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**Reg. No. :**

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**Question Paper Code: 53306**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Third Semester

Electrical and Electronics Engineering

15UEE306 -DIGITAL LOGIC CIRCUITS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Convert binary 11111110010 to hexadecimal. CO1- R  
(a)  $EE_{16}$                       (b)  $FF_{16}$                       (c)  $2FE_{16}$                       (d)  $FD_{16}$
- Any signed negative binary number is recognized by its \_\_\_\_\_. CO1- R  
(a) MSB                      (b) LSB                      (c) Byte                      (d) Nibble
- Canonical form is a unique way of representing \_\_\_\_\_. CO2- R  
(a) SOP                      (b) Minterm                      (c) Boolean Expressions                      (d) POS
- The format used to present the logic output for the various combinations of logic inputs to a gate is called CO2- R  
(a) Truth table.                      (b) Input logic function.  
(c) Boolean constant                      (d) Boolean variable
- What is a shift register that will accept a parallel input, or a bidirectional serial load and internal shift features, called? CO3- R  
(a) Tri state                      (b) End around                      (c) Universal                      (d) Conversion
- A basic S-R flip-flop can be constructed by cross-coupling of which basic logic gates? CO3- R  
(a) AND or OR                      (b) XOR or XNOR                      (c) NOR or NAND                      (d) AND or NOR

7. Table that is not a part of asynchronous analysis procedure is CO4- R  
 (a) Transition table      (b) State table      (c) Flow table      (d) Excitation table
8. How much locations an 8-bit address code can select in memory? CO4- R  
 (a) 8 locations      (b) 256 locations      (c) 65,536 locations      (d) 131,072 locations
9. Each unit to be modeled in a VHDL design is known as CO5- R  
 (a) Behavioral model      (b) Design architecture  
 (c) Design entity      (d) Structural model
10. Which of the following describes the connections between the entity port and the local component? CO5-R  
 (a) Port map      (b) One to many map  
 (c) One to one map      (d) Many to many map

PART – B (5 x 2= 10 Marks)

11. Why Excess-3 code is called self complementing code? CO1- U
12. Draw the circuit diagram of full adder using two half adders. CO2- R
13. Compare Moore and Melay circuits. CO3- R
14. Define static hazard. CO4- R
15. What are the various modeling techniques in VHDL? CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) (i) Encode the binary word 1011 into seven bit even parity Hamming Code. CO1- U      (10)  
 (ii) Write short notes on binary weighted code. CO1- U      (6)
- Or
- (b) (i) With a neat schematic explain the working of two input TTL NAND gate. CO1- U      (10)  
 (ii) Compare totem pole and open collector outputs. CO1- U      (6)
17. (a) Design a 3:8 decoder and explain its operation as a minterm and maxterm generator. CO2- Ana      (16)
- Or
- (b) Design a circuit that can convert a four bit binary code into its equivalent gray code. CO2- Ana      (16)

18. (a) Design a MOD-7 synchronous counter using JK flip flop and CO3- Ana (16)  
implement it. Also draw its timing diagram.

Or

- (b) Design a clocked sequential circuit for the state diagram CO3- Ana (16)  
shown in Fig.1 using T flip flop.

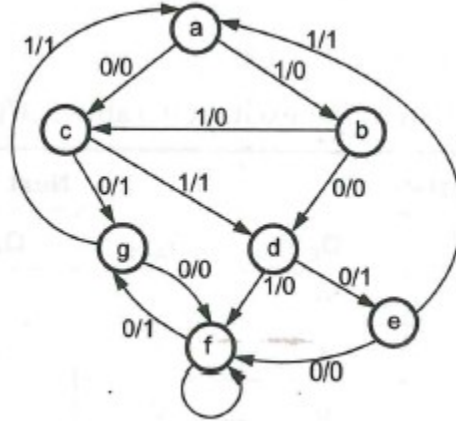


Fig.1

19. (a) (i) Analyze the following asynchronous network shown in Fig.2 using a flow table. Starting in the total stable state for which  $X = Z = 0$ . CO4-Ana (16)  
(ii) Are there any races in the flow table?

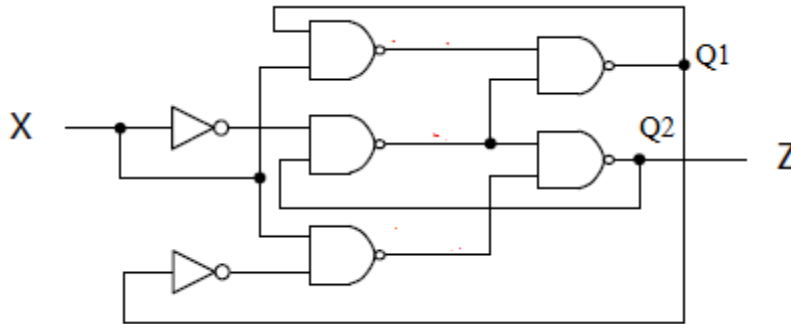


Fig.2

Or

- (b) Show how to programme the fusible links to get a 4 bit gray CO4-Ana (16)  
code from the binary inputs using PLA and PAL and compare  
the design requirements with PROM.

20. (a) Write a VHDL program for full adder using structural modeling and 1: 4 DMUX using data flow modeling. CO5-U (16)

Or

- (b) (i) Explain the various operators supported by VHDL. CO5-U (8)
- (ii) Write a VHDL code to realize a decade counter with behavioral modeling. CO5-U (8)