Roll No. .....

3152

B. Tech. 3rd Semester (CSE-IOT & CSE) Examination – February, 2022

DIGITAL LOGIC AND COMPUTER ARCHITECTURE

Paper : PCC-CSE-251-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is ***compulsory***. Attempt ***five*** questions in total selecting ***one*** question from each Unit.

1. (a) Define race around condition briefly. $6 \times 2.5 = 15$

(b) Write the characteristic equations for JK and D flip-flops

(c) Which addressing mode requires no additional calculations to work out the effective address ? Explain with example.

(d) What are registers ? Can we call them memory ? Explain.

(e) Define locality of reference.

(f) Advantages and disadvantages of programmed I/O.

UNIT – I

2. (a) "RS flip-flop cannot be converted to T flip-flop but JK flip-flop can be converted to T flip-flop". Justify this statement. 7

(b) Convert the following : 8

(i) ABCD to base-8

(ii) $(456)_8$ to decimal

(iii) $(1110.101)_2$ to decimal

(iv) $(43.56)_{10}$ to binary

3. (a) What are universal gates. Design OR, AND and NOT gates using NAND and NOR gates. 8

(b) What is flip-flop ? Draw and explain the excitation table of different flip-flop. 7

UNIT – II

4. Write short notes on : 5 + 5 + 5 = 15

   (a) High performance arithmetic

   (b) Direct and indirect mode of addressing

   (c) Basic machine instructions

5. (a) Explain with an example, how effective address is calculated in different types of addressing modes ? 8

   (b) Derive an algorithm for evaluating the square root of a binary fixed-point number. 7

UNIT – III

6. (a) What are the advantages and disadvantage of hardwired and microprogrammed control in tabular form ? 5

   (b) Explain briefly about Associate-mapped and set-associated mapped cache. 7

(c) What is volatile memory ? Which memory is called volatile memory and why ? 3

7. (a) Define the term micro programmed control. Draw the basic organization of a micro programmed control unit and explain it. 8

(b) Draw and explain memory hierarchy of a computer. 7

UNIT – IV

8. (a) What is Direct Memory Access ? Explain its working with the help of diagram. 8

(b) What are interrupts ? Explain the need of interrupts. 7

9. (a) What is device controller ? Explain memory mapped I/O. 8

(b) Explain programmed I/O mode input data transfer. 7
