Reg. No…….. Name……

B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER 2017

SEMESTER **–5: PHYSICS (CORE COURSE)**

COURSE: **15U5CRPHY08: DIGITAL ELECTRONICS**

(For Regular 2015 admission)

Time: Three Hours Max. Marks: 60

PART A (Very short answer questions)

*Answer **all** questions. Each question carries 1 Mark*

1. The decimal equivalent number of the binary number 0.110 is _____
2. What is duality theorem in Boolean algebra?
3. What is the binary equivalent of the decimal number 0.85?
4. Draw the logic symbol and truth table of XOR gate.
5. Why NAND gate is known as a universal gate?
6. The flip flop is known as a memory element. Why?
7. Define the 'fan out' of an IC?
8. What is a demultiplexer?
9. Why asynchronous counters are named so?
10. How can you convert a JK flip flop to a T flip flop? (1 x 10 = 10)

PART B (Short answer questions)

*Answer **any Seven** questions. Each question carries 2 Marks*

11. What is meant by radix of a number system? Explain the concept using a hexadecimal number.
12. Implement the logic gates for the following expressions:

    (a) ABC + $\overline{C}D$ (b) $A\overline{B}C + D\overline{E}FG$
13. Using Karnaugh map simplify the following expression to their minterms sum of product form

    X= $\overline{A}\overline{B} + A\overline{B} + AB$
14. How a NOT gate is constructed using a transistor, resistors and a voltage source?
15. Write a comparative note on MOS and CMOS logic families.
16. What is a half adder? In what feature(s) is it different from a full adder?
17. What is an encoder? Draw the logic symbol of a 8 to 3 encoder.
18. How the racing condition avoided in MSJK flipflop?
19. What is the difference between a DAC and a ADC? (2 x 7 =14)

PART C (Problem/Derivations)

*Answer **any Four** questions; each question carries 4 marks*

20. Do the necessary arithmetical operations for the following decimal numbers after converting them to binary numbers. Express the answers as binary numbers

    (a) 4.25+7.75 (b)7.25-4.50 (c) 15x11 (d) 15÷6

21. Simplify the following using Boolean algebra

    (a) $(A+B)\left(A+\overline{B}\right)$ (b) $(A+B)\left(A+\overline{B}\right)\left(\overline{A}+\overline{C}\right)$

22. (a) Convert the following expression to the other conical form

    F = ∑m (1,4,5,6,7)

    (b) Draw the general format of 3 and 4 variable Karnaugh maps.

23. Draw the logic circuit, logic symbol and truth table of a T flip flop.

24. With a neat diagram, explain the working of a 4 bit parallel adder.

25. Describe the working of a 1 to 4 demultiplexer. (4 x 4 = 16)

PART D (Long answer questions)

*Answer **any two** questions; each question carries 10 marks*

26. Discuss the 1's complements and 2's complements methods of binary subtraction. Do the following Subtractions using 1's complement and 2's complement methods

    (a) 12 - 10 (b) 25 -18 (c) 30 -- 20

27. Discuss in detail the Logic symbol, Truth table and Logic expression of the following gates

    (a) AND (b) OR (c) NOT (d) NAND (e) NOR (f) XOR (g) XNOR

28. Discuss the construction and working of a ladder type DAC.

29. Draw the logic circuits, logic symbols and truth tables of the following flip flops

    (a) RS (b) clocked RS (c) D (d) JK (e) T

(10 x 2 = 20)

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