

Sixth Semester B. Sc. Examination

Under CBCS

Wednesday, 3<sup>rd</sup> April 2019

Time : 10:00 am To 01:00 pm

Subject : PHYSICS [ US06CPHY05]

Digital Electronics, Electronic Communication &amp; VLSI Technology

Total Marks : 70

(31/A-12)

Que.-1 To answer the MCQs choose the correct option.

(10)

1. \_\_\_\_\_ gate is equivalent to NAND gate.  
(a) Bubbled OR (b) Bubbled AND (c) Exclusive-OR (d) Exclusive-NOR
2. A string of 8 bits is called \_\_\_\_\_.  
(a) nibble (b) byte (c) bit (d) base
3. The Boolean expression for Exclusive-OR gate is given by  $Y =$  \_\_\_\_\_.  
(a)  $AB + \overline{AB}$  (b)  $\overline{AB} + AB$  (c)  $\overline{A}B + A\overline{B}$  (d)  $\overline{AB} + \overline{BA}$
4. A flip-flop is a device with \_\_\_\_\_ stable states.  
(a) one (b) two (c) three (d) none of these
5. In RS-flip flop, input labelled "S" stands for \_\_\_\_\_.  
(a) systematic (b) static (c) stable (d) set
6. An 8-bit ripple counter requires \_\_\_\_\_ flip-flops.  
(a) 8 (b) 16 (c) 32 (d) 4
7. For ideal amplitude modulation process value of modulation index \_\_\_\_\_.  
(a)  $m > 1$  (b)  $m < 1$  (c)  $m = 1$  (d)  $m = 0$
8. In an AM wave, the majority of the power is in \_\_\_\_\_.  
(a) Carrier (b) lower sideband (c) upper sideband (d) none of these
9. In LSI technology of IC fabrication, the number of logic gates on a chip are \_\_\_\_\_.  
(a) between 100 to 10,000 (b) greater than 10,000  
(c) between 10 to 100 (d) less than 10
10. The MOS capacitor is a non polarized capacitor which can operate with \_\_\_\_\_.  
(a) negative voltage (b) positive voltage  
(c) positive or negative voltage (d) zero voltage

Que.-2

Answer briefly any ten of the following questions.

[20]

- (1) State the de Morgan's theorems.
- (2) Convert following hexadecimal numbers to binary numbers.  
(i) C5E2 (ii) CD42
- (3) Explain briefly : ASCII code.
- (4) Show the logic diagram of RS flip-flop with NAND gate.

(1)

(1) P.T.O

- (5) Define : Ring counter and Ripple counter.
- (6) What is race condition ?
- (7) Why we use carrier wave in electronic communication ?
- (8) Define Modulation and Modulation Index.
- (9) Differentiate between half duplex and full duplex.
- (10) Give the cross sectional view of a PMOS structure fabricated on IC.
- (11) List out the advantages of MOS technology over bipolar technology in IC fabrication.
- (12) State the advantages of MOS capacitors.

**Que.-3** (a) Define logic gate. Describe the working of two inputs AND gate and OR gate with suitable circuit diagram. [06]

(b) Discuss Exclusive-OR gate giving logic symbol, truth table and its application. Also implement EX-OR gate using basic gates. [04]

OR

**Que.-3** (a) Give the circuit diagram and working of two inputs TTL NAND gate. Also discuss the propagation delay time and power dissipation in standard TTL gate. [06]

(b) Describe the working of a NOT gate with proper circuit diagram. [04]

**Que.-4** (a) What is a flip-flop? Explain clocked RS flip-flop using proper logic diagrams and truth tables. Also discuss race condition. [06]

(b) Describe working of D flip-flop and its disadvantages. [04]

OR

**Que.-4** (a) Explain the working of 4-bit ring counter with suitable logic circuit diagram. Discuss the applications of ring counter. [06]

(b) Explain the working of 4-bit shift left register with suitable logic diagram. [04]

**Que.-5** (a) Define communication. Draw the block diagram of any communication system and explain function of each of its elements. [06]

(b) Discuss single sideband and double side band in amplitude modulation. [04]

OR

**Que.-5** (a) What is frequency modulation? With necessary diagram, explain how FM and PM differ? [06]

(b) Explain the use of varactor diode to achieve the process of frequency modulation. [04]

**Que.-6** Discuss in detail, general classification of integrated circuits and different levels of integration of IC chip. Describe advantages of ICs over discrete components. [10]

OR

**Que.-6** With proper diagrams, discuss monolithic planar diode, avalanche diode and Schottky diode. [10]

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 (2)

(2)