Total No. of Questions : 10]

SEAT No. :

PF-12642

[Total No. of Pages : 3

[6625]-259
S.E. (Computer Science)
MDM-221-CSC : DIGITAL ELECTRONICS AND LOGIC DESIGN
(2024 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Numeric figures in square brackets [] indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Minimize the following expression using K-Map

Y=∑m (1, 5, 6, 7, 11, 12, 13, 15) **[6]**

i) Plot the function on a 4-variable K-map.

ii) Simplify Y to its minimal SOP.

iii) Draw the simplified logic diagram.

b) Simplify the following Boolean expression using Boolean algebra laws : **[4]**

F = A + AB + ABC

State the laws used during simplification.

c) Convert the decimal number 97 into binary, octal and hexadecimal. **[4]**

OR

Q2) a) Using the k map method, solve the following and draw logic diagram **[6]**

F = ∑π (0, 1, 2, 5, 7, 9, 12, 14, 15).

b) Draw the symbols and truth tables of NAND, NOR, and XOR gates. Why are NAND and NOR gates called universal gates? **[4]**

c) Write the Boolean expression for a 4-input OR gate and simplify it using Boolean laws. **[4]**

P.T.O.

SPPUQuestionPapers.com

Q3) a) Explain the design and operation of a Full Adder with the help of a truth table and logic diagram. **[7]**

b) Differentiate between an Encoder and a Decoder in terms of their operation, circuit design, and practical applications. **[7]**

OR

Q4) a) Implement the Boolean function **[7]**

F(A, B, C) = Σ(1, 3, 5, 7) using a 8:1 MUX.

b) Explain the design and operation of a Half Subtractor with the help of a truth table and logic circuit. Derive the Boolean expressions For Difference and Borrow. **[7]**

Q5) a) Convert Following Flip flops : **[7]**

i) SR to D

ii) JK to T

b) What is a Counter? Differentiate between Asynchronous and Synchronous Counters. **[7]**

OR

Q6) a) Design a 3-bit Asynchronous Binary Counter using JK Flip-Flops and explain its working. **[7]**

b) What is a Register? Explain the operation of Serial-In Serial-Out (SISO) and Serial-In Parallel-Out (SIPO) registers. **[7]**

Q7) a) Write VHDL code for Full Adder using Data Flow Modeling Technique. **[5]**

b) Explain data types and data objects in VHDL with examples. **[5]**

c) Compare concurrent and sequential statement in VHDL. **[4]**

OR

Q8) a) Explain the features of VHDL. **[5]**

b) Compare Behavioral, Dataflow, and Structural modeling approaches used in VHDL design. **[5]**

c) Compare VHDL and Verilog in terms of syntax, structure, and application areas. **[4]**

SPPUQuestionPapers.com
CEGP019671
103.157.122.163 13/06/2026 11:21:58 in-pnq-static-163-122-157-103

Q9) a) Compare FPGA and CPLD in terms of architecture, cost, and applications. **[5]**

b) Discuss the role of digital logic in wireless communication systems. **[5]**

c) Explain the difference between microprocessor and microcontroller. **[4]**

OR

Q10)a) Describe the block diagram of a microcontroller and its core components. **[5]**

b) Describe the pipeline stages in a typical processor. **[5]**

c) Describe the features of embedded system. **[4]**

♦ ♦ ♦

CEGP019671 103.157.122.163 13/06/2026 11:21:58 in-pnq-static-163-122-157-103
SPPUQuestionPapers.com