

Indian Maritime University
(A Central University, Govt. Of India)
End Semester Examination Dec-2019 / Jan-2020
B. Tech(Marine Engineering)
Semester -IV
Digital Electronics and PLC
UG11T3402

Date:02-01-2020

Max Marks: **70**

Time:3 Hrs

Pass Marks: **35**

Part – A (compulsory)

Answer the following (10x2=20 Marks)

- 1) Draw logic diagram of T flip-flop and give its truth table.
- 2) Define Resolution, Linearity of a Digital to Analog Converter.
- 3) Construct OR gate using NAND gate.
- 4) Define: (i) Address bus (ii) Data bus.
- 5) List the different addressing modes of 8085.
- 6) Define fan-in and fan-out of a gate.
- 7) State different PLC programming languages used.
- 8) What is an IC tester.
- 9) What is HMI?
- 10) State De-Morgan's theorem.

Part – B

Answer any 5 out of 7 questions (5 x 10= 50 marks)

- 11) a) Explain full adder with its logic diagram & truth table.
b) Draw block diagram of PLC. Explain function of CPU, memory. (5+5)
- 12) a) State maintenance guidelines for PLC.
b) Explain with block diagram principle of Digital Voltmeter (5+5)
- 13) a) Draw and Explain the circuit of binary weighted resistor digital to analog converter (DAC).
b) Explain with suitable circuit diagram and truth table for operation of J-K flip flop. (5+5)
- 14) a) Design 1:8 de multiplexer using 1:4 de multiplexer.
b) Write a program for 8085 microprocessor to Add the contents of memory locations 4000H and 4001H and place the result in memory location 4002H. (5+5)
- 15) a) Solve the following using K-map technique:
$$f(a, b, c, d) = \sum m(0, 2, 3, 5, 6, 7, 8, 10, 11, 14, 15)$$

b) Explain working of 2-bit ripple counter with diagram and truth table. (5+5)
- 16) a) Compare static and dynamic RAM.
b) List the salient features of Intel 8085 Microprocessor. (5+5)
- 17) a) Draw ladder diagram for 2 motor operation for following condition:
(i) Start push button start motor M1 & M2.
(ii) Stop push button stop motor M1 first & after 10 seconds motor M2.
b) Draw and explain SCADA architecture. (5+5)
