

- Q.25 Draw the truth table and explain the working of full subtractor
- Q.26 Explain De morgan's first theorem.
- Q.27 List five characteristics of CMOS logic family
- Q.28 Differentiate between a latch and a flip flop
- Q.29 Subtract 1001 from 1010 using 1's compliment method of binary subtraction.
- Q.30 Explain the working of a 2-bit comparator.
- Q.31 Minimize using K-Map $Y = \sum m(0,2,3,5,6,7)$
- Q.32 Explain the working of Dual slope A/D converter
- Q.33 Explain the working of weighted resistor DAC
- Q.34 Explain the working of universal shift register.
- Q.35 Explain the working of an Encoder.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. $(2 \times 10 = 20)$

- Q.36 Simplify using K-map and realize using only NAND gate

$$Y = \sum m(0,1,5,6,9,10,14) + d(4,7,8,11,15)$$

- Q.37 Design a 3 bit binary up counter.
- Q.38 Draw the truth table and explain the working of full adder.

No. of Printed Pages : 4 202445/122445/062445
Roll No.

**4th Sem / Mechatronics
Subject:- Digital Electronics**

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory $(10 \times 1 = 10)$

- Q.1 What is the binary equivalent of the decimal number 14?
- a) 1110
 - b) 1010
 - c) 1101
 - d) 1001
- Q.2 What is the value of the Boolean expression $A + \bar{A}$?
- a) 1
 - b) 0
 - c) A
 - d) \bar{A}
- Q.3 Output of SR flip flop when both the inputs are one is _____
- a) 0
 - b) 1
 - c) Not defined
 - d) Toggle
- Q.4 A 3 -input OR gate will give an output of 0 When:
- a) All three inputs are 0
 - b) At least one inputs is 0
 - c) All three inputs are 1
 - d) At least one input is 1

Q.5 Number of inputs in a half adder is _____

- a) 1
- b) 2
- c) 3
- d) 4

Q.6 What is the minimum number of inputs an AND gate can have?

- a) 1
- b) 2
- c) 3
- d) 0

Q.7 What is the primary purpose of a flip-flop in digital circuits?

- a) Amplify the signal
- b) Store binary data
- c) Convert analog signals to digital
- d) Perform arithmetic operations

Q.8 A decade counter has _____ states

- a) 4
- b) 10
- c) 16
- d) 32

Q.9 The race-around condition occurs in which type of flip-flop?

- a) D flip-flop
- b) T flip-flop
- c) JK flip-flop
- d) SR flip-flop

Q.10 What is the main disadvantages of a binary - weighted DAC?

- a) It uses too many op-amps
- b) It is very slow
- c) It requires wide range of precise resistors
- d) It cannot be used in microcontrollers

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 The basic building block of sequential circuits is the _____.

Q.12 The base of the binary number system is _____

Q.13 Expand CMOS.

Q.14 Output of JK flip flop when both the inputs are zero is _____

Q.15 A flip-flop stores _____ bit of data.

Q.16 Number of flip flop required to construct a MOD-8 binary up counter is _____

Q.17 A NAND gate is a combination of an AND gate followed by a _____ gate.

Q.18 ANOT gate has _____ inputs

Q.19 Number of select lines in 8:1 MUX is _____.

Q.20 Full form of SOP is _____

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 List five applications of digital signals.

Q.22 Explain error detection and correction using parity.

Q.23 Minimize using boolean algebra $\overline{A}\overline{B}C + \overline{A}BC + \overline{ABC} + A\overline{B}\overline{C} + ABC$

Q.24 Convert $(ABC)_{16}$ into decimal and binary number.