

22563

12223

3 Hours / 70 Marks

Seat No.

00236858

- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
 - (7) Preferably write answers in sequential order.

Marks

1. Attempt any FIVE of the following: 10
- a) Write advantages of EDM process. (Any two)
 - b) State different types of milling machines.
 - c) Enlist any two gear manufacturing methods.
 - d) State the functions of any two important elements of CNC machine.
 - e) State the meaning of Code M03 and M06 in CNC part programming.
 - f) Define home position and programme zero in CNC part programming.
 - g) Define Automation. Give any one example of hard automation.

P.T.O.

2. Attempt any THREE of the following: 12
- Explain with the neat sketch working principle of Abrasive Jet Machining.
 - Draw the neat sketch of Column and Knee type of milling machine. State the function of each part of the machine.
 - Describe the concept of cutter radius compensation for CNC machine with suitable example.
 - Justify the need of virtual simulation of CNC machine.
3. Attempt any THREE of the following: 12
- Explain with the neat sketch any one type of gear hobbing process.
 - Compare CNC (Computerized Numerical Control) machine with DNC (Direct Numerical Control) machine.
 - Explain the term preparatory function and miscellaneous function in the context of CNC part programming.
 - "Pneumatic actuators are widely used in Robotics." Justify.
4. Attempt any THREE of the following: 12
- Compare gear hobbing process with gear shaping process (Atleast four points)
 - Explain working and importance of re-circulating ball screw used in CNC machine.
 - Prepare process sheet and calculate cutting parameters for the component shown in Figure 1. All dimensions are in mm.
Given: Raw material stock size - ϕ 60 x 120 length.
Stock material - Aluminium
Feed $f = 0.2$ mm / rev.
Cutting velocity (V_c) = 90 m / min.
Assume suitable data if required.

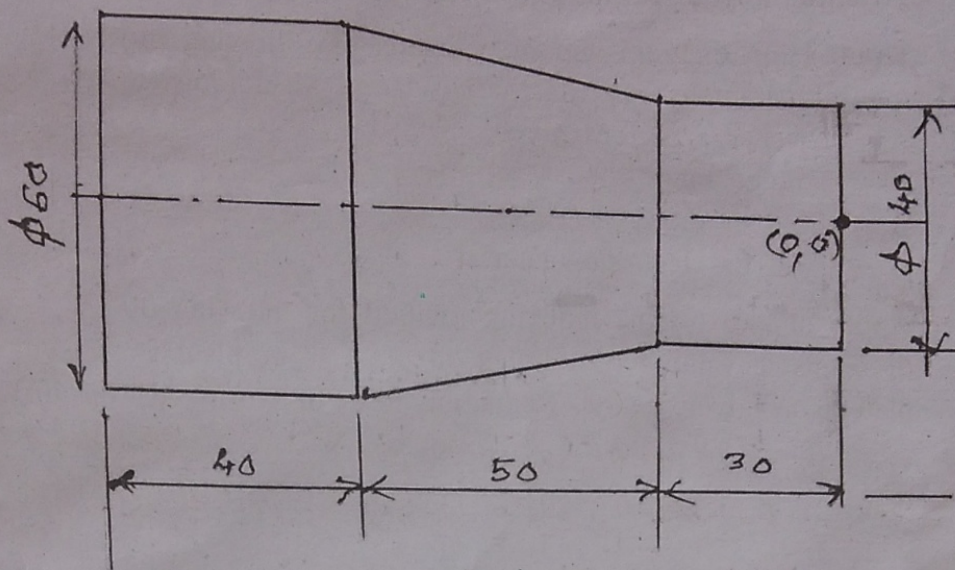


Fig. No. 1

- d) Develop full G and M code manual part program of CNC lathe for component given in Figure 1 in word address format (WAF).
- e) Justify use of cellular manufacturing in today's manufacturing situation.

5. Attempt any TWO of the following:

12

- a) Draw set up diagram of Ultrasonic Machining (USM) process, showing all the elements. State the function of each element.
- b) A milling cutter of diameter $\phi = 10$ mm and rotating at 1000 rpm is used to cut 'L' shape slot. Find cutting velocity in m/min. Show cutter and work piece relative arrangement with neat sketch.
- c) Describe Axes nomenclature for CNC turning centre and CNC milling centre.

P.T.O.

6. Attempt any TWO of the following:

- a) Draw setup diagram and give details of following process control parameters of Electro Discharge Machining (EDM).
- i. Discharge current range.
 - ii. Voltage range
 - iii. Type of dielectric
 - iv. Type of electrode material
- b) Apply simple (plain) indexing method for indexing 30 divisions use number of holes on plate 1, or plate 2 or plate 3 as given below. Reduction ratio of worm gear is 40:1.
- Plate 1 → 15, 16, 17, 18, 19, 20
Plate 2 → 21, 23, 27, 29, 31, 33
Plate 3 → 37, 39, 41, 43, 47, 49
- c) Justify the need of gear finishing. Demonstrate any one gear finishing process with important process parameters.
-