Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (MECHANICAL ENGINEERING)

END SEMESTER MAKE UP EXAMINATIONS, DEC 2016/JEN 2017

SUBJECT: COMPUTER INTEGRATED MANUFACTURING [MME 405]

REVISED CREDIT SYSTEM
(04/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.	What are friction guideways? How can they be used in CNC machine tools? List different types of friction guideways.	**2**
1B.	Discuss the features of different tool holders and changers in Vertical Machining Centres.	**3**
1C.	Write a CNC part program for the workpiece shown on Fig. 1C.	**5**
2A.	Explain the ISO coding system for Tungsten Carbide turning tool holders for external turning.	**2**
2B.	Why are flexible couplings used in CNC machine tools? Explain with sketches.	**3**
2C.	Sketch and explain the four structural configurations of Coordinate Measuring Machine (CMM). List different methods of operating and controlling it.	**5**
3A.	Schematically represent the coordinate system of vertical machining and turning centres.	**2**
3B.	Suggest a mechanism to convert rotary motion of the drive into linear motion of the worktable for positioning with high degree of accuracy. Explain with neat labelled sketch, it's construction.	**3**
3C.	Write a CNC part program for the workpiece shown on Fig. 3C.	**5**

4A. i) Write the rotation matrix in X, Y and Z axis to determine the position and orientation of the tool with respect to base frame. **3**

ii) A mobile body reference frame OABC is rotated 60° about OY axis of the fixed base reference frame OXYZ. If $p_{xyz}=(4,6,8)^T$ & $q_{xyz}= (5,7,9)^T$ are the coordinates with respect to OXYZ plane, what are the corresponding coordinates of p and q with respect to OABC frame?

4B. Briefly explain the basic components of FMS. **3**

4C. Explain various functions of Computer Integrated Production Management System. **4**

5A. Explain briefly the methods of vehicle guidance and routing for AGV's. **3**

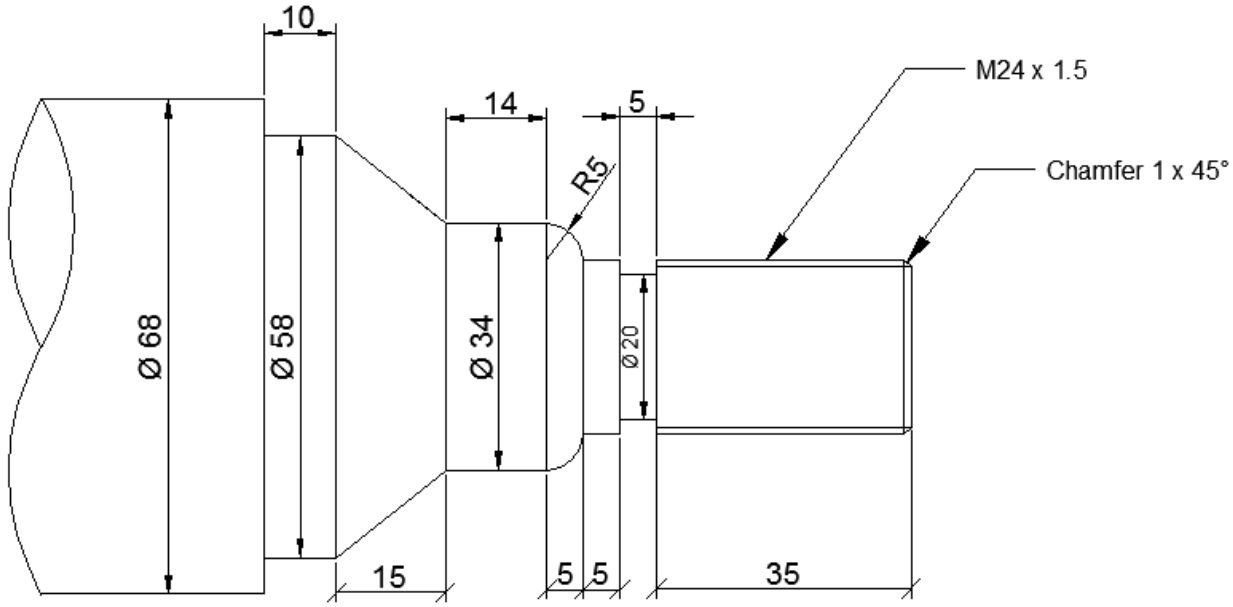
5B. Write a note on Generative and retrieval CAPP. **3**

