B.Sc. (Honours) Examination 2018
Semester-I
Computer Science
Course : CC-2
(Computer System Architecture)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin
Answer question No.**1** and **any four** from the rest

1. Answer **any four** questions : 2×4=8
   a) Distinguish between conjunctive normal form and disjunctive normal form.
   b) Show analytically that $X \oplus (X \oplus Y) = Y$.
   c) What do you mean by dual statements / expressions?
   d) What are the limitations of a Karnaugh map?
   e) Distinguish between combinational and sequential circuits.
   f) Why is address bus unidirectional while data bus is bidirectional?

2. a) Given A = $(0101)_2$ and B = $(1001)_2$. Find A OR B, A AND B, A' and $A \oplus B$.
   b) State De Morgan's Theorem. Give an example.
   c) Find f' where $f = a(bc + b'c) + a'b'c'$ 4+2+2=8

3. a) Write down the full form of BCD.
   b) Design a binary to BCD converter that converts binary equivalants of the numbers from 00 to 15. 1+7=8

4. a) Simplify $f = xy + \overline{xz} + \overline{xy}\, z(xy + z)$.
   b) Simplify using K-maps, $f(a,b,c,d) = \sum_m (1,3,6,7,13,14,15)$ Draw the simplified circuit and find the number of gate delays. 2+6=8

5. a) Draw the circuit diagram of ripple counter and explain how it works.
   b) What is the advantage of synchronous counter our ripple counter? 6+2=8

6. a) What are the functions of (i) Accumulator (ii) ALE.
   b) Write briefly how the $AD_7 - AD_0$ bus is 8085 microprocessor is demultiplexed. 3+5=8

7. a) Describe the different control and status signals of 8085 microprocessor.
   b) Distinguish between memory-mapped I/O and I/O mapped I/O. 4+4=8

8. Discuss briefly (a) the flag register and (b) the bus structure of microprocessor. 4+4=8

9. Write short notes on any two : 4×2=8
   a) Full adder
   b) Master-slave J-K flipflap
   c) Race condition
   d) Universal gates
