7241

BOARD DIPLOMA EXAMINATION, (C-20)
JUNE/JULY—2022

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 gray code 101011 into its binary equivalent.

2. State De-Morgan's theorems.

3. Draw the symbols for AND, OR, and NOT gates.

4. Classify different logic families.

5. Construct half-adder using only NAND gates.

6. Mention any three applications of multiplexer circuit.

7. Explain the need for a tri-state buffer.

8. List any three applications of shift registers.

9. Draw the logic diagrams of D and T flip-flops.

10. State any three uses of SD card.

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 with circuit diagram the working of open collector TTL NAND gate.

(OR)

(b) Explain with circuit diagram the working of CMOS NAND gate.

12. (a) Explain the working of 4×1 multiplier with circuit diagram.

(OR)

(b) Explain the operation of full-adder with truth table.

13. (a) Explain the working of 4-bit shift left register with a circuit diagram.

(OR)

(b) Explain with circuit diagram the working of synchronous decode counter.

14. (a) Explain the NAND and NOR latches with truth tables.

(OR)

(b) Explain the working of 4-bit asynchronous counter with circuit diagram and timing diagram.

15. (a) Explain the working of basic dynamic MOS RAM cell with circuit diagram.

(OR)

(b) Compare static RAM with dynamic RAM.

PART—C 10×1=10

Instructions : (1) Answer the following question.

(2) Question carries **ten** marks.

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

16. A chemical factory has a microprocessor-controlled alarm to activate under certain conditions of temperature (T), pressure (P) and fluid level (F). Design a logic circuit to notify the microprocessor to activate the alarm if any of the following conditions satisfy :

   (a) Temperature and pressure are high.

   (b) Temperature and fluid level are low.

   (c) Pressure and fluid level are high.

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