Roll No .....

MMPD - 301(A)

M.E./M.Tech., III Semester

Examination, December 2015

Mechatronics and Flexible Manufacturing

(Elective-I)

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) All parts of each question are to be attempted at one place.

1. a) Discuss the objectives, scope, characteristics and problems associated with the applications of Mechatronics concerned with manufacturing automation.
   b) Discuss the similarities and dissimilarities between Flexible Manufacturing System (FMS) and Computer Integrated Manufacturing System (CIMS).

2. a) Discuss in detail about the design criterion of CNC based machines.
   b) i) Write the criteria of tool selection for CNC machines.
      ii) Give the advantages of CNC over conventional methods.

3. a) What are the different types of tool magazines and how Automatic Tool Changer (ATC) is incorporated in CNC machines for tool change?
   b) What are the selection criteria for spindle, spindle bearing and feed drives for good designing of CNC machines?

4. a) What is Programmable Logic Controllers (PLCs)? How it is conceptualized for designing variety of CNC machines?
   b) Discuss the following with respect to design of CNC machines :
      i) Measurement and Control Systems
      ii) Gauging and Tool Monitoring Systems

5. a) Explain the concept, working principle, advantages and limitations of Direct Numerical Control (DNC).
   b) Enlist the inspection and testing criterion before installation and erection of CNC Machines.

6. a) Describe the configuration and structural details of a CNC based System giving its schematic layout.
   b) Give short notes on the following :
      i) Importance of Software Interface between users and CNC
      ii) Measures to be taken for safe operation of CNC Machines.

7. a) What is Part Programming? Also discuss Manual Part Programming and Computer Aided Part Programming.
   b) Discuss the structure of Part Programme. What are the G, M, N, S, F and T codes and for what purpose they are used?

8. a) Discuss the following Control Systems used in NC / CNC / DNC :
      i) Point-to-Point System and Straight Line System (for Position Control)
      ii) Open Loop System and Closed Loop System (for Tool Control)
   b) Give short notes on the following :
      i) Automatically Programmed Tooling (APT) Language
      ii) Computer Aided Part Programming using UNIGRAPHICS

******