

**AQ – 2848**

**Second Semester M. E. (Mech.) (Thermal Engg.) Examination**  
**(Elective-II)**

**MECHATRONICS**

**Paper - 2 MTE 5**

**P. Pages : 3**

**Time : Three Hours]**

**[Max. Marks : 80**

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- Note :** (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and separate answer-book must be used for Section A & B in Pharmacy and Cosmetic Tech.  
(2) Answer **Three** questions from Section A and **Three** questions from Section B.  
(3) Due credit will be given to neatness and adequate dimensions.  
(4) Assume suitable data wherever necessary.  
(5) Illustrate your answer necessary with the help of neat sketches.

**SECTION A**

1. (a) What do you understand by spindle drive and feed drive in CNC M/cs. Briefly explain various electrical motors used in machine tools, with its applications. 7  
(b) What is purpose of diagnostics in CNC m/cS ? How is it achieved ? 6
2. (a) Sketch a typical computer process monitoring and control system showing various interfaces. 8  
(b) What is PLC, ? How does it differ from microprocessor and micro controller ? Explain PLC with neat sketch. 6
3. (a) With the help of schematic diagram explain the mechatronic systems involved in a modern CNC machine. 7

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- (b) Explain following capabilities of computer process control :—
- (i) Interlocks.
  - (ii) Interrupt system.
  - (iii) Exception handling. 6
4. (a) List various methods for process control using computers. Explain 'Direct digital control'. 7
- (b) Compare contact and non contact type of sensors List both type of sensors. Explain various optical sensors. 6
5. (a) Explain proximity and displacement sensor with neat sketch of each. 7
- (b) Explain the supervisory computer control in detail. 6

### SECTION B

6. (a) Explain with sketch various feeding mechanisms used with automatic machines. 6
- (b) What are chutes ? Sketch following types of chutes and state its application :
- (i) Open for disc.
  - (ii) Closed for shaft.
  - (iii) Gutter chutes. 7
7. (a) What are the uses of magazine in material handling systems ? Explain various magazines with suitable sketch. 7
- (b) With neat sketch explain function of direction control valve used in hydraulic system. Enlist its various types. 6
8. (a) Regeneration circuit is used to speed up the operation of cylinder. If we want to control the speed. What changes in hydraulic circuit you will suggest ? Explain. 7

- (b) Design and explain pneumatic circuit for a two pressure in power chucking operation. 7
9. (a) Sketch a symbolic diagram of a typical pneumatic system. Explain the applications of each element. 6
- (b) With neat sketch explain the hydraulic circuit for speed control of bi-direction motor using bleed-off method. 7
10. (a) With neat sketch explain the construction and working of three way two position normally closed direction control valve. Represent this valve with its symbol. 7
- (b) Compare hydraulic and pneumatic systems. Explain FRL unit of pneumatic system with sketch. Draw its symbol. 6



