7241

C20-EC–303

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DECE - 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 the following :

(a) $(357)_8$ to decimal

(b) $(A3)_{16}$ to decimal

(c) $(65)_{16}$ to binary

2. Perform the following binary subtraction using 2's complement method :

$$(1111)_2 - (1001)_2$$

3. Realize AND, NOT gates with NAND gate.

4. Classify different logic families.

5. Draw the full adder circuit diagram.

6. Compare serial and parallel binary adders.

7. Draw the circuit symbols of active high enable, active low enable tri-state buffer.

8. Compare asynchronous and synchronous counters.

9. State the need for preset and clear inputs.

10. Define access time, word length and memory capacity of memories.

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)* Explain the working of open collector TTL NAND gate with a circuit diagram.

(OR)

(b) Explain the working of totem-pole output TTL NAND gate with a circuit diagram.

12. *(a)* Explain 4×1 multiplexer with logic circuit diagram.

(OR)

(b) Explain BCD-to-decimal decoder with a circuit diagram.

13. *(a)* What is race-around condition problem? Explain how to eliminate this problem using master-slave JK flip-flop with a circuit diagram.

(OR)

(b) Explain the working of 3-bit asynchronous counter with circuit diagram and draw the timing diagram.

14. *(a)* Explain the working of 4-bit shift right register with a circuit diagram.

(OR)

(b) Explain 4-bit ring counter with a circuit diagram.

15. *(a)* Explain the working of diode ROM with suitable circuit diagram.

(OR)

(b) Explain the working of static MOS RAM cell with a circuit diagram.

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. Simplify the following Boolean expression using K-map and by using Boolean postulates. Compare the result in two methods.

$$X = \bar{A}.\bar{B}.\bar{C} + \bar{A}.\bar{B}.C + \bar{A}.B.\bar{C} + \bar{A}.B.C$$

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