22563

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

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.

Marks

2. Attempt any THREE of the following: **12**

a) Explain with the neat sketch working principle of Abrasive Jet Machining.

b) Draw the neat sketch of Column and Knee type of milling machine. State the function of each part of the machine.

c) Describe the concept of cutter radius compensation for CNC machine with suitable example.

d) Justify the need of virtual simulation of CNC machine.

3. Attempt any THREE of the following: **12**

a) Explain with the neat sketch any one type of gear hobbing process.

b) Compare CNC (Computerized Numerical Control) machine with DNC (Direct Numerical Control) machine.

c) Explain the term preparatory function and miscellaneous function in the context of CNC part programming.

d) "Pneumatic actuators are widely used in Robotics." Justify.

4. Attempt any THREE of the following: **12**

a) Compare gear hobbing process with gear shaping process (Atleast four points)

b) Explain working and importance of re-circulating ball screw used in CNC machine.

c) 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) = 90 m / min.
Assume suitable data if required.

Marks

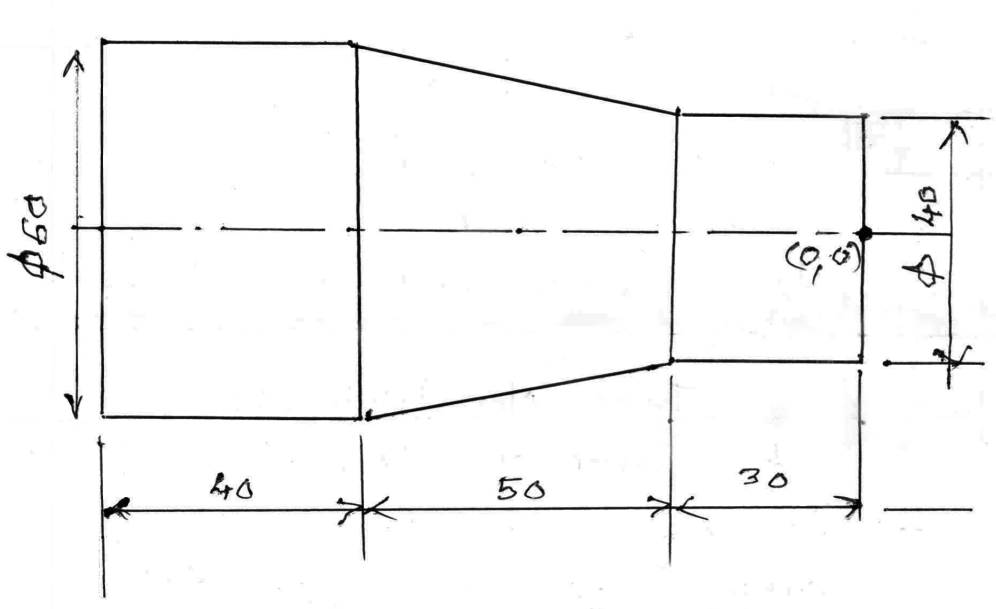

Fig. No. 1

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 todays 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 ϕ = 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.

Marks

6. Attempt any TWO of the following: **12**

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 $\rightarrow$ 15, 16, 17, 18, 19, 20
   Plate 2 $\rightarrow$ 21, 23, 27, 29, 31, 33
   Plate 3 $\rightarrow$ 37, 39, 41, 43, 47, 49

c) Justify the need of gear finishing. Demonstrate any one gear finishing process with important process parameters.