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Question Paper Code : 81931

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh/Ninth Semester

Computer Science and Engineering

OMR 351 — MECHATRONICS

(Common to: Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Biomedical Engineering/Civil Engineering/Computer Science and Design/Computer Science and Engineering (Artificial Intelligence and Machine Learning/Computer Science and Engineering (Cyber Security)/Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Communications Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Environmental Engineering/Geoinformatics Engineering/ Industrial Engineering and Management/ Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/ Mechanical Engineering (Sandwich)/ Mechanical and Automation Engineering/ Medical Electronics/ Petrochemical Engineering/Production Engineering/Robotics and Automation/Safety and Fire Engineering/Agricultural Engineering/Artificial Intelligence and Data Science/Bio Technology/Biotechnology and Biochemical Engineering/Chemical Engineering/Chemical and Electrochemical Engineering/ Computer Science and Business Systems/Fashion Technology/Food Technology/ Handloom and Textile Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/ Textile Chemistry/Textile Technology

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write two factors that need to be considered in selecting a sensor for a particular application.
2. What is the working principle of an eddy current proximity sensor?
3. List four branch instructions of 8085.

4. What is meant by ALU? State its function.
5. What is an DAC interface?
6. What is the need of traffic control interface?
7. Draw a timing circuit that will switch on output for ON for 1 second then OFF for 20 seconds, then ON for 1 second, then OFF for 20 seconds and so on.
8. List the factors to be considered while selecting a PLC.
9. How is a traditional design of temperature control of domestic central heating system improved by mechatronics design.
10. Compare the AC and DC servo motor.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Classify transducers by function, performance and by output basis. (5)
(ii) Explain how displacement is sensed by LVDT. With neat sketch show how it can be made phase sensitive. (8)

Or

- (b) (i) Explain the emerging areas of the Mechatronics system with examples. (5)
(ii) What is RTD? Briefly explain the relationship between resistance and temperature for the RTD with temperature resistance curve. (8)
12. (a) List out the functions of the following signals of INTEL 8085 Microprocessor.
(i) READY, HOLD, HLDA, SOD (8)
(ii) Discuss the interrupt structure of 8085 Microprocessor. (5)

Or

- (b) Draw and explain the block diagram of 8085 micro processor.
13. (a) Write short notes on the following with neat figures.
(i) Interfacing 8-bit ADC to 8085 microprocessors. (7)
(ii) GPIB (6)

Or

- (b) (i) With a neat sketch, explain the working of the 8255 PPI. (7)
(ii) Explain how a 8255 PPI is interfaced to 8085. (6)

14. (a) Explain the following (i) Delay–Off Timer (ii) Delay – ON Timer (iii) Steady state error.

Or

- (b) Explain the following (i) Timers (ii) Counters and (iii) Internal Relays.
15. (a) (i) Device a car parking barrier system and write the appropriate PLC programming ladder diagram to execute the system. (7)
- (ii) Details about the various functional components in a wireless surveillance balloon system. (6)

Or

- (b) Design a mechatronics system for a ATM and explain in detail about the various Mechatronics elements present.

PART C — (1 × 15 = 15 marks)

16. (a) Design a mechatronics system for a Automatic Tool Changer of CNC machine and explain the various mechatronics elements.

Or

- (b) Device a circuit that could be used with a domestic washing machine to switch on a pump. To pump water for 100 s into the machine then switch OFF and switch ON a heater for 50 s, to heat the water. The heater is then switched OFF, and another pump is to empty the water from the machine for 100 s.

