7235

C20-CM–302

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BOARD DIPLOMA EXAMINATION, (C-20)

MAY—2023

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 $746_{(8)}$ into decimal.

2. What is the importance of parity bit?

3. Draw the symbols and truth tables of basic gates.

4. List various postulates of Boolean algebra.

5. Classify different logic families.

6. Differentiate between level clocking and edge triggering.

7. State the need for preset and clear inputs.

8. Classify registers based on data I/O.

9. List any three applications of decoders.

10. List the applications of multiplexers.

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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)* Convert the given numbers into decimal *(i)* $2B8_{(16)}$ and *(ii)* $746_{(8)}$.

(OR)

(b) Explain the use of alphanumeric codes *(i)* ASCII and *(ii)* EBCDIC.

12. *(a)* Give the steps of how the K-map reduces the given expression

$$Y = \Sigma m\ (1, 2, 3, 5, 6, 7, 8, 13).$$

(OR)

(b) Draw and explain 4-bit parallel adder using full adders.

13. *(a)* Draw the logic diagram, truth table and timing diagram for an edge triggered JK flip-flop. Explain its operation.

(OR)

(b) Draw the logic diagram, truth table and timing diagram for a SR flip-flop. Explain its operation.

14. *(a)* Write the steps to modify the UP counter to measure both UP and DOWN with truth table.

(OR)

(b) Draw and explain the working of 4-bit shift left register with timing diagram.

15. *(a)* Recommend an encoder for transmitting 3 outputs with the 8 line controller with proper explanation.

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(OR)

(b) Recommend a multiplexer using which 4 inputs are transmitted on a line with proper explanation.

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PART—C

10×1=10

Instructions : (1) Answer the following question.

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

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

16. Design a circuit that has a 3-bit binary input and a single output z specified as follows :

z = 0 when the input is less than 5_{10}

z = 1 otherwise

(a) Write the truth table.

(b) Derive Boolean expression from truth table.

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