5C. With neat sketches explain the types of mechanical gripper mechanisms. **4**

6A. With a neat sketch, explain the types of joints commonly used in industrial robot. **3**

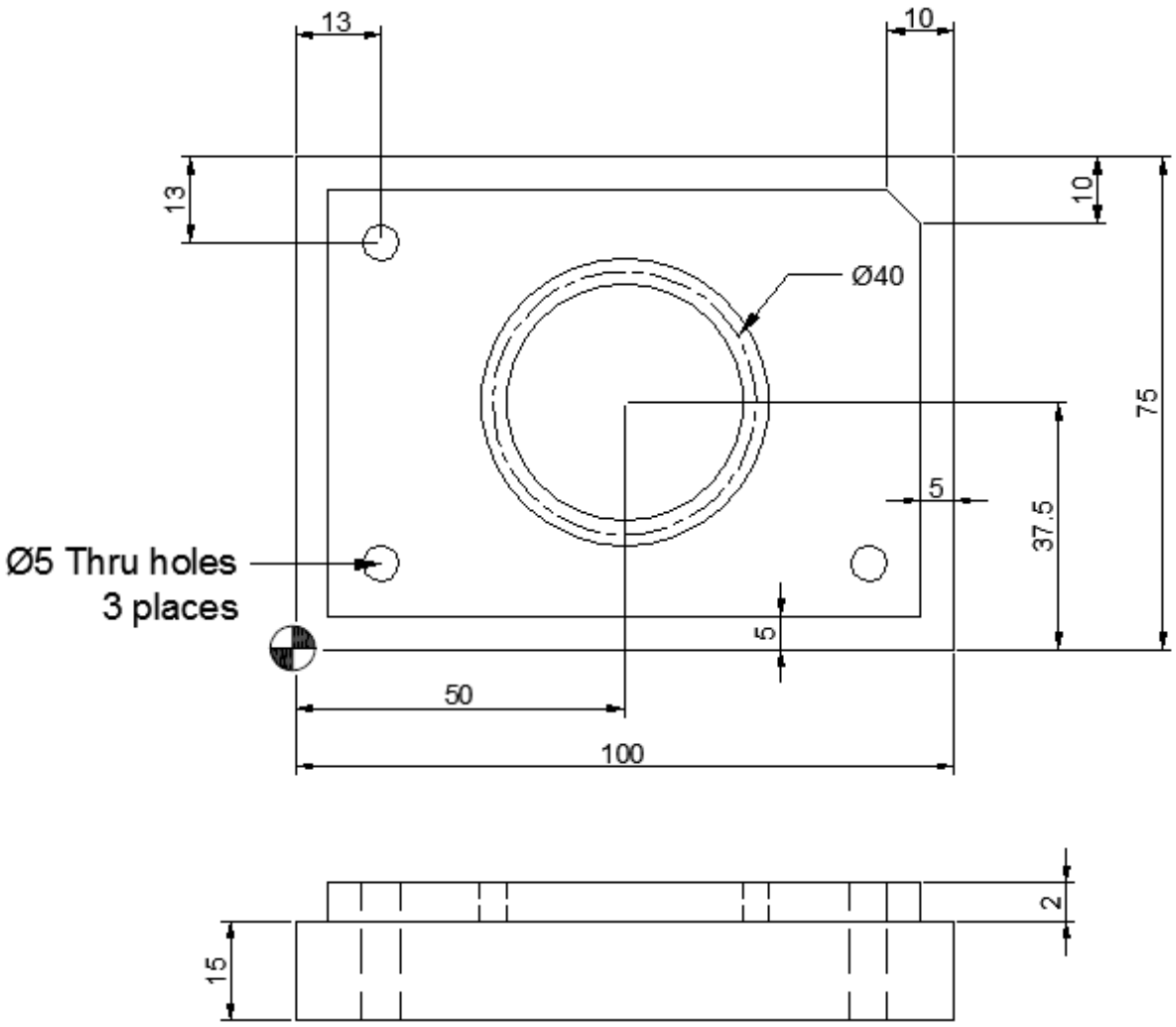
6B. With the help of a flowchart explain CRP. **3**

6C. With an example explain three basic types of coding structures in part classification & coding systems. **4**



Note: 1. Blank dia = 68 mm
2. Use groooving tool width 3mm

Fig. Q1 C



Note: 1. Contour mill the sides and corners using Ø 20 slot mill
2. Mill circular slot using Ø 4mm slot mill
3. Drill 3 holes using Ø 5mm drill
4. Thickness of the raw material is 17 mm
5. All dimensions are in mm

Fig. Q3 C