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Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, September 2016
(2008 Scheme)
08.305 : DIGITAL SYSTEM DESIGN (RF)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What do you mean by 'base' of a number system ? Why binary numbers are used in digital systems ?

2. Explain the two types of complements of a base-r number system. Find the 10's complement of $(935)_{11}$.

3. Convert the following to decimal equivalent.
   i) $(A08F.EA)_{16}$
   ii) $(6534.04)_8$
   iii) $(143.21)_5$
   iv) $(165.2)_7$

4. Convert the following expression to its canonical form : $(A + \overline{B})(\overline{C} + D)$.

5. State De Morgan's theorem. Apply De Morgan's theorem to the following function.
   $\overline{\overline{AB}\,(CD + \overline{E}F)\,(\overline{AB} + \overline{CD})}$

6. Implement the following function with a suitable multiplexer and a single inverter.
   $F(A, B, C, D) = \sum(0, 1, 3, 4, 8, 9, 15)$.

P.T.O.

7. Prove that the dual of the X-OR gate is also its complement.

8. Differentiate between synchronous and asynchronous sequential circuits.

9. Explain the terms : 'state diagram' and 'state table'.

10. What are universal shift registers ? **(10×4=40 Marks)**

PART – B

Answer **any one** from **each** Module.

Module – I

11. a) Explain the procedure for subtracting two numbers using r's complement and (r – 1)'s complement method.

Subtract the following numbers using both r's complement and (r – 1)'s complement method.

i) $(4AB.68)_{16} - (507D.56)_{16}$

ii) $(679.6)_{BCD} - (885.9)_{BCD}$ **12**

b) Explain briefly on alphanumeric codes. Give examples. **8**

OR

12. a) Perform the following conversions :

i) $(756.603)_8$ to hexadecimal

ii) $(375.54)_8$ to base-3

iii) $(165.2)_7$ to base-5

iv) $(B9F.AE)_{16}$ to octal **12**

b) Explain briefly on error detection and error correction codes. **8**

Module – II

13. a) Reduce the following expression using K-map.

$f(w, x, y, z) = x'y'z + w'xz + wxyz' + wxz + w'xyz$ 8

b) Implement a full adder circuit with

i) Decoder

ii) Multiplexer. 12

OR

14. a) Find a minimum sum of products expression for the following function using tabulation method.

$f(A, B, C, D, E) = \sum(0, 2, 3, 5, 7, 9, 11, 13, 14, 16, 18, 24, 26, 28, 30)$. 10

b) Design and implement an Excess-3 code to BCD converter. 10

Module – III

15. Design and implement a synchronous BCD counter using JK flip-flops. Is the counter self starting ? 20

OR

16. a) Write short notes on Programmable Logic Devices. 10

b) Design and explain the working of a Johnson counter with ten timing signals. 10
