B. Sc. DEGREE END SEMESTER EXAMINATION -OCT. 2020: JANUARY 2021

SEMESTER –5: PHYSICS (CORE COURSE)

COURSE: **15U5CRPHY08: DIGITAL ELECTRONICS**

(Common for Regular 2018 admission & Improvement 2017/Supplementary 2017/ 2016/2015 admissions)

Time: Three Hours   Max. Marks: 60

PART A (Very short answer questions)

Answer all questions. Each question carries 1 Mark

1. *What is the decimal equivalent of octal 20?*
2. BCD Code for 9 is ……………………
3. Draw the symbol of a 2 input NAND gate.
4. Explain duality theorem.
5. What are universal gates?
6. Write down the truth table for a half adder.
7. What is meant by a buffer register?
8. Write any two applications of multiplexers.
9. How decoders are useful in electronics?
10. Draw the logic circuit of a half subtractor.   (1 x 10 = 10)

PART B (Short answer questions)

Answer any Seven questions. Each question carries 2 Marks

11. Convert the decimal number 348 into its equivalent binary and hexadecimal number
12. Apply De-Morgan's theorem to $\overline{A + \bar{B}}$ and $\overline{ABC}$
13. Draw the Karnaugh map for the function $\bar{X}$YZ +XYZ.
14. Draw the logic circuit for the realization of the OR operation using NOR gates only.
15. Explain the operation of a T filp flop.
16. How can you construct a binary counter?
17. Explain the operation of a four bit adder.
18. How many select lines are required for a 1 to 8 de-multiplexer? Explain
19. For a JK flipflop J = 0, K=1 what would be the output after a clock pulse?

                                                                                                        (2 x 7 = 14)

PART C (Problem/Derivations)

Answer any Four questions; each question carries 4 marks

20. Subtract 1001010_2 - 10100_2 and add 111001_2 + 101001_2
21. Write down the four Huntington postulates of Boolean algebra.
22. Prove that A+ $\overline{A}$ B = A+B
23. Draw the diagram of a Mod-8 ripple counter and explain the operation.

24. Give the circuit diagram of a 4 bit R-2R DA converter and explain its working.
25. Briefly explain Parallel in – Serial out and Serial in – Serial out registers.

$$(4 \times 4 = 16)$$

PART D (Long answer questions)

Answer any two questions; each question carries 10 marks

26. Give an account of the working of shift register. List out the various shift register.
27. Draw the logic diagrams and explain the working of 8-to-1 demultiplexer.
28. Convert (a) 0.35_{10} to octal number (b) $BA6_{(16)}$ to binary equivalent (c) 177_{10} to its eight-bit binary equivalent by first converting to octal.
29. Construct truth table and draw the logic circuit for the Boolean expressions
    (a) A+B+C (b) AB+BC+CA (c) ABC (d) (A+B)(B+C)(C+A)

$$(10 \times 2 = 20)$$

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