WEST BENGAL STATE UNIVERSITY

B.Sc. General Part-I Examination, 2019

COMPUTER SCIENCE

PAPER-CMSG-I

Time Allotted: 3 Hours | Full Marks: 100

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.

1. Answer any ***ten*** questions from the following: 2×10 = 20
   (a) What do you mean by recursion?
   (b) Explain FIFO in terms of queue.
   (c) What is operating system?
   (d) $(1011100)_2 = (?)_8$.
   (e) Prove that NAND gate is universal gate.
   (f) What is toggle?
   (g) What is Latch?
   (h) What are the differences between RAM and ROM?
   (i) What is race condition?
   (j) Simplify $AB + \overline{A}B$.
   (k) Define virtual memory.
   (l) Compare LAN and WAN.
   (m) What is operating system?
   (n) Compare between shell and kernel.

GROUP-A

Answer any *two* questions from the following 16×2 = 32

2. (a) Define general purpose and special purpose register. 3
   (b) Draw the block diagram of a CPU. 3
   (c) What are the characteristics of object oriented programming language? 3
   (d) Write short note on Von Neumann architecture. 4
   (e) Distinguish between compiler and interpreter. 3

3. (a) Define linear and nonlinear data structure with example. 3
   (b) Define max heap and min heap binary tree with example. 4
   (c) What is the function of BIOS (Basic Input Output System) program? 3
   (d) Draw a flowchart to check whether a positive integer '*n*' is prime or not prime. 6

4. (a) What are the differences between array and linked-list? 2
   (b) Sort the following elements using Bubble sort: 5
   65, 47, 57, 33, 12, 68, 36, 73, – 42, 22

(c) What is stack and why is this called LIFO? 3

(d) Define System Software and Application Software. 3

(e) How a sparse matrix is represented using Linked List? 3

GROUP-B

Answer any *two* questions from the following 16×2 = 32

5. (a) Simplify the following Boolean function: 2

$$F = xyz + x'y + xyz'$$

(b) Draw and explain (with truth table) full adder using two half adders. 4+2

(c) Find the minimized expression for the following function: 4

$$f(a, b, c, d) = \sum(0,\ 1,\ 2,\ 5,\ 8,\ 9,\ 10)$$

(d) What do you mean by addressing mode? 2

(e) What are the phases of Instruction Cycle? 2

6. (a) Define a flip-flop. How can a D flip-flop be made using JK flip-flop? 2+2

(b) Design an 8×1 Multiplexer using two 4×1 Multiplexers. 4

(c) Using 2's complement find $(1001)_2 - (110110)_2$. 4

(d) Using 1's complement find $(15)_{10} - (25)_{10}$. 4

7. (a) Describe the physical structure of coaxial cable. 3

(b) Briefly discuss about the TCP/IP reference model. 5

(c) Why MODEM is necessary for data communication? 3

(d) Define Point-to-Point and Multipoint connection. 2

(e) Write short note on E-mail. 3

GROUP-C

Answer any *one* question from the following 16×1 = 16

8. (a) Write the differences between program and process. 3

(b) What do you mean by context switch? 2

(c) Briefly describe the different states of a process. 4

(d) What are the objectives of CPU scheduling? 4

(e) What is priority scheduling? 3

9. (a) What is semaphore? What are the different types of semaphore? 2+3

(b) What is demand paging? How it is implemented? 2+2

(c) What is virtual memory? 4

(d) Mention one characteristic each of time sharing system, batch processing system and distributed system. 3

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