END SEMESTER / RETEST EXAMINATION-2020

(New Syllabus)

Semester - 4th

Subject Code : ET- 403

DIGITAL ELECTRONICS

Full marks - Part-A + Part-B = 70

Time - Three hours

The figures in the margin indicate full marks for the questions.

All questions of PART - A are compulsory.
Answer any *five* questions from PART - B.

Part- A
Marks - 25

1. **Fill in the blanks with suitable words.** 10

a) A flip-flop can store a _____ bit.

b) A digital counter is used to count _____.

c) The flip-flop is the fundamental block of _____ logic circuits.

d) A NOR gate is equivalent to _____ AND gate.

e) In a multiplexer the output depends on its _____ inputs.

f) Latch is a device with _____ stable state.

g) If the input and output of a NOT gate is shorted then output will be _____.

h) In the negative logic system the more negative of the two logic levels represents a logic _____ state.

i) Logic gate operates on the principle of _____ algebra.

j) NAND gate is basically _____ gate followed by a NOT gate.

2. **Write TRUE or FALSE.** 10

a) The minimum number of flip-flips necessary to design a mod-10 counter is 4.

b) The maximum possible number of states in a ripple counter with 5 flip-flops is 15.

c) A universal shift register can shift from left to right.

d) A.0 = A.

e) AB + A = A.B.

f) De Morgan's first theorem is A. $\bar{A} = 0$.

g) In the expression A+BC, the total number of minterm will be 5.

h) A K-Map with 4 variable has 8 cells.

i) RAM is non volatile memory.

j) In R-2R ladder DAC four input resistor values are required.

3. **Specify the correct answer.** 5

a) A dynamic RAM can be fabricated using -

i) MOS technology ii) TTL iii) ECL iv) DTL

b) Memories are used in digital system to store -

i) Instructions ii) Data iii) Intermediate and Final result iv) All of these.

c) A data selector is also called a -

i) Demultiplexer ii)Multiplexer iii) Decoder iv) Encoder.

d) When J=K=1 in a JK Flip Flop the output is -

i) Set ii)Reset iii) Tristate iv) Toggle.

e) The fastest A/D convertor is -

i)Flash Type ii) SAR Type iii) Dual Slope Type iv) None of these.

Part-B

Marks - 45

4. **Convert the following:**

a) With the logic diagram and truth table define OR, AND, NOT gate. 6

b) Draw the logic circuit of OR, AND and NOT gate using NOR gate only. 3

5. a) Prove the following using Boolean algebra 4

i) $A + BC = (A+B)(A+C)$

ii) $(A+B)(\bar{A}+C) = AC + \bar{A}B$

b) Minimize the four variable logic function using K-map 5

$f(A,B,C,D) = \sum m(0,1,2,3,5,7,8,9,11,14)$

6. Define a decoder. Draw a BCD to Decimal decoder. Show how to convert the system into demultiplexer. Name two demultiplexer IC's. 1+4+2+2 = 9

7. a) What is flip flop and why it is used? 1+2 = 3

b) Explain R-S NOR flip-flop with circuit diagram and truth table 6

8. a) What is register? Classify the different types of register. 1+2 = 3

b) Explain a 4 bit ring counter with proper circuitry. 6

9. a) What is multiplexer? Why it is used? 1+2 = 3

b) Explain the 8:1 multiplexer with its equation and circuit diagram. 6

10. **Write short notes on any three:** 3x3 = 9

a) D/A converter.

b) Full subtractor.

c) ECL.

d) Semiconductor memories.

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