Indian Maritime University

(A Central University, Govt. Of India)

B. Tech. (Marine Engineering)

Semester IV

End Semester Examination June 2022

Digital Electronics and PLC
(UG11T3402)

Time: 3 Hours **Max Marks: 70**

Date: 03/06/2022 **Pass Marks: 35**

Part – A (Compulsory)

Q.1 Answer the following (10x1=10 Marks)

(I) What will be the output from a JK flip-flop if J=K = 1 and the clock is valid?

a) No change
b) Toggle between 0 and 1
c) 0
d) 1

(II) What determines the output from the combinational logic circuit in Digital Electronics?

a) Input signals from the past condition
b) Input signals at the present moment
c) Input signals from both past and present
d) Input signals expected in future

(III) Which of these sets of logic gates are known as universal gates?

a) XOR, NAND, OR
b) OR, NOT, XOR
c)NOR, NAND, XNOR
d)NOR, NAND

(IV) What is SCADA?

a) Software
b) Process
c) System
d) Hardware

(V) Find out the resolution of 8-bit DAC/ADC?

a) 562
b) 625
c) 256
d) 265

(VI) Which of the following is not a condition flag?
a) Trap flag
b) Auxiliary carry flag
c) Parity flag
d) Zero flag

(VII) . Which of the logic family uses FET as its switching element?
a) TTL
b) Diode logic
c)CMOS
d)None of the above

(VIII). CRO is used for measurement of _____
a) AC as well as DC current
b) AC current only
c) DC current only
d) AC power only

(IX) . Which of the following memories must be refreshed many times per second?
a) EPROM
b) ROM
c)Static RAM
d)Dynamic RAM

(X). _____is an 8-bit register for 8085 microprocessors.
a) Stack pointer
b) Accumulator
c)Program counter
d)Memory pointer

Part – B (Compulsory)

(5 x 2= 10 marks)

Q.2 Answer the following

(I). What is the function of carry flag?

(II). What is a Q meter?

(III). write two applications of flip flop.

(IV). Simplify using Boolean algebra $AB + A(B+C) + B(B+C)$

(V). Define: fan in of a Gate.

Part C – Answer any 5 out of 7 Questions
(05 X 10 Marks)

Q.3a) Give advantages of CMOS IC family. (5 M)

Q.3b) Define Resolution, Accuracy of a Digital to Analog Convertor. (5 M)

Q.4a) Explain the addressing modes of 8085 microprocessor with examples. (5 M)

Q.4b) Write a program of 8085 microprocessor to add the contents of memory locations 8000H and 8001H and place the result in memory location 8002H. (5 M)

Q.5a) Draw block diagram of PLC and explain each block in brief. (5 M)

Q.5b) Draw and explain one-bit half adder. (5 M)

Q.6a) Simplify the following using K map. f (A, B, C, D) = Σ m (7,8,9) +Σ d (10,11,12,13,14,15) (5 M)

Q.6b) Compare S-RAM and D-RAM. (5 M)

Q.7a) Draw and explain architecture of SCADA (5 M)

Q.7b) Construct 8:1 multiplexer from 4:1 multiplexer (5 M)

Q.8a) Explain Block diagram, operation of single slope type ADC. (5 M)

Q.8b) Explain the principle and working of Frequency meter. (5 M)

Q.9a) Draw and explain flag register of 8085 microprocessor. (5 M)

Q.9b) Design 3 bit binary to gray code converter (5 M)