BE Semester-_3 -_CE_ Question Bank

(Digital Logic and Design)

All questions carry equal marks (10 marks)

Q.1	Convert any decimal number to base 3, base 4, base 7, base 8 and base 16.
Q.2	Explain BCD Ripple counter and draw its logic diagram and timing diagram.
Q.3	Explain JK Flip-flop in detail. What is the disadvantage of it and how it can be eliminated?
Q.4	Discuss 4 bit BCD Adder in Detail.
Q.5	Explain 4 bit Magnitude Comparator.
Q.6	Explain Binary Ripple Counter.
Q.7	Explain Arithmetic addition and Arithmetic subtraction with some suitable example.
Q.8	Explain Binary Synchronous Counter.
Q.9	Design a combination circuits for a full adder and explain it in detail.
Q.10	Design a combination circuits for a half adder and explain it in detail.
Q.11	Design a combination circuits for a full subtractor and explain it in detail.
Q.12	Design a combination circuits for a half subtractor and explain it in detail.
Q.13	Explain briefly : SOP & POS , minterm & maxterm , canonical form , propagation delay, fan out
Q.14	What is meant by Multiplexer? Explain with diagram and truth table the Operation of 4-to-1 line multiplexer
Q.15	What is meant by Decoder? Explain 3-to-8 line decoder with diagram and truth table
Q.16	Explain with figures how NAND gate and NOR gate can be used as Universal gate.
Q.17	What is the function of shift register? With the help of simple diagram explain its working.

Q.18	Define: Integrated Circuit and briefly explain SSI, MSI, LSI and VLSI.
Q.19	Draw the logic symbol and construct the truth table for each of the following gates. [1] Two input NAND gate [2] Three input OR gate [3] Three input EX-NOR gate [4] NOT gate [5] Two input AND gate
Q.20	Explain SOP and POS expression using suitable examples.
Q.21	Design a combinational circuit with four input lines that represent a decimal digit in BCD and four output lines that generate the 9's complement of the input digit.
Q.22	Simplify the following Boolean function by means of the tabulation method: $F(A,B,C,D,E,F,G) = \_ (20,28,38,39,52,60,102,103,127)$.
Q.23	Explain PLA with necessary diagrams.
Q.24	Explain tabulation method and Simplify the following Boolean function by using Tabulation method. $F = \Sigma (0,1,2,8,10,11,14,15)$
Q.25	Explain the procedure followed to analyze a clocked sequential circuit With suitable example.
Q.26	Draw and explain logic diagram of arithmetic logic unit (ALU).
Q.27	With logic diagram and truth table explain the working JK Flip-flop. Also obtain its characteristic equation. How JK flip-flop is the refinement of RS flip-flop?
Q.28	Design a counter with the following binary sequence: 0, 4,2,1,6 and repeat. Use JK flip-flops.
Q.29	Briefly explain control organization. With diagram explain control logic with one Flip-flop per state.
Q.30	Draw the block diagram of a processor unit with control variables and explain its operation briefly.
Q.31	With simple diagram explain the working of control logic with sequence register and decoder.
Q.32	What is the function of shift register? With the help of simple diagram explain its working. With block diagram and timing diagram explain the serial transfer of information from register A to register B.
Q.33	With respect to Register Transfer logic, explain Interregister Transfer with necessary diagrams.
Q.34	Simplify the Boolean function: (1) F = A'B'C'+B'CD'+A'BCD'+AB'C' (2) F =A'B'D'+A'CD+A'BC d=A'BC'D+ACD+AB'D' Where "d" indicates Don't care conditions.
Q.35	Demonstrate by means of truth tables the validity of the following Theorems of Boolean algebra (i) De Morgan's theorems for three variables (ii) The Distributive law of + over-
Q.36	Design a combinational circuit that accepts a three bit binary number and generates an output binary number equal to the square of the input number.
Q.37	Draw the state diagram of BCD ripple counter, develop its logic diagram and

	explain its operation.
Q.38	Discuss Interregister Transfer in detail.
Q.39	Answer the following : (i) Draw symbol and construct the truth table for three input Ex-OR gate. (ii) What is the principle of Duality Theorem? (iii) What are Minterms and Maxterms? (iv) Define: Noise margin , Propagation delay (v) Give comparison between combinational and Sequential logic circuits
Q.40	Draw block diagram of a 4-bit arithmetic logic unit. Design an adder/subtractor circuit with one selection variable S and two inputs A and B .when S = 0 circuit performs A+B, when S = 1 circuit performs A – B by taking the 2's complement of B.