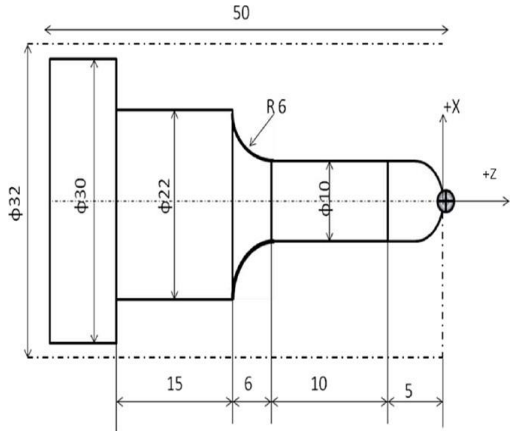
**Assignment 2 (CO1)**

## NC/CNC Machine Tools:

1. What are the basic components of CNC system? Briefly discuss each of them.
2. How the axes are designated in CNC m/c tools? Sketch and designate the axes of CNC vertical milling machine.
3. State various compensations used in CNC machines. Explain tool length compensation with neat sketch.
4. Explain the linear and circular interpolations used in turning stating illustrations. Draw a neat sketch for circular interpolation without radius value also.
5. Write important tool position for manual part programming of following component in absolute mode. Name different canned cycles used for its machining from raw material. Draw a process plan for raw material of mild steel.

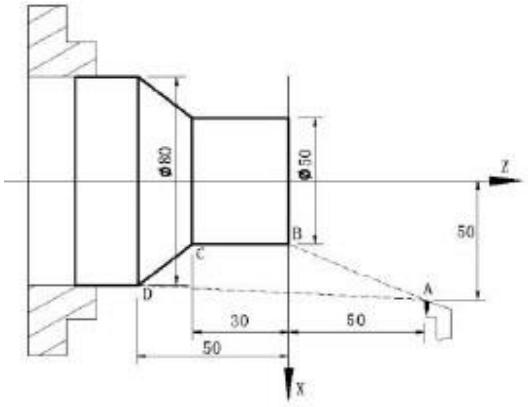



6. Explain turning and threading canned cycles. Write their statements and show the motions with help of neat sketches.
7. Classify CNC machines tools on the basis of :
8. Types of motion control
9. According to programming Method
10. Control System
11. Write a CNC program using appropriate G and M code to turn component as shown in figure. Raw
12. material: MS Φ32 X 50 mm, cutting speed V= 40 m/min and feed=0.1, Assume suitable data for depth of cut.

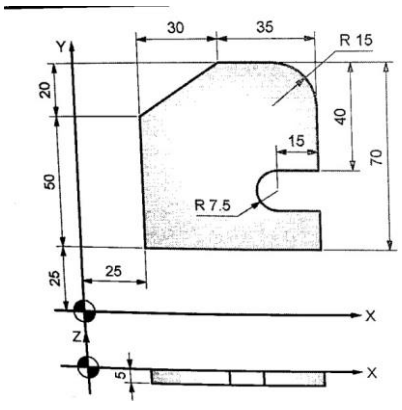



13. What are canned cycles? What is the difference between a canned cycle and subroutine? Discuss how a canned cycle can be useful in writing a part program.
14. Which are the formats used for manual part programming? Explain word address format. Write word
15. address format for milling and drilling operations.
16. What do you mean by ATC? State necessary requirements for ATC. Explain any two ATC with neat sketch.
17. Explain the types of manufacturing systems.
18. Justify: "CNC machines are more suitable for job-shop and batch production".
19. Compare CNC machines with conventional machines in regard to hardware used in them.
20. State various automated programmed tools language. List various statements used in APT. Explain geometric statements of APT.

21. What do you mean by canned cycle? Write general syntax of G81 canned cycle used in CNC milling.
22. Draw a neat sketch of recirculating ball screws. What are the various methods of Preloading? State the advantages of ball screws over conventional lead screws.
23. Explain clearly the difference between NC, CNC and DNC machine.
24. Develop a CNC program, using G and M code, to cut a slot for the component shown in fig. by using a end mill of diameter 6mm. The depth of slot is 5mm. Assume suitable data for speed, feed etc.

