Ex/CSE/T/214/17/2010

BACHELOR OF COMPUTER SC. ENGG. EXAMINATION, 2010

(2nd Year, 1st Semester)

DIGITAL CIRCUITS

Time : Three hours Full Marks : 100

Answer any **five** questions.

1. a) What are the problems associated with DCTL gates? How are they resolved? 4+2

   b) Explain the operations of an RTL gate. How do you estimate the fan out of a standard RTL gate? 6+4

   c) What happens when outputs of two RTL gates are shorted? What are its merits and demerits? 2+2

2. a) What are the Transfer characteristics of a logic family? 4

   b) Explain the transfer characteristics of a standard TTL gate. 16

3. a) Explain the operation of an nMOS Inverter. 8

   b) Explain its transfer characteristics. 4

   c) How can the universal logic gates be implemented with the same? 4

d) Realise $X = \overline{(A+B).C+D.E}$ using a single n MOS gate. 4

4. a) What are the various building blooks of a PLL? Explain their operations. 9

b) How does a PLL operate? 5

c) How can a input frequency be multiplied by π ? 6

5. a) Explain the operation of a 3 Tr/cell RAM. 8

b) How is the information retained by the above? 8

c) What happens during Read operation of an 1 Tr/ cell RAM? 4

6. a) Explain the operation of a buffered weighted register type DAC. 8

b) How can offsets be introduced in such converters? 4

c) How can a 3 bit signed binary number in 1'S complement representation be converted to analog voltages? 8

7. a) Explain the operation of a 3bit direct comparison type ADC. 8

b) Design the encoder circuit. 4

c) How can a 6 bit ADC be designed by using above mentioned converters? 8

8. Write notes on any four of the following : 4x5

a) I^2L;

b) HTL and its transfer characteristics;

c) Tristate gates;

d) NAND & NOR gates using c MOS;

e) 555 IC Timers;

f) EA PROM's;

g) Bipolar Switches for DAC'S;

h) Delta Modulation.

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