

[A-98]

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SARDAR PATEL UNIVERSITY
Sixth Semester B. Sc. Examination
Under CBCS

Wednesday, 6th April-2016

Time: 02:30 P.M. To 05:30 P.M.

Subject: PHYSICS [US06CPHY05]

Digital Electronics, Electronic Communication & VLSI Technology

Total Marks 70

N.B: (i) All the symbols have their usual meanings.

(ii) Figures at the right side of questions indicate full marks.

Que.-1 To answer the multiple choice questions choose the correct option. [10]

1. The full form of ASCII is _____.
(a) American Scientific Code for Information Interchange
(b) American Stable Code to Interchange Information
(c) American Standard Code for Information Interchange
(d) American Scientific Code to Interchange Information
2. The Boolean expression for NOR gate is given by $Y =$ _____.
(a) $\overline{A \cdot B}$ (b) $\overline{A + B}$ (c) $A + B$ (d) $A \cdot B$
3. The binary number 1010 is represented as ____ in hexadecimal number.
(a) A (b) 9 (c) B (d) C
4. How many flip flops are required to form 4 bit ripple counter?
(a) 8 (b) 2 (c) 4 (d) 16
5. When the input of D flip flop is in 0 state the output _____.
(a) toggles (b) is in 0 state (c) is in 1 state (d) is in race condition
6. A register is group of _____ that work together as a unit.
(a) flip flops (b) transistors (c) diodes (d) resistors
7. The information signal is called _____.
(a) Non modulating signal (b) Modulating signal
(c) Modulated signal (d) None of these
8. The frequency range of voice frequencies is from _____.
(a) 30 to 3,000 Hz (b) 20 to 20,000 Hz
(c) 3,000 to 30,000 Hz (d) 300 to 3,000 Hz
9. Mobility of an electron is about _____ that of hole mobility.
(a) same as (b) three times (c) half (d) twice
10. The great advantage of CMOS digital circuits in IC is _____.
(a) occupies less chip area (b) low power consumption
(c) simple fabrication (d) high impedance

Que.-2 Answer briefly any ten of the following questions. [20]

- (1) State the de Morgan's theorems.
- (2) Give circuit symbol and truth table of EX-OR gate. Also state its applications.
- (3) Distinguish between positive logic and negative logic system.
- (4) Explain in brief T flip-flop.

(P.T.O.)

- (5) Define (i) Ripple counter and (ii) Ring counter.
- (6) What are the functions of preset and clear buttons in flip-flops?
- (7) Define modulation and modulation index.
- (8) Distinguish between Half duplex and Full duplex communication.
- (9) Draw frequency domain display of an AM signal having carrier frequency of 2500 KHz and voice signals having frequency of the range 300 to 3,000 Hz.
- (10) Explain briefly different levels of integration of IC chips.
- (11) How does the Schottky diode differ from ordinary diode?
- (12) State the advantages of NMOS technology over PMOS technology.

- Que.-3 (a) Describe the working of two inputs DTL NAND gate with suitable circuit diagram. [06]
- (b) (i) Convert the following Hexadecimal numbers into binary numbers [04]
 (1) 4BF (2) 9C
 (ii) Convert the following decimal numbers into binary numbers
 (1) 14 (2) 25

OR

- Que.-3 (a) What is meant by TTL? Explain the working of two inputs TTL NAND gate with suitable circuit diagram. [06]
- (b) Describe the working of two inputs OR gate with suitable circuit diagram. [04]

- Que.-4 What is a flip flop? With suitable logic diagram explain the working of clocked RS flip-flop and JK flip-flop. [10]

OR

- Que.-4 What is a register? Explain the working of 4 bit shift right & shift left registers. [10]

- Que.-5 (a) Draw the block diagram of communication system and explain function of each of its elements. [06]
- (b) What is amplitude modulation? Explain about mathematical representation of Amplitude Modulation. [04]

OR

- Que.-5 (a) What is frequency modulation? Explain the use of varactor diode to achieve the process of frequency modulation. [06]
- (b) What is a single side band signal? Mention the benefit of using SSB signal. [04]

- Que.-6 (a) Explain the basic configurations of transistor used for diode operation in the monolithic IC with fabrication diagram. [06]
- (b) Discuss the general classification of integrated circuits and mention their advantages over discrete components. [04]

OR

- Que.-6 (a) With proper diagram explain how n-channel JFET integrated on IC chip. [06]
- (b) Explain the structure of base diffused resistor in IC fabrication with proper diagram. [04]

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