

**PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION DECEMBER 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 (10x2 = 20)**

- 1 Name the fundamental digital logic circuits which perform various logic operations. Highlight the output of any one of them.
- 2 State the basic AND law in logic circuits. Write the Boolean expressions for the same.
- 3 What are Encoders? What is the purpose of Encoders?
- 4 Arrive at the equivalents:  
**(1025)<sub>10</sub> = (h = C h = ( )i6-**
- 5 What is the purpose of an Ex-OR operation in the adder circuits? Draw a simple logic circuit for a half adder and tabulate its true outputs.
- 6 What is a flip flop? What is its action?
- 7 List two differences between an Asynchronous counters and synchronous counters.
- 8 What is the difference between a serial data transfer and a parallel data transfer? Which register allows the data output both serially and parallelly?
- 9 What do you understand by the acronyms ROM, PROM and EPROM?
- 10 Which are the basic circuits involved in the D/A and A/D conversion and why? Give a simple reason.

**SECTION - B (25 Marks)**

Answer **ALL** Questions

**ALL Questions Carry EQUAL Marks (5 x 5 = 25)**

- 11 a State Double inversion theorem. State and prove De Morgan's theorems.  
OR  
b How to draw the Karnaugh mapping? What are pairs, quads and octets in the mapping? Explain with an example for each.
- 12 a What are parity generators and parity checkers? Explain its importance in a digital circuit.  
OR  
b Why do we need the ASCII code, Excess 3 codes and gray code? Explain its purpose with an example.
- 13 a What are signed and unsigned binary numbers? Give examples. Subtract by 2's complement method:  
(i) 10101001 - 01111011 (ii) 01110111 - 10010110  
OR  
b What is the purpose of a Schmitt trigger in a electronic circuit? Discuss its function with a neat circuit diagram.

**Cont...**

14 a With a neat logic circuit diagram of a shift register explain an eight - bit (8-bit) serial IN serial OUT shift register.

OR

b How many flip flops are required to realize a MOD - 3 counting? Explain a MOD-3 counter with circuit, tables and waveforms.

15 a What are the salient features of RAM? Explain a dynamic RAM.

OR

b With a neat variable resistor network, how one can achieve the D/A conversion? Explain with suitable circuits.

### **SECTION - C (30 Marks!**

Answer any **THREE** Questions

**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 State all the Boolean laws. Simplify the following using Karnaugh mapping and draw suitable circuits using AND, OR gates.  

$$Y = ABCD -t- A BCD + AB CD + A B C D + A B C D + A B C D .$$
- 17 What are multiplexes? What are their importance? Explain a 1 to 16 multiplexer with a neat circuit diagram.
- 18 Distinguish between a RS flip flop and a JK flip flop. Explain a RS flip flop and a D flip flop with truth tables.
- 19 Explain a MOD - 5 counter with relevant circuit and waveforms. Tabulate the true output conditions.
- 20 Discuss the A/D conversion in detail by the simultaneous conversion method. Draw suitable diagrams and output conditions.

Z-Z-Z

END