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C14–EC–305

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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2018

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 binary numbers into decimal number :

(a) $(1101\ 101)_2$

(b) $(101101\ 11)_2$

2. State any three postulates in Boolean algebra.

3. Draw the symbols of basic logic gates.

4. Define the terms 'propagation delay' and 'power dissipation'.

5. Compare the performances of parallel adder and serial adder.

6. Write any three applications of decoder.

7. Explain race-around condition in flip-flops briefly.

8. Construct JK flip-flop using SR flip-flop.

9. State the need for a register.

10. Define the following terms related to memory :

(a) Read operation

(b) Write operation

(c) Access time

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

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

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

11. Perform subtraction of given binary numbers using 1's and 2's complement methods : 5+5

(a) 1110–1001

(b) 0101–1101

12. *(a)* State and prove De Morgan theorems. 3

(b) Simplify the Boolean expression $Y(A, B, C)$ $m(1, 3, 4, 6)$ using K-map and draw the logic circuit after reduction of Boolean expression. 7

13. Draw and explain the working of CMOS NAND gate with circuit. 10

14. *(a)* Draw and explain 4-bit parallel adder using full adders. 7

(b) Draw the logic diagram of 4×1 multiplexer circuit. 3

15. *(a)* Draw the full-adder circuit and explain its operation with truth table. 7

(b) State the need for a tristate buffer. 3

16. Explain the level clocked D and T flip-flops with the help of truth tables and circuits and timing diagrams. 10

17. *(a)* Explain the working of 'parallel in parallel out' shift register with a circuit. 7

(b) List four applications of shift registers. 3

18. *(a)* Draw and explain the working of 4-bit asynchronous counter with a circuit. 7

(b) Compare static RAM and dynamic RAM. 3

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