

B. Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2019**SEMESTER –5: PHYSICS (CORE COURSE)****COURSE: 15U5CRPHY08: DIGITAL ELECTRONICS**

(Common for Regular 2017 Admission & Improvement 2016/Supplementary 2016/2015 Admissions)

Time: Three Hours

Max. Marks: 60

PART – A (Very Short answer questions)**Answer all the questions. Each question carries 1 mark**

1. Convert $(10.6875)_{10}$ to an equivalent base 2 number.
2. Determine the base of the numbers in the following operation to be correct: $54/4 = 13$.
3. Give the truth table of XNOR gate.
4. Find the complement of the function $F = x'yz' + x'y'z$.
5. Construct an OR gate using NAND gates.
6. What are maxterms?
7. How many flip-flops are required for storing 32 bits of information?
8. What is a half subtractor?
9. What is mod-N counter?
10. Describe shift registers. (1 x 10 = 10)

PART – B (Short answer questions)**Answer any Seven questions. Each question carries 2 marks**

11. The solutions to the quadratic equation $x^2-11x+22=0$ are $x=3$ and $x=6$. What is the base of the numbers?
12. State and explain duality theorem.
13. Write the laws of Boolean algebra.
14. What is K-map? Explain the advantages of K-map.
15. What is the logic levels used in TTL logic system?
16. Distinguish between combinational and sequential digital systems.
17. What are the differences between synchronous and asynchronous counters?
18. Describe the operation of half adder.
19. Explain T flip-flop. (2 x 7 = 14)

PART – C (Problem/Derivations)**Answer any Four questions. Each question carries 4 marks**

20. What is a BCD code? Explain its with examples. What are its advantages and disadvantages?
21. Express the Boolean function $F = A+B'C$ as a sum of minterms and draw the gate implementation of the function in terms of sum of minterms.
22. Simplify the Boolean expressions:

- (a) $AB + \overline{AC} + \overline{ABC}(AB + C) = 1$
 (b) $(A + B)(\overline{A} + C)(B + C) = (A + B)(\overline{A} + C)$

23. Give the operations of MSJK flip-flop. How it eliminates the race-around condition?
 24. Explain the working of a 4-bit binary adder.
 25. Explicate the operation of a demultiplexer. (4 x 4 = 16)

PART – D (Long answer questions)

Answer any Two questions. Each question carries 10 marks

26. (a) Explain subtraction with 2's complement method.
 (b) Subtract the following using 1's complement method:
 (i) $1011.11 - 1001.1$ (ii) $100.0101 - 111011.11$
 (c) Convert $(2598.675)_{10}$ to hexadecimal
 (d) Convert $(378.93)_{10}$ to octal
27. Given the expression $F = \overline{AC} + \overline{AB} + \overline{ABC} + BC$, obtain the simplified expression in
 (a) Express this function as sum of minterms
 (b) Find the minimal sum-of-products expression using Karnaugh map. Also draw the gate implementation of the simplified function
28. With the logic diagram explain 4 bit adder – subtractor.
 29. Explain the working of 4-bit shift register operates in serial in – serial out mode. (10 x 2 = 20)
