C 21450   (Pages : 2)   Name.................................
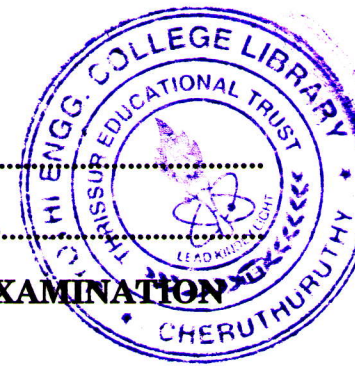
Reg. No................................

EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION APRIL 2017

EE 09 804 L 24—MECHATRONICS

(2009 Admissions)

Time : Three Hours   Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. List any four advantages of NC machine.

2. Mention any four methods of improving machine accuracy and productivity.

3. What are flip-flops ?

4. 'Computer aided programming is the need of the hour'- justify.

5. Classify the types of robotic end effectors.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain the considerations in design of NC machines.

7. Compare the suitability of AC and DC motors for machine tools.

8. Explain the different tape programming formats.

9. With an example, elaborate on contour programming.

10. Elaborate on the significance of resolution and repeatability in robot manipulators.

11. Explain the lead through programming of robots highlighting their advantages.

(4 × 5 = 20 marks)

Part C

Answer **all** *the questions.*

12. (a) With suitable examples, illustrate open and closed loop systems.

Or

(b) Write short notes on (i) Scope of mechatronics in manufacturing ; (ii) point to point NC system and absolute programming method.

(5 + 5 = 10 marks)

Turn over

13. (a) Explain the working of resolver and inductosyn.

Or

(b) Explain any two interpolation techniques in a CNC machine.

14. (a) Write a CNC program to machine the part as shown in Fig. 1. The raw material provided is of ϕ 40 mm and length 100 mm. Assume any missing data appropriately.
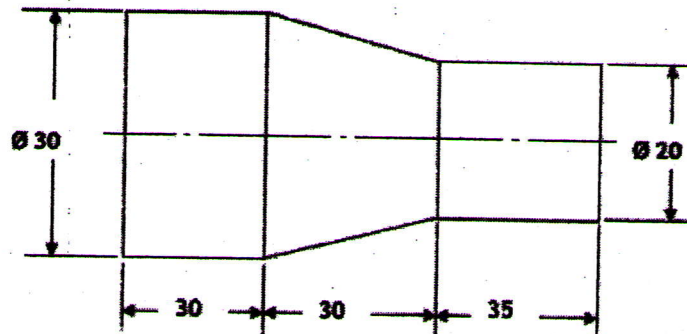
(All dimensions are in mm).

Fig 1. Part to be machined

Or

(b) Explain the geometry statements and motion commands used in APT language using appropriate examples.

15. (a) Explain the configuration of a spherical robot with a neat sketch. Also, list their advantages and limitations.

(7 + 3 = 10 marks)

Or

(b) The force exerted on the end effector of a robot is to be found. Suggest any two sensors to determine the force exerted and explain its working principle.

(5 + 5 = 10 marks)

[4 × 10 = 40 marks]