Name of Subject	Digital Circuit and Logic Design	Subject Code	ESIT-101
Batch	2018 and onwards	Class	D2IT A and B

2 marks qs

1. What are Excess 3 codes? What are their applications?
2. What are ASCII codes? What are their applications?
3. What are Gray codes? What are their applications?
4. What are BCD codes? What are their applications?
5. What are Boolean laws?
6. What is de Morgan's theorem?
7. What is Principle of duality?
8. What we do minimization in electronics?
9. What is SOP and POS?
10. $(10.25)_{10} = ()_2$ Ans: 1010.01
11. $(12.2)_8 = ()_{10}$ Ans: 1010.01
12. What is maxterm and minterm?
13. What are canonical forms?
14. What is K Map?
15. What is Don't care term?
16. What is a logic gate?
17. Realize AND using NAND
18. Realize OR using NAND
19. Realize AND using NOR
20. Realize AND using NOR
21. What is a logic family?
22. What is MOSFET?
23. What is RTL?
24. Weighted BCD
25. Principle of Duality
26. Exclusive-NOR versus Exclusive-OR
27. Multiplexer versus Demultiplexer
28. Uses of Shift Registers
29. Convert 10101 to decimal Ans: 21
30. TTL and CMOS
31. MOSFET
32. Define 1's and 2's compliment?
33. Differentiate combinational and sequential circuits.
34. What are the advantages of CMOS memory chips over BIPOLAR memory chips?
35. What is Flip-Flop?

36. Convert (10110111)2 to octal number? Ans: 267
37. Realize OR gate using only NAND gates.
38. Define the terms decoder and de-multiplexer
39. Give the logic diagram and characteristics table of a clocked D flip flop.
40. What is a ring counter?
41. Explain the principle of Duality.

5 marks qs

42. Diff between edge and level triggering?
43. Diff between latch and flip flop?
44. What is shift register?
45. What is VHDL? What are the applications?
46. What are the VHDL data types?
47. What is the difference between analog and digital signal?
48. Explain the K-map reduction technique.
49. Write a short note on ASCII code.
50. Explain the ECL circuit.
51. Calculate the number of select lines in 16 to 1 multiplexer?
52. Explain the NOR Gate. Specify its symbol.
53. Built a full adder from half adder circuits.
54. List any four characteristics of logic gates.
55. Convert decimal 177.25 to octal number. Ans: 261.2
56. Compare between TTL and CMOS logic.
57. Write the applications of EX–OR gate.
58. What are ASCII codes? What are their applications?
59. Explain binary to gray conversion.
60. What is race condition? In which of the flip-flops it is a problem.
61. What is the difference between a sequential and combinational circuit?
62. What are the applications of flip-flops?
63. What is the difference between digital and binary?
64. What are synchronous counters?
65. What are shift registers?
66. What are Min and Max terms?
67. What are charged coupled device memories?
68. Solve (10101)2 + (10011)2. Ans: 101000
69. What is l's complement? Explain with example.
70. Explain De-Morgan's theorem.
71. Which device can be used to change from serial data to parallel data?
72. What do you understand by volatile memory?
73. Write the name of various types of Analog to Digital Convertors.

74. What can be done to avoid racing problem in JK-Flip flop?
75. Write one advantage of ECL logic family
76. State and prove De-Morgan's Theorems.
77. Design and implement a 4-bit binary to gray convertor.
78. Distinguish between combinational and sequential switching circuits.
79. Simplify the following function using K Map. F(A,B,C) = ∑(0, 2,3, 4,6)
    Ans: Y=C'+A'B
80. Design full subtracter using NAND gates only.
81. Explain the working of Master Slave JK Flip Flop.

10 marks qs

82. Write a short note on the following. a) RTL b) CMOS
83. Explain the working of Successive Approximation A/D Converter
84. Minimize the following expression using K–map. Y = Σm (0, 1, 2, 5, 13, 15)
    Ans: y = A'B'D' + A'C'D + ABD
85. What is full subtractor? Draw a full subtractor circuit
86. Explain the working of full adder with examples.
87. Explain various laws of Boolean algebra.
88. Discuss the classification of sequential circuits.
89. With gate level circuit, Truth table, explain 2 bit magnitude comparator.
90. State and prove De-Morgan's theorems.
91. Construct a 4 bit ring counter. Explain with truth table and timing diagram
92. Draw and explain the operation of TTL 2- input AND Gate.
93. Explain the working of 'T' and 'D' Flip-flops.
94. Explain the working of weighted type Digital to Analog Convertor.
95. Write short note on following a) Successive approximation A to D conversion technique b) Ripple Carry Adder
96. Using Boolean algebra show that a) AB + AC + BC = AB + AC b) AB + AC = (A+C)(A + B)
97. Write the expression for Boolean function F(A,B,C):∑m(0,2,3,5,7) in standard POS form. Solution:

Conversion of SOP form to POS form

To convert the SOP form into POS form, first we should change the Σ to Π and then write the numeric indexes of missing variables of the given Boolean function.

Example:

The SOP function

F = ∑ A, B, C (0, 2, 3, 5, 7) = A' B' C' + A B' C' + A B' C + ABC' + ABC is written in POS form by

Step 1: changing the operational sign to Π

Step 2: writing the missing indexes of the terms, 001, 100 and 110. Now write the sum form for these noted terms.

001 = (A + B + C) 100 = (A + B' + C') 110 = (A + B' + C')

Writing down the new equation in the form of POS form,

F = Π A, B, C (1, 4, 6) = (A + B + C) * (A + B' + C') * (A + B' + C')

98. Write short note on VLSI design.
99. Design a 3 bit Gray to Binary code convertor. b) Distinguish between half and full adder using logic diagram and truth table.
100. Explain different types of ROM along with their advantages and disadvantages
101. a) Draw the logic diagram of 4–bit Twisted Ring counter and explain its operation with the help of timing diagram. b) Design a MoD–3 synchronous counter using J–K Flip–Flops.
102. a) Explain how Parallel in Serial Out (PISO) shift register works. b) Design a mod-6 up counter.
103. Explain the working of dual slope A/D converter
104. Find the minimum sum of products expression for the function f(a, b, c, d) = Σm(l, 3, 4, 6, 7, 9, 11, 12, 13, using K-Map method.
Ans: y = B'D + BC'D' + A'BC + AC'D
105. Design a 32 to 1 Multiplexer using 4 to 1 Multiplexer and explain its working.
106. a) Design a 4 bit synchronous ring counter. Explain its working with the help of timing diagram. b) Explain the working of 4 bit successive approximation type ADC.
107. Explain Structural modeling level in VHDL.
108. Explain the data and behavioral data flow in VHDL.
109. Explain the working of Half Adder using VHDL programming.
110. What are sequential statements in VHDL?