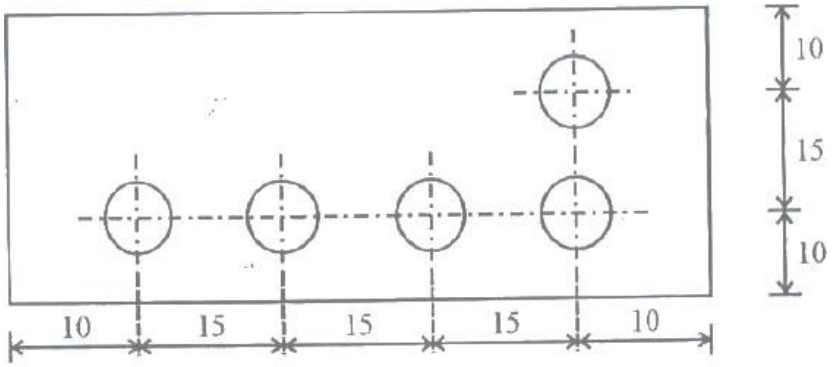



25. List various feedback devices used in CNC machine. Explain working principle of Rotary encoder with neat sketch.
26. Explain incremental and absolute dimensioning with neat sketch.
27. Explain the axes designation rules for machine tools employing rotating tools. Sketch a vertical machining centre and designate its axes.



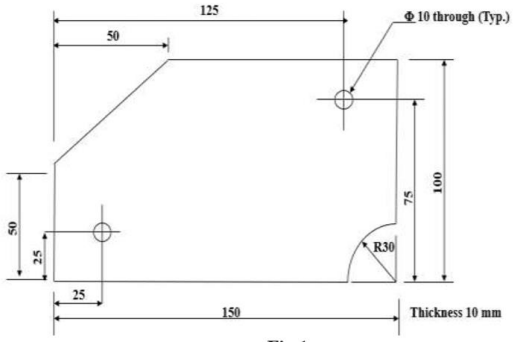

28. What is modal and non-modal code? Give example of each.
29. Write a part program for the given forged component to turn the profile.

30. Explain with the help of part programming, the concept of subroutine and do loopsfor programming showed in figure




Dimensions are in mm.

31. Write a manual part program for drilling and milling of a component with 10mm thickness as shown in Fig. 1. Consider 10 mm diameter milling cutter and necessary drill size for drilling operation. Assume suitable spindle speed and feed for drilling and milling operation.




32. Prepare CNC milling part program for figure 1. (Thickness of plate is 15 mm)

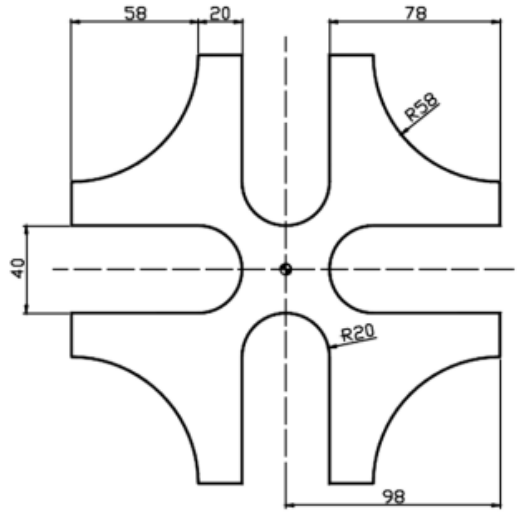



Figure 1

33. Prepare CNC turning part program for figure 2.

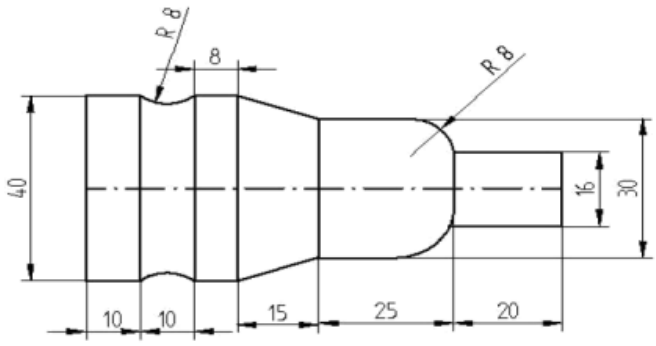



Figure 2

**Assignment 3 (CO1)**

## NC/CNC Machine Tools: Programmable Logic Controllers:

1. What are the essential elements of a PLC system?
2. Define PLC.
3. Discuss the relay device components used in it.
4. Draw and explain PLC architecture

