

Q.22 Explain the memory organization of 8051 microcontroller. (CO4)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

Q.23 Use a 4-variable K-map to simplify and find the SOP expression for: (Co2)

$$F(W,X,Y,Z) = \sum m(1,3,4,5,7,9,11,13,15)$$

Q.24 Define a shift register. Explain SIPO Shift register in detail. (CO3)

Q.25 Draw the architecture of the 8051 microcontroller and explain the function of each block. (CO4)

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3rd Sem / Artificial Intelligence & Machine Learning

Subject : Digital Electronics & Microcontrollers

Time : 3 Hrs.

M.M. : 60

SECTION-A

Note: Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 Which of the following number systems is not a positional number system? (CO1)

- a) Binary
- b) Decimal
- c) Octal
- d) Roman

Q.2 Which logic gate gives a HIGH output only when all inputs are HIGH? (CO2)

- a) OR
- b) NAND
- c) AND
- d) NOR

Q.3 How many input combinations are there for a 3-variable Karnaugh Map? (CO2)

- a) 2
- b) 4
- c) 6
- d) 8

- Q.4 Which device combines multiple inputs into a single output line? (CO3)
- a) Encoder b) Decoder
c) Multiplexer d) Flip-Flop
- Q.5 A JK flip-flop avoids the invalid state of which flip-flop? (CO3)
- a) T b) RS
c) D d) Master-Slave
- Q.6 8051 is a _____ pin IC. (CO4)
- a) 28 b) 32
c) 40 d) 48

SECTION-B

Note: Objective/ Completion type questions. All questions are compulsory. (6x1=6)

- Q.7 The binary equivalent of decimal number 15 is _____. (CO1)
- Q.8 NAND and NOR gates are called _____ gates. (CO2)
- Q.9 Full form of SIPO is _____. (CO3)
- Q.10 Define Latch in one line. (CO4)

- Q.11 An _____ counter changes state only when triggered by a clock pulse on all flip-flops simultaneously. (CO3)
- Q.12 What is the size of ROM in 8051 microcontroller? (CO4)

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

- Q.13 Convert $(39)_{10} = (?)_2(?)_8 = (?)_{16}$ (Co1)
- Q.14 Perform the binary subtraction: (Co1)
110110 - 101001 using 2's complement method. (Co1)
- Q.15 Draw the truth tables for AND, OR, and NOT gates. (CO1)
- Q.16 State and prove both De Morgan's theorems with logic symbols. (CO1)
- Q.17 Design a Full Adder using basic logic gates. (CO3)
- Q.18 Differentiate between Multiplexer and Demultiplexer with one application each. (CO2)
- Q.19 Differentiate between latch and flip flop. (CO2)
- Q.20 Discuss race around condition in JK flip Flop. (CO3)
- Q.21 Draw pin diagram of 8051 microcontroller. (CO4)