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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Applied Electronics and Instrumentation Engineering

AI 010 606 L 01—MECHATRONICS (Elective 1) (AI)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]



Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Briefly compare the Mechatronic approach to the conventional approach for system design.
2. What are the *three* types of buses in a microprocessor ?
3. Describe the working principle of a piezo-electric actuator.
4. What do you mean by micro-machining ?
5. What is the importance of modelling ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Identify the various Mechatronic components in an automatic washing machine.
7. Draw the circuit diagram of an Op-amp difference amplifier and design it for a voltage gain of 3.
8. Compare and contrast pneumatic and hydraulic systems.
9. What are the favourable factors which enable silicon to be used as the material for MEMS fabrication ? Explain.
10. For a simple mechanical translational system, obtain an electrical analogous circuit specifying all analogous quantities in F - I analogy.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. Explain the Mechanical system and control system in a real-life application system. Describe how these two components are interlinked.

Or

12. Draw and explain a generalised block diagram of a practical Mechatronic system.
13. Describe with suitable circuit diagrams, the different types of active and passive filters.

Or

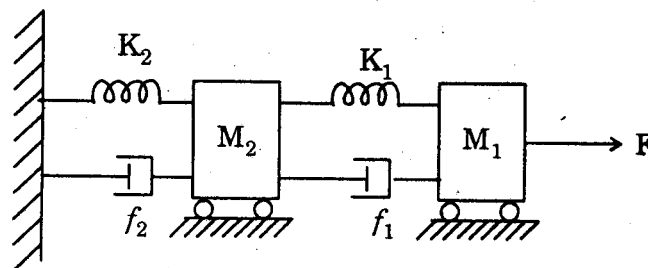
14. With a neat block diagram, explain a typical data logger which uses a micro-controller.
15. Describe the principle of different solid-state switches with typical circuit examples for each type.

Or

16. With neat diagrams explain the *three* different types of control valves used in actuation systems.
17. Describe the construction and working of a MEMS ink jet printer.

Or

18. What is a micro pump? Explain its constructional details. How reverse operation can be achieved?
19. For the Mechanical system shown below, write the differential equations describing its behaviour. Write the analogous electrical equations based on force-voltage analogy and draw the corresponding network:



Or

20. Obtain the various thermal system building blocks and model of a typical system using the same.

(5 × 12 = 60 marks)

