*Total number of printed pages–3*

**53 (CS 301) CPOA**

**2021**

# COMPUTER ORGANIZATION AND ARCHITECTURE

Paper : CS 301

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer* ***any five*** *questions.*

1. (5×2+10)=20

*(a)* Convert the following :

*(i)* $(1739)_{10} = (?)_2$

*(ii)* $(1101 \cdot 01)_2 = (?)_{10}$

*(iii)* $(145)_6 = (?)_{10}$

*(iv)* $(ABCF)_{16} = (?)_8$

*(v)* $(737)_8 = (?)_5$

*Contd.*

(b) Perform (17-23) in signed-magnitude binary and 2's complement method. Discuss which one is better and why.

2. 10+10=20

(a) Represent 17·25 in IEEE floating-point single-precision and double-precision representation.

(b) Use floating-point arithmetic to perform the following :

5·375 + 199·25.

3. 10+10=20

(a) With a suitable diagram, discuss a 3-bit carry-lookahead adder.

(b) With Booth's multiplication, perform $(-8) \times (-5)$ .

4. 10+10=20

Perform 15/4 using —

(a) restoring division algorithm

(b) Non-restoring division algorithm.

5. 5+7+8=20

(a) Differentiate among the Write through and Write back protocols of cache.

(b) In a computer, if the hit ratio = 80%, cache read time = $1ns$, RAM read time = $10ns$ and there are 1000 instructions, then compute the speedup.

(c) With a diagram, discuss the Read/Write operations of a DRAM cell.

6. Write short notes on : ***(any four)*** 5×4=20

(a) $\mu$ programmed *vs* H/W control unit

(b) Virtual memory

(c) Stored Programmed Architecture

(d) Read operations of CD

(e) Memory hierarchy

(f) Pipelining.