



WEST BENGAL STATE UNIVERSITY

B.Sc. General Part-I Examination, 2021

COMPUTER SCIENCE

PAPER: CMMSG-I

Time Allotted: 2 Hours

Full Marks: 50

The figures in the margin indicate full marks.

Candidates should answer in their own words and adhere to the word limit as practicable.

1. Answer any **four** questions from the following: 2×4 = 8
- (a) Simplify $x'y + x'yz + z$
 - (b) What do you mean by addressing mode?
 - (c) What are the differences between static and dynamic RAM?
 - (d) What do you mean by multitasking operating system?
 - (e) What do you mean by GUI?
 - (f) What are the phases of Instruction Cycle?
 - (g) What is the advantage of 2's complement representation over 1's complement representation?
 - (h) What is the function of OMR?
 - (i) Explain LIFO in terms of stack.
 - (j) What is ripple counter?
 - (k) How are binary codes converted to grey codes?
 - (l) How is class related with object?
 - (m) Explain XOR gate with truth table.
 - (n) What is demand paging?
 - (o) What is stack point register?

GROUP-A

Answer any one question from the following

16×1 = 16

2. (a) Compare between single-pass assembler and two-pass assembler. 3
- (b) Distinguish between compiler and interpreter. 4
- (c) Write short note on Von Newman architecture. 4
- (d) Draw the block diagram of a CPU. 3
- (e) Define operating system. 2
3. (a) Explain max heap and min heap with examples. 3
- (b) Write an algorithm to delete a node from a doubly linked list. The node can be anywhere of the linked list. 6
- (c) Draw a flow chart to find LCM and HCF of two given numbers. 4
- (d) Describe the big-oh notation. 3
4. (a) Sort the following elements using Quick Sort. 6
- 55, 88, 22, 44, 33, 11, 77, 110, 66, 99

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| (b) Define a Max-Heap. | 2 |
| (c) How a sparse matrix is represented using a Linked List? | 3 |
| (d) Illustrate the concept of a Priority Queue and a Dequeue with example. | 5 |

GROUP-B

Answer any *one* question from the following

13×1 = 13

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| 5. (a) Perform $(-19)_{10} + (-25)_{10} = (?)_2$. Use 2's complement method after converting the input number in binary. | 3 |
| (b) Design a 2-input XOR gate using Four (4) 2-input NAND Gates only. Show only the circuit diagram mentioning intermediate results. | 3 |
| (c) $f = \sum(2, 4, 8, 12, 15) + \phi(3, 7, 13)$
Realize a circuit producing f as output using only NOR gates, after minimizing the expression by means of K -Map. | 7 |
| 6. (a) Describe and implement any one universal gate for all basic gates (with diagram). | 5 |
| (b) Draw and explain (with truth table) full adder using two half adders. | 3+2 |
| (c) Design a 3-to-8. Decode using NAND gates only. | 3 |
| 7. (a) What do you mean by race around condition of JK flip-flop? | 3 |
| (b) What is register? | 2 |
| (c) Name four special purpose register in CPU. | 3 |
| (d) $(1010100)_2 - (1000100)_2 = ?$ (using 1's complement) | 3 |
| (e) $(1.0101)_2 = (?)_{10}$ | 2 |

GROUP-C

Answer any *one* question from the following

13×1 = 13

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| 8. (a) What is virtual memory? | 3 |
| (b) Differentiate between paging and segmentation. | 4 |
| (c) What is kernel and briefly explain its function. | 3 |
| (d) What is shell in terms of UNIX? | 3 |
| 9. (a) Write down the different Process States. | 4 |
| (b) What is PCB? | 2 |
| (c) What is job queue and ready queue? | 3 |
| (d) What do you mean by context switch? | 2 |
| (e) What is Co-operating process? | 2 |

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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