Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering
End Sem Examination May-2023
EE3CO21 / EX3CO21 / EE3CO31 Digital Electronics

Programme: B.Tech. Branch/Specialisation: EE/EX

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. The representation of octal number $(532.2)_8$ in decimal is _____. **1**
(a) $(346.25)_{10}$ (b) $(532.864)_{10}$
(c) $(340.67)_{10}$ (d) $(531.668)_{10}$

ii. The K-map based Boolean reduction is based on the following unifying theorem: A + A' = 1. **1**
(a) Impact (b) Non-impact
(c) Force (d) Complementarity

iii. A full adder logic circuit will have _____. **1**
(a) Two inputs and one output
(b) Three inputs and three outputs
(c) Two inputs and two outputs
(d) Three inputs and two outputs

iv. In a multiplexer, the selection of a particular input line is controlled by _____. **1**
(a) Data controller (b) Selected lines
(c) Logic gates (d) Both (a) and (b)

v. One example of the use of an S-R flip-flop is as _____. **1**
(a) Transition pulse generator (b) Racer
(c) Switch debouncer (d) Astable oscillator

vi. A counter circuit is usually constructed of _____. **1**
(a) A number of latches connected in cascade form
(b) A number of NAND gates connected in cascade form
(c) A number of flip-flops connected in cascade
(d) A number of NOR gates connected in cascade form

vii. Which of the following is not a type of memory? **1**
(a) RAM (b) PROM (c) EEPRAM (d) ROM

P.T.O.

viii. ROMs are used to _____. **1**
(a) Store bootstrap program (b) Character generation
(c) Code conversion (d) All of these

ix. CMOS technology is used in _____. **1**
(a) TTL (b) Microprocessor
(c) Digital logic (d) Both (b) and (c)

x. TTL is a _____ device. **1**
(a) Current sinking (b) Current sourcing
(c) Voltage sinking (d) Voltage sourcing

Q.2 i. Define 1's and 2's complement of binary number with example. **2**

ii. Convert the following numbers: **3**
(a) $(1E2)_{16} = (\ )_{10}$ (b) $(651.124)_8 = (\ )_{16}$
(c) $(0.345)_{10} = (\ )_8$

iii. How Boolean expressions can be simplified using K-map? Explain with an example. **5**

OR iv. Explain quine McCluskey method using an example. **5**

Q.3 i. Realize the following logic operations using only NAND gates: AND, OR, NOT. **3**

ii. Draw and explain half adder and full adder with truth table. **7**

OR iii. Explain multiplexer and compare with demultiplexer. **7**

Q.4 i. Define sequential and combinational circuits. **3**

ii. Define modulus of a counter? Write down the number of flip flops required for mod-5 counter? **7**

OR iii. Describe the working of JK flip-flop with truth table & logic diagram. **7**

Q.5 i. Compare the SRAM with DRAM memory (Any three points). **3**

ii. Draw and explain the block diagram of programmable logic array. **7**

OR iii. Explain ROM, PROM and EPROM. **7**

Q.6 Compare any two of following logic families:

i. DTL and RTL **5**

ii. TTL and IIL **5**

iii. NMOS and CMOS **5**

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Marking Scheme

EE-EX3CO21 (T) Digital Electronics

Q.1	i)	The representation of octal number $(532.2)_8$ in decimal is _____ a) $(346.25)_{10}$	**1**
	ii)	The K-map based Boolean reduction is based on the following Unifying Theorem: A + A' = 1. b) Non Impact	**1**
	iii)	A full adder logic circuit will have _____ d) Three inputs and two outputs	**1**
	iv)	In a multiplexer, the selection of a particular input line is controlled by _____ b) Selected lines	**1**
	v)	One example of the use of an S-R flip-flop is as _____ c) Switch debouncer	**1**
	vi)	A counter circuit is usually constructed of _____ c) A number of flip-flops connected in cascade	**1**
	vii)	Which of the following is not a type of memory? c) EEPRAM	**1**
	viii)	ROMs are used to _____ d) All of the Mentioned	**1**
	ix)	CMOS technology is used in _____ d) Both microprocessor and digital logic	**1**
	x)	TTL is a _____ a) Current sinking	**1**
Q.2	i.	Define 1's and -1 marks 2's complement of binary number with example. 1 marks	**2**
	ii.	Convert the following numbers: a) $(1E2)_{16} = (482)_{10}$ b) $(651.124)_8 = (1A9.2A)_{16}$ C) $(0.345)_{10} = (0.26050)_8$ 1 marks each	**3**
	iii.	What is simplifying boolean expression using K-map? 3-marks Explain with examples. 2-marks	**5**
OR	iv.	What are the methods adopted to reduce Boolean function? 2-marks Explain quine Meluskey method. 3-marks	**5**
Q.3	i.	Realize the following logic operations using only NAND gates: AND, OR, NOT. 1 mark each	**3**
	ii.	Draw and 2 marks explain half adder and full adder with truth table. 5 marks	**7**
OR	iii.	Explain multiplexer and 4 marks compare with demultiplexer. 3 marks	**7**
Q.4	i.	Define sequential and 1.5 marks each combinational circuits.	**3**
	ii.	Define modulus of a counter? 3- marks Write down the number of flip flops required for mod-5 counter? 4 marks	**7**
OR	iii.	Describe the working of JK Flip-Flop with 3 marks Truth Table and 2 marks Logic diagram. 2 marks	**7**
Q.5	i.	Compare the SRAM with DRAM memory (Any three points).	**3**
	ii.	Draw and 3 marks explain the block diagram of programmable logic array. 4 marks	**7**
OR	iii.	Explain ROM, 2 marks PROM and 2 marks EPROM. 3 marks	**7**
Q.6		Compare following logic families:	
	i.	DTL and RTL 1 mark for each comparison	**5**
	ii.	TTL and IIL 1 mark for each comparison	**5**
	iii.	NMOS and CMOS 1 mark for each comparison	**5**

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