S.No. 3244 **16 SCCCA 7**

(For candidates admitted from 2016–2021 Batch)

B.C.A. DEGREE EXAMINATION, NOVEMBER 2023.

Part III — Computer Applications — Major

DIGITAL COMPUTER FUNDAMENTALS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20)

Answer ALL questions.

1. Write down the base of decimal, binary and octal number systems.

2. Give examples for error detecting and error correcting code.

3. What are universal building blocks?

4. Write the truth table of XOR gate.

5. Expand SOP and POS.

6. What are the methods to simplify Boolean expressions?

7. What are the inputs and outputs of half adder?

8. What is demultiplexer?

9. What is D flipflop?

10. List out any two sequential circuits.

SECTION B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b).

11. (a) Convert $(1C.2)_{16}$ into equivalent decimal and binary number.

Or

(b) Explain about binary addition and subtraction.

12. (a) State and prove demorgan's theorem.

Or

(b) Write short notes on minterm and maxterm.

13. (a) Draw the simplified circuit using NAND gate for $F(x, y, z) = \Sigma(0, 1, 6, 7)$.

Or

(b) Simplify $F = \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,\overline{B}C + A\,\overline{B}\,\overline{C} + A\overline{B}C$ using knap.

14. (a) What are combinational circuits? Explain with example.

Or

(b) What is Multiplexer? Explain its operation.

15. (a) Describe the working principle of JK flip flop with diagram.

Or

(b) What is shift register? What are its types?

SECTION C — (3 × 10 = 30)

Answer any THREE questions.

16. Convert $(1110.10101)_2$ to its equivalent decimal, octal and hexadecimal number system.

17. Describe about AND, OR, NAND, NOR and XNOR gates.

18. Draw simplified circuit for $F(x, y, z) = \Sigma(0, 1, 3, 7) + d(2, 5)$ using k-map.

19. Explain about full adder circuit with its function table and circuit.

20. What is Ripple counter? Explain its operation with neat diagram and operation table.