Roll No. | | | | | | | | | | |

Paper Code: RCA104

MCA
(SEM I) ODD SEMESTER EXAMINATION 2016-17
COMPUTER ORGANISATION & ARCHITECTURE

[TIME: 3 hrs] **[Max. Marks: 70]**

Note: Attempt all questions. All questions carry equal marks.

Q1. Attempt any two of the following:

A) Given the boolean function:
$F = x.\bar{y}.z + \bar{x}.\bar{y}.z + x.y.z$
   i) List the truth table of the function
   ii) Draw the logic diagram using the original Boolean expression.
   iii) Simplify the above algberic expression.
   iv) List the truth table of the function from the simplified expression and show that it is same as the truth table in part (i).
   v) Draw the logic diagram from the simplified expression and compare the total number of gates with the diagram of part (ii).

B) Draw basic block diagram of computer system and explain the function.

C) Perform following function.
   i) Convert $(10111.0110)_2$ to its decimal equivalent.
   ii) Convert decimal number $(66.38)_{10}$ to its octal equivalent.
   iii) Subtraction using 1's complement method
   $(11010)_2 - (10000)_2$

Q2. Attempt any two of the following:

A) **I)** Differentiate between combinational logic circuit & sequential circuit.
II) What is half adder? Draw three different circuits of half adder.

B) Draw the circuit of magnitude comparator and explain the working.

C) Draw the circuit of 3 - to - 8 line decoder and explain the working.

Q3. Attempt any two of the following:

A) What do you understand by ROM? Draw block diagram of ROM. How logic construction of a 32 × 4 ROM is made?

B) Draw the logic diagram of RS flip flop explain its working & limitations.

C) Design MOD-7 counter & explain the working. Give reasons for selecting particular flip- flops for your design.

Q4. Attempt any two of the following:

A) What do you mean by micro operations? List four logical micro operations. Draw the logic diagram for implementing these four logical micro operations & function table. Explain the working.

B) Draw a 4 - bit arithmetic circuit and explain its function.

C) Discuss the different phases of instruction cycle of a basic computer system along with different addressing modes.

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Q5. Write short notes on any two of the following:

a) De Morgan's I & II Theorem.

b) Why & Where interrupt signal is needed?

c) Shift registers design & application.

d) Register transfer language.

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