

# ENGINEERING & MANAGEMENT EXAMINATIONS, DECEMBER - 2008 DIGITAL ELECTRONICS SEMESTER - 1

Time: 3 Hours ]

[Full Marks: 70

## **GROUP - A**

# ( Multiple Choice Type Questions )

1.	Cho	ose th	e correct alternatives for any	ten of the	e following:	$10 \times 1 = 10$
5	<b>i)</b>	(110	$(0.1011)_2 = (?)_{10}$			
•		a)	10.6785	<b>b</b> )	11.6578	
		c)	12.6875	d)	13.6785.	
	ii)	2's	complement of 10101100 is			
		a)	11001010	<b>b</b> )	01010011	
		c)	01010100	d)	01011001.	
	iii)	(24	$(7\cdot 36)_8 = (?)_{16}$			
		a)	A7·78	<b>b</b> )	1A7·36	
	• •	c)	B7·87	d)	1B7·36.	
	iv)	MBI	R, in reference to memory ma	nagemen	t <b>is</b>	
		a)	Memory Broad Register	<b>b</b> )	Memory Buffer Relay	
		<b>c</b> )	Memory Buffer Register	<b>d</b> )	None of these.	
	<b>v</b> )	Out	put of NAND gate is 1, if and	only if		
		a)	all inputs are 1	<b>b</b> )	any input is 1	
		c)	all inputs are 0	d)	any input is 0.	

٠.	/RCA	SRM.1	/BCA-101	/OS /	(AA)

7	ŧ

Ulech
Utech

vi) 
$$A + \overline{A} = ?$$

a) 1

b) (

c) A

d)  $\overline{\mathbf{A}}$ .

vii) If the no. of states of a counter is 8, then the no. of flip-flops is

a) 8

b) 3

c) 4

d) 6.

viii)  $(A.B + \overline{A}.B + \overline{A}.\overline{B})$  is equal to

a)  $A + \overline{B}$ 

b)  $\overline{A} + B$ 

c) A+B

d) 1.

ix) Karnaugh Map is used to

- a) simplify Boolean function
- b) design Boolean function
- c) evaluate Boolean function
- d) none of these.

x) A multiplexer has

a) single input

b) multiple output

c) no output

d) single output.

xi) Output of R-S (NAND) flip-flop, for R = 1 & S = 1 is

'a) set

b) reset

c) race

d) no change.

xii) Subtracting 1111 from 11000 will result to

a) 1000

b) 1100

c) 1001

d) 1011.

\_\_\_\_\_



#### **GROUP - B**

### (Short Answer Type Questions)

Answer any three of the following.

 $3 \times 5 = 15$ 

2. Apply K-map to obtain the minimal form for the function :

$$F(A, B, C, D) = \Sigma(0, 4, 5, 7, 8, 9, 13, 15)$$

 $d(A, B, C, D) = \Sigma(1, 2, 6, 10)$ 

- 3. Draw a half-adder circuit and describe its operations.
- 4. Design a 4-bit up-down counter.
- 5. Prove the following logical equation using Boolean algebra:

$$(A+BC) \cdot (B+A\overline{C}) = BC + A\overline{C}$$

- 6. i) Subtract  $(7489)_{10}$   $(2485)_{10}$  using 10's complement method.
  - ii) What is a Multiplexer? Why is it called "Data selector"?

#### GROUP - C

#### (Long Answer Type Questions)

Answer any three of the following questions.

 $3 \times 15 = 45$ 

- 7. a) Represent the decimal number "27" in
  - i) BCD code
  - ii) Octal code
  - iii) Gray code.
  - b) Draw the block diagram of a digital multiplexer and explain its function.
  - c) Give the functional truth table of a 4:1 multiplexer and realize it using basic gates AND, OR and NOT.
  - d) Implement the expression using a multiplexer:

$$f(A, B, C, D) = \Sigma m(0, 2, 3, 6, 8, 9, 12, 14)$$

3 + 4 + 4 + 4



- 8. a) What do you mean by a sequential circuit?
  - b) What are synchronous & asynchronous sequential circuits?
  - c) Explain the functionality of D-flip-flop. Give the truth table, State diagram.
  - d) What do you mean by Edge-triggering & Level-triggering in flip-flops?

2 + 3 + 5 + 5

- 9. a) What is a flip-flop?
  - b) What are the uses of flip-flops?
  - c) Give the circuit diagram of a J-K flip-flop.
  - d) Give the truth tables of S-R & J-K flip-flops.

2+3+4+6

10. a) Given the following truth table:

Inputs			Outputs	
х	у	z	+ Je F1 A+8	F2
0	Juan volumejeme	e O O O au Ma	act (7480 )-(248	0
0	0	1	1	0
0	1 .	0	1 .	0
0	1	1	0	1
1	0	0	1	0
1		1	0	1
1	internation	0	0 290/8 0	1
1	1	1	1	1

- i) Obtain the simplified functions in sum of products.
- ii) Obtain the simplified functions in product of sums.
- b) Design a BCD to Exess-3 Code converter.

8 + 7

- 11. a) Explain different types of RAM and ROM.
  - b) Write short notes on any two of the following:
    - i) Parity checker
    - ii) Ring counter
    - iii) Magnitude comparator.

 $7 + (2 \times 4)$ 

Fins: TO D