WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 1st Semester Examination, 2019

CMSACOR02T-COMPUTER SCIENCE (CC2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

Answer Question No. 1 and any *four* questions from the rest $8\times5 = 40$

1. Answer any ***four*** questions from the following: $2\times4 = 8$
   (a) What do you mean by Min-Term and Max-Term of a Boolean expression?
   (b) What do you mean by Instruction Format?
   (c) If $(40)_8 = (32)_6 + (110)_x$. Then find the value of x.
   (d) What are *write back* and *write through* policies in Cache?
   (e) How NaN and Infinity are represented in IEEE 754 format?
   (f) Why DMA based I/O is better than Interrupt Driven I/O?
   (g) Find out the simplified form of following logical expression using K-map:
   $$F(A, B, C, D) = \sum(3, 4, 5, 7, 9, 13, 14, 15)$$

2. (a) Design a 4-bit adder-subtractor circuit. 4
   (b) Why complementary number system was introduced? What is the advantage of 2's complement system over 1's complement? Using 2's complement add $(15)_{10}$ and $(-8)_{10}$. 1+1+2

3. (a) With suitable diagram explain Von-Neumann architecture for stored program. 4
   (b) The content of a 12-bit register is 100101111000. What is its content if it represents (i) a BCD number and (ii) a 3-decimal digit in 2421 code? 4

4. (a) With the help of a flowchart explain Booth's multiplication algorithm. 4
   (b) Differentiate between Zero, One, Two and Three address instruction with suitable example. 4

5. (a) Diagrammatically illustrate Fetch and Execute cycle. 4
   (b) With suitable example explain pipelining. Find out the speedup factor for a k-stage pipelined system. 2+2

6. (a) Explain Direct and Relative Addressing Modes with examples. 4

   (b) Show organizations of memory-mapped I/O and I/O-mapped I/O. State their advantages and disadvantages. 2+2

7. (a) (i) Why Gray Code is known as Mirror Imaging Code? 3+2

   (ii) What is the application of Gray Code?

   (b) What do you mean by self-complementing code? Explain with an example. 3

8. (a) What is the purpose of using Common Bus System in a computer? A digital computer has a Common Bus System for 16 registers of 32-bit each. The bus is constructed with multiplexers. 2+4

   (i) How many selection inputs are there in each multiplexer?

   (ii) What sizes of multiplexers are needed?

   (iii) How many multiplexers are there in the bus?

   (b) When do we use DMA mode of data transfer? 2

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