MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH (INDUSTRIAL & PRODUCTION ENGINEERING)

END SEMESTER (GRADE IMPROVEMENT) EXAMINATION, AUGUST 2021

SUBJECT: MANUFACTURING AUTOMATION ENGINEERING (MME 2256)

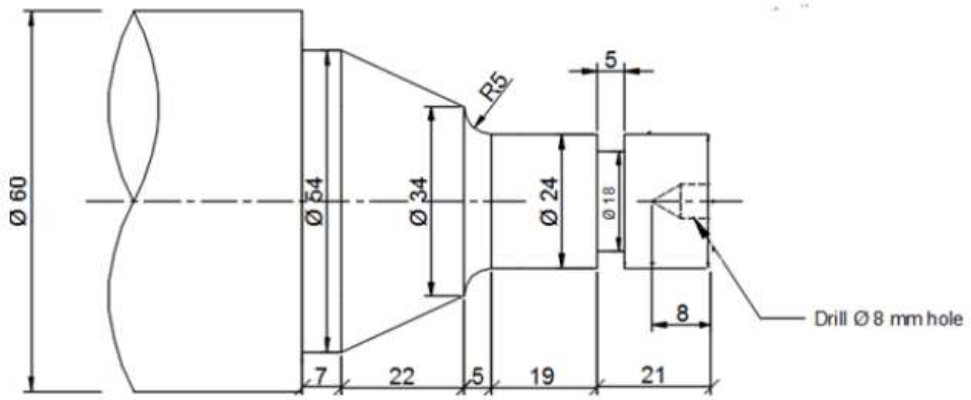
REVISED CREDIT SYSTEM

Time: 120 Minutes **MAX. MARKS: 40**

Note: Answer ANY FOUR FULL questions.

1A	A double acting cylinder guides cylinder pins towards a measuring device. The pins are separated by means of a continuous to and fro movement. The oscillating motion can be started by means of a valve with selector switch. The duration of forward stroke and return stroke of the cylinder is to be adjustable. The cylinder is to remain in the forward end position for t = 5 seconds. Design a pneumatic circuit to automate the process.	**4**
1B	With a neat sketch explain the working of a pneumatic pressure regulator.	**3**
1C	With a neat sketch explain the construction and working of a 3/2 direction control valve used in pneumatic systems.	**3**
2A	A station uses conveyor system to check the presence of lids on cans. If a can without a lid is encountered, then the can must be pushed aside from the conveyor into a bin by a pneumatic cylinder. The lids and cans are interrogated by means of sensors. Design an electro pneumatic circuit for the process.	**4**
2B	With the help of electro pneumatic circuit explain the latching circuit.	**3**
2C	Identify and explain with a neat sketch the working of the component used in electro pneumatic systems which is used to detect the advanced and retracted end positions of the piston rod in linear actuators.	**3**

3A	An electro pneumatic system requires a sensor to detect the presence of non-metallic parts in the shop floor. Identify and explain the working of the component with the help of a neat sketch.	**4**
3B	With the help of a pneumatic circuit explain the working of a one-way flow control valve.	**3**
3C	What are the advantages of using compressed air in pneumatic systems?	**3**
4A	With a neat sketch explain cylindrical and tapered roller bearing.	**4**
4B	List and explain any three types of material handling equipment.	**3**
4C	Sketch and explain loop layout group machine cell with semi – integrated handling system.	**3**
5A	Write a CNC part program for the workpiece shown in Fig. 1.	**4**

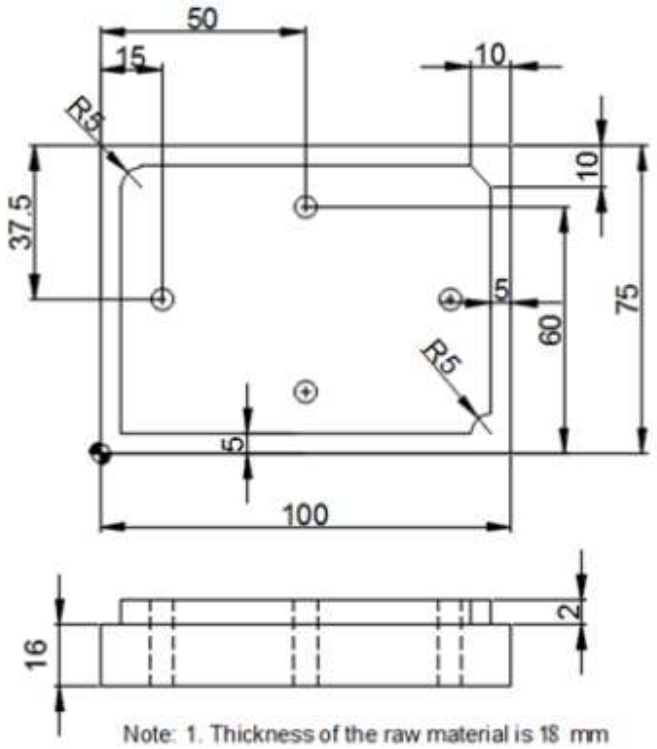


Note: 1. Blank dia = 60 mm
2. Use grooving tool width 3 mm

Figure 1

5B	List and explain Flexible Manufacturing System data files.	**3**
5C	With a neat sketch explain the working of timing belt.	**3**
6A	Write a short note on Material Requirement Planning.	**4**
6B	Write a short note on multi-class part classification and coding system.	**3**

6C Write a CNC part program for the workpiece shown in Fig. 2. **3**



Note: 1. Thickness of the raw material is 18 mm

Tools to be used: 1. Ø 20 mm end mill
2. Ø 5 mm drill tool

Figure 2