53 (CS 301) COAR

2019

COMPUTER ORGANIZATION & 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.

(a) Convert the following :

(i) $(193)_{10} = (X)_2$

(ii) $(1101011)_2 = (X)_8$

(iii) $(1101.101)_2 = (X)_{10}$

(iv) $(CD9)_{16} = (X)_2$

(v) $(473)_8 = (X)_{16}$

Contd.

(b) With an example discuss about the IEEE floating point representation technique. (Clearly mention the storing and reading operations). 2×5+10

2. Design a CPU capable of performing the following operations :

(i) ADD

(ii) Subtract

(iii) Multiply

(iv) Division

(v) Greater than

(vi) Less than

(vii) AND

(viii) OR

and has 8 registrars R_0, R_1 ..... R_7. Clearly show your control signals.

Compute the control signals for the following instructions :

$ADD\ \ R_0, R_1,\ R_2\ \ //C(R_0) \leftarrow C(R_1) + C(R_2)$

$LT\ R_1, R_2, R_3\ \ //if\ C(R_2) < C(R_3)$

$C(R_1) \leftarrow C(R_2)$

else

$C(R_1) \leftarrow C(R_3)$ 20

3. (a) Using Booth's multiplication algorithm, compute

$(-9) \times (-4)$

(b) Using non-restoring division algorithm compute

15/4 10+10

4. (a) With a diagram discuss a static RAM cell. How ROM cell differs from a RAM cell ?

(b) Consider a RAM having of 8192 blocks and each block contains 16 words. The cache memory size is 256 blocks (32 words).

Compute the parts of the CPU address for the following cache mapping techniques :

(i) Direct

(ii) Associative

(iii) 2 Ways Set Associative. 5+3×5

5. 20

(a) What is the main advantage of DMA? (Discuss with an example)

(b) Write the differences between programmed I/O *vs* Interrupt driven I/O. According to your opinion, which one is suitable for our modern computer?

(c) With an example discuss about priority interrupt.

6. (a) What are the advantages of pipelining?

(b) Consider a computer uses five stage pipelining. Each stage needs 5*ms*. If you have 1000 instructions then compute the speed up.

(c) What are the different hazards in pipelining? 5+5+10

7. Write short notes on : 5×4

(a) PC

(b) Virtual Memory

(c) Immediate addressing mode

(d) Stored program architecture.