**Assignment 4 (CO2)**

## Group Technology and CAPP

1. Why is part classification and coding required in GT. Explain OPTIZ system of coding?
2. What is Group Technology? What are the advantages of GT in manufacturing?
3. Explain the variant type CAPP system. State the benefits and limitations of variant type CAPP systems.
4. What are the steps involved in APT program? What is part, drive and check surface? Draw a neat sketch showing all surfaces.
5. Explain the types of code structures used in GT classification citing illustrations.
6. Explain in detail composite part.
7. Define Group Technology (GT). State the main two hurdles in its implementation. Enlist various benefits of GT implementation in the industry.
8. Explain with sketch the concept of composite job in GT and its use. What do you understand by “Key Machine” concept in GT?
9. What is GT? Explain methods of grouping parts into part families in brief.
10. Explain cellular manufacturing and different types of machine cell designs.
11. Explain MICLASS classification and coding system in detail.

**Assignment 5 (CO3)**

## Flexible Manufacturing System.

1. What is FMS? Which are the components of FMS? Draw sketch of various types of FMS along with their objectives.
2. Explain the types of flexibilities in FMS and discuss the factors on which these flexibilities depend.
3. Describe with neat sketch AS/RS system used in FMS
4. Define FMS. Which are the components of FMS? Explain FMS layouts with their application.
5. Write a short note on: Automated guided vehicle associated with FMS

**Assignment 6 (CO4)**

## Robot Technology

1. What are the different types of drives used in robots?
2. Differentiate between a SCARA and a gantry robot.
3. What do you mean by ATC? State necessary requirements for ATC. Explain any two ATC with neat sketch.
4. What is robot sensing? What are the different sensors used in robotics. Discuss any two in brief.
5. Sketch SCARA robot and explain its degree of freedom and motion.
6. Explain robotic work cell control and interlocks.
7. Explain the axes designation rules for machine tools employing rotating tools. Sketch a vertical machining center and designate its axes.
8. Explain the term “Work Volume” with respect to Robot.
9. What are the different types of drives used in Robot.
10. Discuss various applications of robots.
11. Explain various sensors and actuators used in robots.
12. Write complete specifications of a typical robot. What are the different sensors used in robotics. Discuss any two in brief.
13. What do you mean by precision & accuracy in context of robotics? Explain with neat sketch. State various applications of robots.
14. Explain the degrees of freedom of wrist of robot.
15. Explain the degrees of freedom of wrist of robot.
16. Enlist and explain different elements of robots.
17. What are the various types of grippers used in robots?
18. List various power source, transducers used in robot arm.
19. Describe the terms with reference to Robot: 1. Payload, 2. Work envelop, 3. Wrist motions: Roll, Pitch and Yaw

20. Select a Robot configuration for loading and unloading a part from CNC turning center and place it in a rack near to the machine. Draw neat sketch of the configuration and define degree of freedom of each joint. Assume suitable data as required. Also justify your selection over other options.

**Assignment 7 (CO5)**

## Integrated Production Management System:

1. What are the different types of manufacturing? Make an assessment of the extent of computer control in specific cases of each types of manufacturing.
2. What are the major functions of process planning? What are the main problems associated with manual process planning?
3. Explain Manufacturing Resource planning (MRP-II).
4. What are the objectives of MRP system? State the various input to MRP system. Draw an MRP structure.
5. What are the input parameters in MRP-I?
6. What is the difference between MRP-I &MRP-II?
7. What is computer integrated production management system? Explain with neat sketch.
8. Explain JIT technique used in auto industries.
9. What are the typical outputs from MRP system? Prepare a sample output report of MRP system.