WEST BENGAL STATE UNIVERSITY

B.Sc. General PART-I Examinations, 2017

COMPUTER SCIENCE-GENERAL

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.

Group-A

1. Answer any ***ten*** questions from the following: 2×10 = 20

(a) Convert $(458)_{10}$ to octal number.

(b) Simplify $AB + \overline{A}B$.

(c) Define big-Oh.

(d) List two advantages of linked list.

(e) What do you mean by recursion?

(f) Prove that NOR is universal gate.

(g) What is multiplexer?

(h) Compare between Boolean and Switching algebra.

(i) Write the differences between synchronous and asynchronous counter.

(j) What is toggle?

(k) What is Latch?

(l) Compare LAN and WAN.

(m) What is operating system?

(n) Compare between shell and kernel.

Group-B

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

2. (a) Define general purpose and special purpose register. 3
   (b) Why preprocessing is necessary before compilation? 2
   (c) What are the characteristics of object oriented programming language? 3
   (d) Write a recursive algorithm to find out HCF of two positive integer numbers. 5
   (e) Why Queue and Stack are called FIFO and LIFO data structure? 3

3. (a) Why it is easy to write a program in High level language than Low level language? 3
   (b) Write an algorithm to sort an array in ascending order using Bubble sort technique. 6
   (c) Define System Software and Application Software. 3
   (d) Write an algorithm to insert an element in a linear queue. 4

4. (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

Group-C

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

5. (a) Describe and Implement any one universal gate for all basic gates (with diagram). 6
   (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

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

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) Write short notes on any ***two*** from the following: 4+4

(i) E-mail

(ii) www

(iii) Router

(iv) Satellite.

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

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

Group-D

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 GUI? 3

(c) Write the differences between single user and multiuser operating system. 3

(d) What are the objectives of CPU scheduling? 3

(e) Write the functions of long term scheduler and short term scheduler. 4

9. (a) Differentiate paging and segmentation. 2

   (b) Write any 2 page replacement algorithm. 4

   (c) What is demand paging? How it is implemented? 4

   (d) Write short notes on: 6

   (i) Mutual exclusion

   (ii) Hold and wait

   (iii) Semaphore.