

B.E. PRODUCTION ENGG. 2ND YEAR 2ND SEMESTER EXAMINATION - 2025

Subject : MICROPROCESSOR CONTROL AND MECHATRONICS

Time: 3 hours

Full Marks: 100

ANSWER ANY 10 QUESTIONS

- 1.a) What do you mean by a 'mechatronic' system? 4
- b) What do you mean by a closed loop control system? What are the advantages and disadvantages of closed loop control in comparison to open loop control? 6
- 2.a) What do you mean by (i) a sensor, and (ii) an actuator? 4
- b) What are meant by the following properties of a sensor?
(i) accuracy, (ii) resolution, and (iii) sensitivity 6
3. Explain the working principle of LVDT in measuring linear displacement. What is meant by sensitivity of LVDT? 9+1
4. Explain the working principle of an absolute encoder. What is the advantage of Gray code in such encoder? 7+3
- 5.a) Show that NAND gate is a universal logic gate. 5
- b) State and prove De-Morgan's theorems for multiple variables in general. 5
- 6.a) Explain the different methods of representing signed binary numbers with examples. 6
- b) Convert the following decimal numbers into 8-bit signed binary numbers using 2's complement representation:
(i) 113 (ii) -75 4

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- 7.a) What is the limitation of half adder? How is it overcome in full adder? 4
- b) Show a 4x1 multiplexer, and explain its operation. 6
8. Show a 4-bit controlled 2's complement adder-subtractor, and explain its operation. 10
- 9.a) What are the condition flags available in 8085 microprocessor, and what do they indicate? 5
- b) What addressing modes are used in the following 8085 instructions? 5
(i) LDA 4020 H (ii) ADD B (iii) SUB M (iv) MVI B, 56 H
10. Explain the different addressing modes for 8085 microprocessor with suitable examples. 10
11. Explain the operations performed by the following 8085 instructions (**any five**): 10
(i) MOV D, E (ii) STA 241A H (iii) LXI B, 1080 H
(iv) SUB B (v) ADI 2B H (vi) ADD M
12. Write an assembly language program for 8085 microprocessor to add the numbers in memory locations 4000 H and 4100 H, then to subtract the number in memory location 4200 H from the sum, and to place the final result in register D. 10