**II-II-R18-CSE- COMPUTER ORGANIZATION AND ARCHITECTURE-QB**

1. Simplify the Boolean function in sum of products form by means of a four variable map. Draw the logic diagram with AND-OR gates and NAND gates.

F(A,B,C,D)=∑m(0,2,8,9,10,11,14,15)

F(A,B,C,D)=∑m(0,2,3,7,10,12,13,14,15)

1. Design D-flip-flop and draw characteristic table, excitation table and derive the characteristic equation.
2. Prove Why NAND and NOR called universal logic gates.
3. Design 4-bit arithmetic circuit and explain all arithmetic operations.

1. Explain the construction of bus system using multiplexers in detail with neat sketch.
2. Convert the following
3. (1234.17)10=( )5=( )8=( )2
4. (347)8=( )10=( )16=( )2
5. (1902.12)10=( )5=( )8=( )2
6. Explain the following
7. Memory stack
8. Register stack
9. Reverse polish notation
10. Explain various addressing modes with numerical example.
11. Multiply -9 with -13 using booth’s algorithm. Give each step and explain with the help of flow chart.
12. What do you mean by asynchronous data transfer? Explain strobe control in detail.
13. Explain programmed I/O with example.
14. Explain the operational concepts of computer in detail.
15. Design 8\*1 multiplexer and draw the logic diagram.
16. Simplify the following expressions in sum of products form and product of sums form.
17. x̅ z̅ +y̅ z̅+yz̅+xy
18. AC̅+B̅D+A̅CD+ABCD
19. Design 3 to 8 decoder and draw the truth table of it.
20. Design a 4-bit combinational circuit decrementer using four full-adder circuits.
21. The 8-bit registers AR, BR, CR, and DR initially have the following values: AR=11110010

BR=11111111

CR=10111001

DR=11101010

Determine the 8-bit values in each register after the execution of the following sequence of micro operations.

AR←AR+BR Add BR to AR

CR←CRɅDR, BR←BR+1 AND DR to CR, increment BR

AR←AR-CR subtract CR from AR

1. Explain the construction of bus system using three state buffers.
2. Explain the shift micro operations in detail with examples and implement hardware of 4-bit combinational circuit shifter.
3. Explain about computer registers and common BUS system in detail.
4. Explain about register reference instructions in detail.
5. Convert the following arithmetic expressions from infix to reverse polish notation.
6. A\*B+C\*D+E\*F
7. A\*B+A\*(B\*D+C\*E)
8. Explain about asynchronous data transfer with handshaking method.
9. Explain about input-output interface in detail.
10. Explain about programmed I/O with example.
11. Explain BCD adder with its block diagram.
12. Simplify the Boolean function F together with the don’t care conditions d in

i) sum-of-products form and ii) product-of-sums form

F(w,x,y,z)=∑m(0,1,2,3,7,8,10)

d(w,x,y,z)=∑m(5,6,11,15)

1. Design 3 to 8 decoder using 2 to 4 decoders and draw the logic diagram and truth table.
2. Write the differences between combinational and sequential logic circuits.
3. Given the Boolean function

F=xy̅z+x̅y̅z+xyz

1. List the truth table of the function
2. Draw the logic diagram using the original Boolean expression
3. Simplify the algebraic expression using Boolean algebra.
4. List the truth table of the function from the simplified expression and show that it is the same as the truth table in part (i)
5. Draw the logic diagram from the simplified expression and compare the total number of gates with diagram of part(ii)
6. Design 16\*1 multiplexer using 4\*1 multiplexers and draw the truth table.
7. Explain about memories of computer in detail.
8. Implement one stage of arithmetic logic shift unit and explain all operations.
9. Perform the arithmetic operations using 2’s complement subtraction method.
10. +42-13 (8-bit representation)
11. -42+13 (8-bit representation)
12. Design 4- bit binary adder subtractor and explain in detail with examples.
13. Explain about instruction cycle with neat flow chart.
14. Explain about control unit of basic computer with neat sketch and write example of control timing signals.
15. Explain about memory reference instructions in detail.
16. Explain the booth’s algorithm with the help of flow chart and give one example.
17. Explain the procedure for non restoring division algorithm with example.
18. Explain about functional units of computer.
19. A majority function generated in a combinational circuit when the output is equal to 1 if the input variables have more 1’s than 0’s. The output is 0 otherwise. Design a three-input majority function.
20. Implement the following functions using 8\*1 multiplexer.
21. F(w,x,y,z)=∑m(1,3,5,6,8,10,12,15)
22. F(w,x,y)=∑m(1,2,3,6,7)
23. Simplify the Boolean functions using 4-varible maps in SOP and POS forms.
24. F(A,B,C,D)=∑m(3,7,11,13,14,15)
25. F(A,B,C,D)=∑m(0,1,2,4,5,7,11,15)
26. Implement the hardware for basic logic micro operations of computer and write some applications in detail.
27. List the logic micro operations and draw the truth table for 16 logic micro operations.
28. Represent the following in single precision and double precision floating point formats.

a) (125.123)10 b) (145.87)10

1. Evaluate the arithmetic expression X=(A+B)\*(C+D) using three, two, one, zero address instructions.
2. Explain any 5 addressing modes in detail.
3. Explain about general register organization in detail with neat sketch.
4. Explain the procedure for addition and subtraction with signed magnitude data with the help of flow chart.
5. Write a detailed note on Direct Memory Access.