PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2017
(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   ($10 \times 2 = 20$)

1. Give the truth table and Boolean expression for a two input i) OR gate and ii) the AND gate.
2. Prove that $A + A B = A + B$.
3. Convert $(52)_{10}$ to its equivalent binary number.
4. Convert $(45.6)_8$ to decimal.
5. Calculate $(-21) - (-19)$ using 2's complement arithmetic method. *
6. a) Add the binary 1011 and 1001 (b) Subtract the binary 1101 from 1111.
7. What is a shift register? Give any two uses of it.
8. What is meant by asynchronous counter?
9. What are ROM and RAM?
10. Give any two difference between D / A and A/D converters.

SECTION - B (25 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks ($5 \times 5 = 25$)

11. a ' State and prove Demorgan's theorems.
    OR
    b Simplify the expression $Z = \bar{A} BC + A\bar{B} C + ABC + ABC$
    implement the result using NAND gates.

12. a Explain the operation of a seven segment decoder.
    OR
    b Describe the function of a Demultiplexer.

13. a What is Schmitt trigger? Explain how Schmitt trigger could be constructed using op amp? Obtain an expression for its hysteresis voltage.
    OR
    b Describe the construction, working and use of D flip flop. Give its truth table.

14. a Describe the Mod 3 counter with necessary diagram.
    OR
    b Draw the circuit of a ring counter and discuss its working.

15. a Explain the simultaneous method of A/D conversion.
    OR
    b Write a note on variable resistor network.

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

16. Using Karnaugh map, simplify the Boolean function.
    $F = \Sigma m (0, 1, 2, 3, 11, 12, 14, 15)$ Implement the result using logic gates.
17. Explain the Excess —3 code and the Gray code with examples.
18. Explain, the action of JK flip flop, giving truth table. What are its draw backs? What is meant by toggling?
19. Discuss the serial in parallel out and parallel in parallel out shift registers.
20. Explain with relevant diagram the function of binary ladder type D 'A converter