(FOR THE CANDIDATES ADMITTED   SUBJECT CODE 22 UPS 6E16

DURING THE ACADEMIC YEAR 2022-23 ONLY)   REG.NO. [   ]

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : MAY– 2025

B.Sc. – PHYSICS   **MAXIMUM MARKS: 50**

VI SEMESTER   **TIME : 3 HOURS**

PART – III
DIGITAL CIRCUIT SYSTEMS AND MICROPROCESSOR

SECTION – A   (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.   (K1)

1.   The binary equivalent of the decimal number 25 is:
   (a) 11001 (b) 10101 (c) 10011 (d) 11100

2.   In a Karnaugh map, a group of four adjacent 1's is called a:
   (a) Pair (b) Quad (c) Octet (d) Don't care

3.   A half adder consists of which two logic gates?
   (a) AND and OR (b) XOR and AND (c) NAND and NOR (d) XOR and OR

4.   A shift register is mainly used for:
   (a) Data Storage (b) Data Transfer (c) Counting (d) Both A and B

5.   Which register holds the address of the next instruction to be executed?
    (a) Accumulator (b) Stack Pointer (c) Program Counter (d) Instruction Register

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.   (K2)

6.   Convert $(BCH)_{16}$ into its binary equivalent.

7.   What is the use of don't care conditions in K-map?

8.   Define a parallel binary adder.

9.   How many states does a MOD-8 counter can have?

10.   Name any two arithmetic instructions of the 8085 microprocessor.

SECTION – B   (5 X 3 = 15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.   (K3)

11.   a)   Explain 1's complement and 2's complement with an example.

(OR)

   b)   Convert $(345)_8$ into binary and decimal.

(CONTD …. 2)

12. a) State and prove De Morgan's first theorem.

(OR)

b) What are the different Boolean algebra theorems?

13. a) Explain the working of a half subtractor with a truth table.

(OR)

b) Explain the difference between a decoder and an encoder.

14. a) Explain the working of an RS flip-flop with a truth table.

(OR)

b) Differentiate between synchronous and asynchronous counters.

15. a) What are the different groups of instructions in the 8085 instruction set? Give one example for each.

(OR)

b) Write an 8085 assembly language program to add two 8-bit Hexadecimal numbers.

SECTION – C   (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. a) Explain ASCII and BCD codes with examples.

(OR)

b) Explain the working of NAND gates as universal gates with truth tables.

17. a) Simplify the Boolean expression using Boolean laws: AB+A(B+C) +B (B+C).

(OR)

b) Explain the Sum of Products (SOP) with examples and simplifications.

18. a) Explain the working of a full adder with a truth table and circuit diagram.

(OR)

b) Explain the working of a seven-segment decoder with a circuit diagram.

19. a) Describe the working of a JK flip-flop with a truth table and timing diagram.

(OR)

b) Design a synchronous MOD-5 counter and explain its working.

20. a) Explain the architecture of the 8085 microprocessor with a neat diagram.

(OR)

b) Describe the working of the stack and subroutines in 8085 programming with examples.

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