PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2019
(Fifth Semester)

Branch – PHYSICS

PRINCIPLES OF DIGITAL ELECTRONICS

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 x 2 = 20)

1   State the Boolean laws for the AND operation.
2   What do you understand by the terms sum-of-products and product-of-sums? Give one example for each.
3   What is the acronym for ASCII Code? What is its purpose?
4   Convert $FFAOH = (\ )_2 = (\ )_8 = (\ )_{10}$.
5   The 1's complement of $(11001011)_2 = ?$
     The 2's complement of $(10110010)_2 = ?$
6   How many gates are involved in a half subtractor? What are their actions?
7   Which shift register performs both shift left and shift right operations? Give one example for this operation.
8   How many flip flops are required for constructing MOD – 5 counter? How many states are skipped during the operation? Why?
9   What is the difference between ROM and PROM? How you can signify both?
10   Which hardware components is best suited for digital to analog conversion? Why? How?

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a   What does AND, OR and NOT operations represent in the digital logic circuits? Explain with their truth tables and symbolic representations.
                              OR
    b   State and prove DeMorgan's theorem.

12 a   What is meant by Demultiplexing? Explain a 16-1 demultiplier.
                              OR
    b   Convert $(945)_{10} = (\ )_8 = (\ )_{16}$.
        Convert $(11010110)_2 = (\ )_{10} = (\ )_{16}$
        Convert to excess 3 code = $(1011)_2 = (\ )$excess 3
        Convert to Gray Code $(10110110)_2$
        Convert to binary (01110110) gray code.

13 a   How to perform a 3-bit arithmetic addition and subtraction? Explain using Full adder and subtrator circuits.
                              OR
    b   What is the purpose of a Schmitt Trigger? Explain its working with the necessary circuit diagram.

14 a   With a neat logic circuit diagram explain a 4-bit serial IN serial OUT shift register.
                              OR
    b   What is the action of decoding gates in asynchronous counters and synchronous counters? Explain.

15 a What does EPROM signify? How does it work? Explain with proper diagrams.

OR

b Explain the counter method of A/D conversion. Draw circuits wherever required.

SECTION - C (30 Marks)
Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 State the various boolean laws and theorems. Apply the laws to simplify the following expression by Karnaugh mapping, draw AND – OR logic gates.

$$Y = A \bar{B} \bar{C} \bar{D} + \bar{A} B \bar{C} \bar{D} + \bar{A} \bar{B} C \bar{D} + \bar{A} B \bar{C} D$$

17 What are Encoders, Parity generators/checkers? Explain with examples.

18 What is a Flip Flop? Explain a RS flip flop and a JK master /slane flip flop with suitable circuits and truth tables.

19 Explain the action of a 8-bit ring counter. Draw a neat logic diagram and wave form representation.

20 Draw the binary ladder network for the digital to Analog conversion and explain the ladder in steps.

Z-Z-Z   END