

BANGABASI COLLEGE
TEST EXAMINATION - 2016
B.SC (HONOURS) PART I
SUBJECT: COMPUTER SCIENCE (PAPER I & PAPER II)

Full Marks: 100

Times: 4 Hrs

Answer Question No.1 and any Eight questions from the rest taking at least one question from each group:

- I. Answer any *ten* questions from the following: 2×10=20
- a) Using Boolean algebra techniques, simplified the following expression as much as possible
$$AB + (A'+B')C + AB$$
 - b) Show that dual of XOR is equal to its complement.
 - c) Distinguish between decoder and de multiplexer.
 - d) What is bus arbitration?
 - e) What is the difference between ROM & PROM?
 - f) What is stored memory architecture?
 - g) What is hamming code?
 - h) What is ASCII?
 - i) $(5234)_8 = (?)_{16}$
 - j) What is the important of 2's complement method?
 - k) What is Multiprogramming?
 - l) What is Thrashing in OS?
 - m) What are the differences between p-type semiconductor and n-type semiconductor?
 - n) What are the differences between compiler and interpreter?

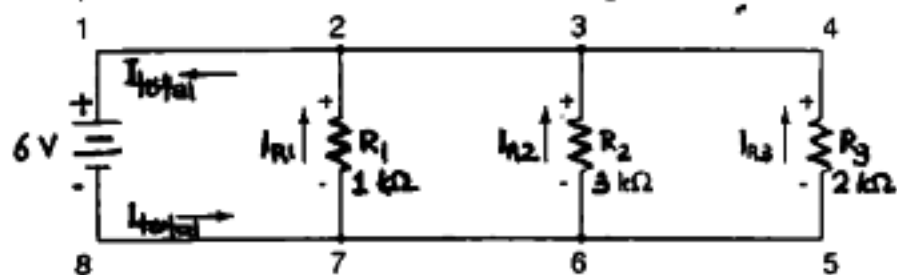
GROUP-A

(COMPUTER FUNDAMENTALS)

2. a) State De Morgan's law.
b) Compare and contrast at least two bus structures.
c) What are the advantages of having floating point arithmetic with un-normalized form?
d) Develop the logic circuit for adding two decimal digits express in excess-3 code. 2+2+3+3
3. a) Reduce the SOP expression $F(A, B, C, D) = \sum m(0, 1, 2, 3, 6, 7, 13, 15)$ by K-map method and implement the result in NAND logic circuit.
b) What is the difference between assembly language and machine language?
c) What is the importance of system software? 4+3+3

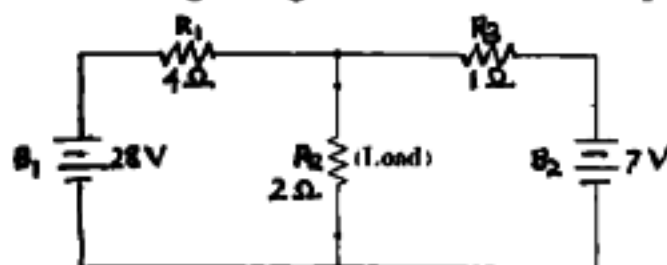
GROUP-B
(INTRODUCTION TO BASIC ELECTRONICS)

- 4 a) State KCL and KVL Theorem.
b) Find out all the currents through the circuit.

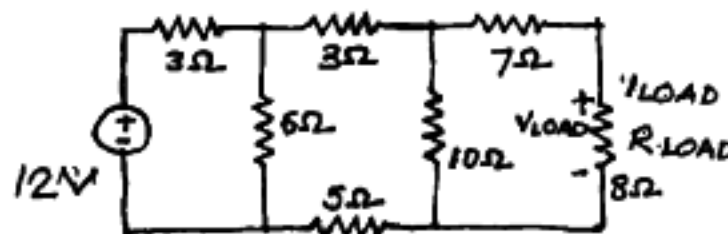


(2+2)+6

- 5 a) State Thevenin's Theorem.
b) Find out the Current flowing through the Load resistance R_2 using Norton's Theorem.



- c) Find out the Current flowing through the Load resistance R_{LOAD} using Thevenin's Theorem.



2+4+4

GROUP-C
(DIGITAL SYSTEM DESIGN)

6. a) Implement the following Boolean function F , together with the don't-care conditions d , using no more than two NOR gates
 $F(A, B, C, D) = \sum(2, 4, 6, 10, 12)$
 $D(A, B, C, D) = \sum(0, 8, 9, 13)$
 Assume that both the normal and complement inputs are available.
- b) A combinational circuit is specified by the following three Boolean functions
 $F_1(A, B, C) = \sum(3, 5, 6)$
 $F_2(A, B, C) = \sum(1, 4)$
 $F_3(A, B, C) = \sum(2, 3, 5, 6, 7)$
 Implement the circuit with a decoder constructed with NAND gates and NAND or AND gates connected to the decoder output.

5+5

7. a) Realize $F(A, B, C, D) = \sum(0, 1, 3, 5, 6, 8, 9, 13, 15)$ using 8×1 mux.
 c) Design a code converter that converts a decimal digit from the 8, 4, -2, -1 code to BCD.

6+4

GROUP-D
(COMPUTER ORGANIZATION-I)

8. a) What do you mean by Addressing mode? Explain the following address mode
 i) direct
 ii) relative
 b) What is pipelining technique? Differentiate between RISC and CISC.
 (2+(2+2))+ (2+2)
9. a) Explain the function of cache memory in the memory hierarchy.
 b) A digital computer has a memory unit of $64K \times 16$ and a cache memory of 1K words.
 The cache uses direct mapping with a block size of four words.
 i) How many bits are there in the tag, index, block and word fields of the address format?
 ii)

6+4

GROUP-E
(SYSTEM SOFTWARE FUNDAMENTALS AND OPERATING SYSTEMS)

10. a) What is medium-term scheduler?
 b) What are turnaround time and response time?
 c) What is the average waiting time for the following processes if priority scheduling is used:

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

2+(2+2)+4

11. a) What are the necessary conditions for occurring Deadlock in OS? Explain.
- b) An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1, and P2. The table given below presents the current system state.

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. Is the system in safe state? Justify

4+6

GROUP-E
(DATA STRUCTURE-I)

12. a) Define Data Structure.
- b) Given two matrices that contain numbers. Write algorithms of functions that
- i) Computes the sum matrix.
 - ii) Computes the product matrix.

2+ (4+4)

13. a) Write an algorithm to sort an array in ascending order.
- b) What is an array? Explain with a diagram.
- c) How is a string different from a character array?

6+2+2