Q.31 Describe Universal Shift Register in detail with Truth Table and Logical Circuit.

Q.32 Explain the Logic Diagram, Truth Table and Operation of Master-Slave J-K flip Flop.

Q.33 Discuss truth table, logic diagram and logical expression of a Full Subtractor.

Q.34 What is MUX? Design a 1 :8 MUX by using truth table logical expression and logical circuit.

Q.35 What is Logic Gate? Draw the Symbol, Truth Table, Logical Expression of different types of logic gates.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Minimize the following Boolean expression using K-Map and realize the logic Circuit using NAND gates only.

$F(P,Q,R,S) = \Sigma M(0,1,3,9,10,12,13,15) + d(2,4,6,8)$

Q.37 What is Shift Register? Explain various types of Shift Register with the help of logic diagram and truth table. Also write down applications of shift register.

Q.38 Explain the working of following D to A Converter with suitable diagram.

a) R/2R Ladder Digital to Analog Converter

b) Binary Weighted Digital to Analog Converter

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4th Sem / Mechatronics Engineering
Subject:- Digital Electronics

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 $(43)_{10} = (\ldots\ldots\ldots)_2$

a) 101011 b) 1110

c) 1100 d) 1111

Q.2 According to associative law of multiplication

a) X(YZ) = (XY) Z b) Z=XY

c) X + Y = Y + X d) None of these

Q.3 Which equation shows a SOP expression

a) A+B (C+D) b) AB+BC+A

c) (A+B) (C+D) d) None of these

Q.4 _____Flip Flop have Race Around Condition.

a) Master Slave b) J-K Flip-Flop

c) RS Flip-Flop d) D Flip-Flop

Q.5 The output of a gate is High when all the inputs are Low. This is true for

a) AND b) NAND

c) NOR d) OR

Q.6 Distinct digits used in Hexadecimal Number system are

a) 0 to 7 and A to F b) 0 to 9 and A to F
c) 0 to 8 and A to F d) 0 to 9 and A to G

Q.7 A D-multiplexer can be used for
a) Parallel to serial data conversion
b) Serial to parallel data conversion
c) Parallel to parallel data conversion
d) None of these

Q.8 Which gate is known as universal gate?
a) NAND b) OR
c) XOR d) NOT

Q.9 How many bits are there in the Binary Number 1110000111001100
a) 3 b) 2
c) 16 d) 8

Q.10 A 1 : 16 Demux has_____output data lines
a) 32 b) 1
c) 16 d) None of above

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 Define Demorgan's Theoram.

Q.12 What is Asynchronous Counter?

Q.13 Write any two names of A/D converter.

Q.14 Name different types of Combinational Circuits.

Q.15 Define Linearity.

Q.16 $(10101101011.10110)_2 = (\ldots\ldots\ldots\ldots\ldots)_8$

Q.17 Draw the symbol of NAND gate

Q.18 What is Octal Number System?

Q.19 Define MOD-7 Counter.

Q.20 Write any two application of Flip-Flop.

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 What is the difference between Register and Counter?

Q.22 Subtract the following Binary Numbers:
i) 11001-101 ii) 1100 - 10
iii) 1100 - 1010

Q.23 Explain Block diagram, Logical expression, Truth Table of Decimal to BCD Encoder.

Q.24 Convert the following Hexadecimal Numbers into Binary Numbers:
i) AF.45 ii) BCF5
iii) 9A.23

Q.25 What do you mean by Number System? How many number system are used in Digital electronics? Explain in detail.

Q.26 Design Block diagram, Truth Table, Logical Expression of 3-Line-to-8-Line Decoder.

Q.27 Differentiate between MUX and DEMUX.

Q.28 Draw the symbol, logical expression, truth table and pulse operation of D Flip-Flop.

Q.29 Solve the following Boolean expression:
i) $XY + X(Y+Z) + Y(Y+Z)$
ii) $XY(Z) + XY\overline{Z} + \overline{X}Z + X\overline{Y}Z$

Q.30 State and explain Rules for Boolean Algebra.