Analog and Digital Circuits.

QP Code : 30720

(3 Hours) [Total Marks : 80

N.B. : (1) Question No.1 is compulsory.
    (2) Attempt **any three** out of remaining questions.
    (3) Assume suitable **data** wherever **required**.
    (4) Draw appropriate **waveforms** wherever **required**.

1. Solve **any five** :
    (a) CE configuration is popular in amplifier circuits. Justify.   4
    (b) Explain the working of zener diode as voltage regulator.   4
    (c) State ideal and practical characteristics of Op-amp.   4
    (d) Add $(83)_{10}$ and $(34)_{10}$ in BCD.   4
    (e) Convert S-R flip-flop to D flip-flop.   4
    (f) Explain parallel i/p, serial o/p shift register.   4

2. (a) Explain in brief different biasing circuits of BJT.   10
    (b) Explain how Op-amp can be used as summing, scaling and averaging   10
        amplifier in inverting configuration.

3. (a) Design and implement one digit BCD adder using IC-7843.   10
    (b) Implement the following logic function using 4:1 mux   5
        $f(A, B, C) = \pi M (0, 1, 3, 5, 7)$.
    (c) Explain the working of LCD.   5

4. (a) Design a 2-bit comparator using minimum number of gates.   10
    (b) Explain the working of Astable multivibrator using IC-555.   10

5. (a) Design a synchronous counter which goes through following states using   10
        J K flip-flop,

             0 - 2 - 4 - 6 - 0

    (b) With the help of neat diagram, explain the functioning of a 4-bit   10
        bidirectional shift register.

6. Write short notes on the following :   20
     (a) VHDL program format
     (b) Universal gates. Implement EX-OR gate using NAND gate
     (c) Integrator using Op-amp
     (d) Current mirror circuit

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