

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
Hanuman Vyayam Prasarak Mandals's
College of Engineering & Technology, Amravati
Course: Computer Science Engineering
BE Four year Semester 4th Summer 2020 Exam Subject: 4KS02
Analog and Digital Integrated Circuits
Assignment for ONLY BACKLOG STUDENTS

Instructions

- 1) Solve ANY TWO Questions**
- 2) Each Question Carries 10 marks**

Q I Solve the Following

- 1) State the ideal characteristics of OP-AMP and explain ideal voltage transfer curve. **2 marks**
- 2) With the help of neat diagram, explain application of PLL as FM detector **2 marks**
- 3) Perform the following conversions: **2 marks**
 - 1) $(225.225)_{10} = (?)_2$
 - 2) $(11010111.110)_2 = (?)_8$
 - 3) $(8.36)_{10} = (?)_2$
 - 4) $(623.77)_8 = (?)_{16}$
 - 5) $(11100110)_{\text{gray}} = (?)_2$
- 4) Obtain simplified expressions for F_1 and F_2 in SOP as well as POS form: **2 marks**

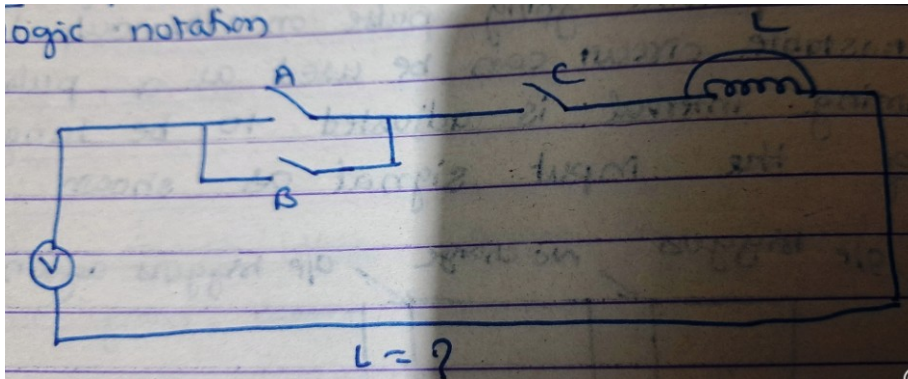
x	y	z	F1	F2
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

- 5) Implement the function **1 marks**
 $F(a,b,c,d) = a b' + a c d + b c' + d$
Using MUX with 3 select inputs

- 6) Design a binary counter for the sequence 0 , 1 , 2 , 3 , 4 and repeat using T - flip flop **1 marks**

Q II Solve the Following

- 1) Draw and explain block diagram of OP-AMP. State applications of OP-AMP **2 marks**
- 2) Draw the circuit for pulse stretcher using IC 555 and explain it. **2 marks**
- 3) Explain the following switching circuit in binary logic notation **2 marks**



- 4) Minimize the following function using k-map **2 marks**
 $F = \sum m (0,1,2,5,6,7,9) + d(10,11,12)$
- 5) Explain full adder circuit using gates ; also implement it using MUX **1 marks**
- 6) What are the various types of shift registers? Explain any one in detail. **1 marks**

Q III Solve the Following

- 1) Explain how OP-AMP can be used as integration amplifier. What are the limitations of this circuit? How these limitations can be overcome? **2 marks**
- 2) Explain the function of following pins of IC 555 **2 marks**
- 1) Discharge
 - 2) Control Voltage
 - 3) Trigger
- 3) Encode the decimal number 46 to gray code **2 marks**
- 4) Simplify following Boolean function using theorems **2 marks**
- 1) $F = x y z + x' y + x y z'$
 - 2) $G = (x + y) (x + y')$
- 5) What is PLD? Explain PLA in detail. Also implement following functions using PLA **1 marks**
- 1) $F1 = \sum m (0,1,2,4)$
 - 2) $F2 = \sum m (0,5,6,7)$
- 6) Design a mod 12 up counter **1 marks**

Q IV Solve the Following

- 1) Explain the following terms: **2 marks**
- 1) CMRR

- 2) Slew Rate
- 3) Input offset voltage
- 2) Draw the circuit for astable multivibrator using IC 555 and explain its operation. Derive expression for frequency and duty cycle. **2 marks**
- 3) Explain in detail following codes with examples **2 marks**
 - 1) BCD
 - 2) Excess-3
- 4) Given Boolean function is **2 marks**
$$F = x y + x' y' + y' z$$
 - 1) Implement this with OR, AND, NOT gates
 - 2) Universal gates only
- 5) Explain in detail 4 bit parallel binary adder **1 marks**
- 6) Differentiate between synchronous and asynchronous circuits **1 marks**