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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE)/(IT) (2012 to 2017) (Sem.-3)**DIGITAL CIRCUITS & LOGIC DESIGN****Subject Code : BTCS-303****M.Code : 56593**

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A**Answer briefly :**

- 1) Perform 2's complement subtraction of $(7)_{10} - (11)_{10}$
- 2) What is race around condition? How it can be avoided?
- 3) How many states can an n -bit Ring counter and an n -bit Johnson's counter have?
- 4) What is meant by the term edge triggered?
- 5) How many flip-flops are required to design a mod-7 up down counter?
- 6) What is difference between static RAM and dynamic RAM?
- 7) What is EEPROM?
- 8) What are the advantages of ring counter?
- 9) Differentiate between A/D and D/A conversion techniques.
- 10) Write a short note on : SOP and POS.

SECTION-B

- 11) Prove the following identities using Boolean algebra :
$$(A + B)(A + (AB)')C + A'(B + C') + A'B + ABC = C(A + B) + A'(B + C')$$
- 12) A microprocessor uses RAM chips of 1024×1 capacity.
 - (a) How many chips will be required and how many address lines will be connected to provide capacity of 1024 bytes?
 - (b) How many chips will be required to obtain a memory of capacity of 16 K bytes?

- 13) What are the characteristics of digital ICs used to compute their performance?
- 14) Design an FPLA circuit, programmed to implement a 3-bit binary to Gray conversion.
- 15) Design a sequence detector to detect the sequence **1010** (overlapping of the sequence is permitted). Use D flip-flop to design the circuit. Show the intermediate design steps :
 - (a) State Diagram
 - (b) Truth Table/ Excitation table
 - (c) Logic Diagram of the circuit.

SECTION-C

- 16) A combinational circuit has 3 inputs A, B, C and output F. F is true for following input combinations

A is False, B is True

A is False, C is True

A, B, C are False

A, B, C are True

- (a) Write the Truth table for F. Use the convention *True* = 1 and *False* = 0.
- (b) Write the simplified expression for F in SOP form.
- (c) Write the simplified expression for F in POS form.

Draw logic circuit using minimum number of 2-input NAND gates.

- 17) Design a 8 to 1 multiplexer by using four variable function given by

$$F(A, B, C, D) = \sum m(0, 1, 3, 4, 8, 9, 15)$$

- 18) What are synchronous counters? Design a 3-bit Gray code counter using T-Flip Flop.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.