



(3 Hours)

[Total Marks:80]

- N.B.: (1) Question No. 1 is compulsory.  
 (2) Solve any **three** questions out of remaining **five**.  
 (3) Figures to **right** indicate **full** marks.  
 (4) Assume suitable **data** where **necessary**.

1. Attempt any five out of six questions (20)
  - a) What are the various regions that a transistor can operate? In which region can a transistor be operated if it is used as a switch?
  - b) Give some applications of OpAmp and explain the block diagram of Op Amp.
  - c) Explain the working of LCD.
  - d) Minimize the following boolean expression using K-map  

$$F(A,B,C,D) = \sum m(0,3,7,11,15) + d(1,2,5)$$
  - e) Draw the truth table and excitation table for S-R flip flop.
  - f) Convert  $(101101.1101)_2$  to decimal, octal and hexa decimal.
2.
  - a) What is the need for biasing? Explain voltage divider bias and locate the Q points (10)
  - b) Draw the truth table for full adder and realize using 3:8 decoder (10)
3.
  - a) Explain the working of Monostable Multivibrator using IC555. Draw the waveforms and give its applications (10)
  - b) Design and implement one digit BCD adder using IC- 7483. (10)
4.
  - a) Design and implement binary to gray code converter (10)
  - b) Realize the following expression using only one 8:1 MUX and few logic gates (05)  

$$F(A,B,C,D) = \sum m(0,3,6,8,11,13,15)$$
  - c) Explain the practical differentiator circuit using op-Amp. (05)
5.
  - a) Explain differential amplifier and elaborate on any one method to improve the CMRR (10)
  - b) Design a half adder using VHDL (05)
  - c) Design mod-3 up counter using JK Flip Flop (05)
6. Write short notes on any four (20)
  - a) Bidirectional shift registers
  - b) Full subtractor
  - c) Basic Logic Gates
  - d) BCD and Excess-3 code
  - e) JFET