



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours/Programme 4th Semester Examination, 2022

CMSGEC04T/MSGCOR04T-COMPUTER SCIENCE (GE4/DSC4)
COMPUTER SYSTEM ARCHITECTURE

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.*

Answer Question No. 1 and any *four* questions from the rest

1. Answer any *four* questions from the following: 2×4 = 8
 - (a) Define instruction set.
 - (b) Why CPU registers are preferred for temporary data storage?
 - (c) Define Fan-in of a gate.
 - (d) What is byte code?
 - (e) Draw an EX-OR gate using only NAND gate.
 - (f) Define min-term and max-term of a Boolean function.
 - (g) How to define a digital circuit?
 - (h) What is PCI?

2. (a) Define a decoder. Design a 3-to-8 decoder using 2-to-4 decoder. 4
(b) Realize a full subtractor circuit using half subtractor. 4

3. (a) State and prove De Morgan's theorem by using truth table. 4
(b) Simplify the following expression into SOP using K map 4
$$F(a, b, c, d) = \sum m(0, 1, 2, 3, 7, 8, 10) + \text{don't care conditions } \sum d(5, 6, 11, 15).$$

4. (a) What is SR Flip-Flop? Draw NAND based SR Flip-Flop. 4
(b) Derive the characteristic equation and excitation table of SR Flip-Flop. 4

5. (a) Convert $(10101.010)_2$ to decimal number. 2
(b) Perform the subtraction with 2's complement: $(1111)_2 - (1010)_2$ 3

(c) Simplify the following expression using K-map: 3

$$F(P, Q, R) = P'Q'R' + P'QR' + PQ'R' + PQR' + PQR$$

6. (a) What do you mean by addressing mode? 2

(b) Explain relative and indexed addressing modes with examples. 2+2

(c) What is interrupt? 2

7. Write short notes on (any *two*): 4×2 = 8

(a) Associative memory

(b) Decoder-demultiplex circuit

(c) Register addressing mode vs. Direct addressing mode

(d) SRAM vs. DRAM.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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