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C20-CM–302

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BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 2022

DCME - THIRD SEMESTER EXAMINATION

DIGITAL ELECTRONICS

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Convert $12.5_{(10)}$ into binary.

2. Give the table showing octal digits from 0 to 7 and binary values.

3. Define logic gate.

4. Construct OR gate from NOR gate.

5. Define flip-flop.

6. What is the need for master slave flip-flop?

7. Define a counter.

8. Define register.

9. State the importance of data selector.

10. List the applications of multiplexers.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* What is the value of *(i)* $10110011_{(2)}$ into decimal and *(ii)* $10101100_{(2)}$ into hexadecimal.

(OR)

(b) Give the steps in forming 8421 code and 2421 code for the values from 0 to 9, comment on how these two codes are different.

12. *(a)* Give the steps of how the Products of Sum (POS) method gives the Boolean expression of the below truth table :

A	B	C	Y
0	0	0	0
1	0	0	1
0	1	0	1
1	0	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

(OR)

(b) Give the steps of how the K-map reduces the given expression $Y = \Sigma m(3,5,6,8,10,11,14)$.

13. *(a)* Give the reasons for supporting the statement RST flip-flop is more suitable than RS flip-flop with truth table.

(OR)

(b) Give reasons why flip-flop is more suitable than NAND latch with diagrams.

14. *(a)* Give the steps to modify the synchronous counter as mod-10 counter with waveforms and truth table.

(OR)

(b) Draw the circuit diagram of a register that takes data in serial and takes out data in serial with working principle and steps for processing the data.

15. *(a)* Suggest the name of a decoder for transmitting 10 outputs with the 4line controllers with proper explanation.

(OR)

(b) Recommend a multiplexer using which 8 inputs are transmitted on a line with proper explanation.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and criterion for valuation is the content but not the length of the answer.

16. Construct a 4-bit adder for adding two numbers at a time, by using two half adders for adding bits at each column of two numbers.

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