



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.Sc. DEGREE EXAMINATION – PHYSICS**

**FIRST SEMESTER – NOVEMBER 2022**

**UPH 1502 – INTRODUCTION TO DIGITAL ELECTRONICS**

Date: 03-12-2022

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

**PART – A**

**Answer ALL questions**

**(10x 2 = 20 Marks)**

- 1 Simplify  $Y = [A\bar{B} (C + BD) + \bar{A}\bar{B}] + C$
- 2 Define decoder.
- 3 Predict the output of  $Y = F(A,B,C) = \sum (1,6,7)$ .
- 4 Differentiate between Multiplexer and demultiplexer.
- 5 Simplify  $\bar{A}\bar{B} + \bar{A}B$ .
- 6 Tabulate the four rules of binary subtraction.
- 7 Convert  $(10101)_2$  to its equivalent octal number.
- 8 Find the 1's complement of  $(100011)_2$ .
- 9 What is a Flip flop?
- 10 Draw the block diagram and truth table of 'T' Flip flop.

**PART – B**

**Answer any four questions**

**(4 x 7.5 = 30 Marks)**

- 11 Calculate  $(256)_{16} = (X)_8 = (Y)_{10} = (Z)_2$ . Find X, Y, Z.
- 12 Sketch and explain the circuit 'D' flip flop and give its truth table.
- 13 Construct the logic gates EX-OR, NAND & NOR gates with circuit diagrams and give the appropriate truth tables.
- 14 Explain the working of 1-2 demultiplexer with truth table and block diagram.
- 15 Simplify using K Map  $Y = F(A,B,C,D) = \sum(0,1,2,3,4,6,8,9,10,11,12,14)$ .
- 16 (i) Show that  $(\bar{A} + B) (\bar{B} + C) (\bar{C} + A) = (A + \bar{B}) (B + \bar{C}) (C + \bar{A})$  (3.5 marks)  
(ii)  $\bar{A}\bar{B}C + A\bar{B}C + AB\bar{C} + ABC = AB + \bar{B}C$  (3 marks)

**PART – C**

**Answer any four questions**

**(4 x 12.5 = 50 Marks)**

- 17 Show that NAND gate is an universal gate.
- 18 a) Describe the working of a 4 input multiplexer with a neat circuit diagram and give its truth table. **(6.5 marks)**  
(b) State and prove De Morgan's theorem **(6 marks)**
- 19 (a) Convert (i)  $(1001101)_2$  to Gray code. **(3 marks)**  
(ii)  $(1100101)_G$  to binary. **(3 marks)**
- Convert the decimal numbers into binary number and do
- (b) Addition in binary number system  $94 + 125$  **(3.5 marks)**  
(c) Subtraction in binary number system  $38 - 17$  **(3 marks)**
- 20 Convert (i)  $(2FA.8)_H$  to decimal **(3.5 marks)**  
(ii)  $(11001.110001)_2$  to Hex **(3 marks)**  
(iii)  $(94.75)_8$  to binary **(3 marks)**  
(iv)  $(100.25)_{10}$  to Hex **(3 marks)**
- 21 Explain the working of a JK Flip flop with a circuit diagram and give its truth table.
- 22 (a) Simplify using K Map  $Y = F(A,B,C,D) = \sum(2,3,4,5) + \sum_d(10,11,12,13,14,15)$  **(8.5 marks)**  
(b) Evaluate 2's complement (i) 100101001 (ii) 11101110 **(2+2 marks)**

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