

Code: 9A03707

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

MECHATRONICS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Explain in-detail about object oriented language interface. How manipulation of data is possible?
(b) How was the discipline of mechatronics evolved? Explain the evolution stages.
- 2 (a) What are the various stages of digital signal processing? Explain.
(b) Discuss how amplification of signals using OP amps enhances the performance of control systems.
- 3 (a) Explain the steps involved in design considerations of a mechatronic system.
(b) Explain the different components of a hydraulic system. What are the advantages and disadvantages?
- 4 (a) Explain with neat sketches and block diagram the working of four stroke petrol engine with sensor interfacing.
(b) Compare the functions of series wound D.C. motors and shunt wound D.C. motors.
- 5 (a) Explain the term bouncing and de-bouncing as applicable to mechanical switches and mention the different methods to overcome this problem.
(b) Describe the following:
(i) Relay with drive circuit.
(ii) MOSFET circuit to control the DC motor.
- 6 (a) How analog to digital converters, function to control a mechanical system?
(b) Highlight the features of microcontroller programming. Give a suitable example.
- 7 (a) A work piece is loaded on a conveyor belt and it is operated between two limits of travel A and B. When the limit switch at station A is activated, the conveyor moves in the forward direction and at station B is activated, the conveyor moves in the reverse direction. Pressing the start button makes the motor to run in the forward direction and stop button makes the motor to stop. Draw a suitable ladder diagram and explain the same.
(b) Define PLC. Draw labeled block diagram of PLC.
(c) State the role of PLC matrix function in handling bulk data manipulations.
- 8 (a) Design a mechatronics system for a pick and place robot and explain the various mechatronics elements.
(b) How artificial intelligence helps in advanced mechatronic applications.
