Test Examination 2014
Department of Computer Science
Part-I Honours
Bangabasi College

Time 4Hrs | Full Marks:100

Answer Q.No 1 and Any Six from rest.

Short Question (Answer any *Eleven)* 11x2=22

1. a) Can the barrier potential of a junction diode be measured by a Voltmeter? Explain
   b) Distinguish between Zener breakdown and avalanche breakdown.
   c) What is the PIV in rectification?
   d) Define the Cut-in voltage of a p-n diode.What are its typical values for Ge and Si diodes?
   e) What is radix of a number system?state with examples.
   f) Add:$(1.350)_6$ +$(24)_6$.
   g) Subtract: 01100 – 00011 using 2's complement method.
   h) Proof that X(Y+Z) = XY+XZ.
   i) What is glitch?
   j) What is stored memory architecture?
   k) What is the difference between ROM and PROM?
   l) What is cache memory?
   m) What is virtual memory?
   n) State difference between Compiler and Assembler?
   o) Compare between System Software and Application Software.
   p) State the purpose of any four symbols used in a flowchart.
   q) What do you understand by an integer variable?

2. a) State De-Morgan's Law.
   b) Compare and contrast at least three bus structures.
   c) What are the advantages of having floating point arithmetic with unnormalized form?
   d) Design a combinational circuit with four lines as inputs and whose output complement of the input number.
   e) What do you mean by Multiprocessing. 2+3+3+4 1

3. a) Show that dual of the exclusive OR is equal to its complement. Prove or disprove Whether it is equally true for the exclusive NOR
   b) What is translator? Give two examples.
   c) Discuss about the evolution of computer system since 1940s?

   4+3+6

4. a) What is Zener diode?
   b) In Zener diode voltage regulator circuit ,the source series resistance Rs=20 Ohm. Zener voltage V_Z=18 volt and load resistance R_l=200 Ohm. If source voltage can Vary from 20 volt to 30 volt, find max and min current in the diode.

c) What do you mean by the Junction Capacitance of p-n diode? Does it depend the depletion layer width and the applied reverse bias.

d) Define static and dynamic resistance of p-n diode

5. a) Implement the function with only AND & NOT Gates

$$F = xy + x'y' + y'z$$

b) Why filter is used in rectification?

c) For a Half-wave and full-wave rectifier, calculate

i) Form Factor.

ii) Ripple Factor.

iii) Efficiency of rectification. 5+2+(3x2)= 13

6 a) Explain the operation of JK ff.

b) What is race around condition? How this race problem can be overcome by using JK master-slave ff ?

c) What is T ff ? Mention its use.

d) Convert a SR ff to JK ff .Show the details design.

3+(2+2)= 1

7 a) A combinational circuit is specified by the following three Boolean functions.

$F_1(A,B,C) = \Sigma(3,5,6)$

$F_2(A,B,C) = \Sigma(1,4)$

$F_3(A,B,C) = \Sigma(2,3,5,6,7)$

Implement the circuit with a decoder constructed with NAND gates and NAND or AND gates connected to the decoder output.

b) Realize $F(A,B,C,D) = \Sigma(0,1,3,5,6,8,9,13,15)$ using 8x1 Mux

c) Design a BCD to Gray code Converter using Mux.

4+4+5=1

8. Given a linked list whose nodes contain numeric data values. Write algorithms to :-

a) Compute sum of the data values.

b) Return the maximum of data values.

c) Count the number of nodes. 5+4+4

9. a) What is recursion? Explain with any recursive function of your choice.

b) With respect to a singly linked list, write the following algorithms:-

i) Create the linked list.

ii) Search for a given node whose key value is input from user.

4+4+5

10. With respect to a singly linked list, write algorithms for functions to

a) Insert an element at the beginning of the list.

b) Insert an element before a given node.

c) Delete an element.

Also include algorithm for any other user defined function incorporated