

2018

COMPUTER SCIENCE – GENERAL

Second Paper

Full Marks : 100

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any five** from the rest, taking **two** from Group-A,
one from Group-B and **two** from Group-C.

1. Answer **any ten** questions :

2×10

- (a) Give the difference between recursive and non recursive algorithm.
- (b) State the difference between linear and non linear data structure.
- (c) Define full binary tree with example.
- (d) What is pendent vertex in a graph?
- (e) State any two differences between stack and queue.
- (f) What do you mean by height of a binary tree?
- (g) State the difference between context diagram and data flow diagram.
- (h) What is software maintenance?
- (i) Why is software testing required?
- (j) What is DDL? State any one DDL command in SQL.
- (k) Explain how candidate key is different from super key of a relation.
- (l) Define instance and schema.
- (m) Why normalization is needed?
- (n) What is "data integrity"? Give example.
- (o) Distinguish between entities and schema.

Group - A

(Algorithms and Data Structure)

2. (a) Write down the algorithm of binary search and mention its worst case complexity. 5+2
- (b) State the advantages of linked allocation over contiguous allocation. 4
- (c) State the characteristics of an algorithm. What do you mean by complexity of an algorithm? 3+2

Please Turn Over

3. (a) What is singly linked list? 2
- (b) Write an algorithm for insertion sort to arrange the element of an array in ascending order. 4
- (c) What is a flow chart? Draw the symbols used in a flow chart stating their purposes. Draw a flow chart to find sum of all odd numbers upto N, where N is input from user. 2+2+4
- (d) Explain array with an example. 2
4. (a) State differences between connected graphs and unconnected graphs with examples and diagrams. 5
- (b) Write separate algorithms for the following queue operations :
- (i) Test whether queue is FULL.
- (ii) Test whether queue is empty.
- (iii) Insert an element to the rear of the queue.
- (iv) Remove an element from the front of the queue. 1+1+2+2
- (c) Construct Binary Search Tree using the following nodes : 5
- M P T F O Z R J L A

Group - B

(Software Engineering)

5. (a) What do you understand by software development life cycle?
- (b) What is feasibility study?
- (c) Explain the phases of Spiral model with a diagram.
- (d) State any two advantages and any two disadvantages of classical waterfall model. 2+2+8+4
6. (a) Name the different phases of the waterfall model. State their function briefly. 6
- (b) What is DFD? What are the characteristics of level -O-DFD? 2+3
- (c) State the characteristics of a good SRS document. 5

Group - C

(Database Management System)

7. (a) What are data redundancy and data inconsistency? Explain with example. 4
- (b) Distinguish between strong and weak entity with an example. 3
- (c) Discuss utility of 'Foreign key' and 'composite primary key' with example. 6
- (d) Define 3-NF. 3

8. (a) Consider the following relational schema :

EMPLOYEE (*EID*, *EName*, Date of Birth, Salary, *DNo*)

DEPARTMENT (*DNo*, *DName*, Location)

Write SQL commands for the following queries :

(i) Find all employees whose names start with 'A'.

(ii) Find all employees of 'Marketing' department.

(iii) Find all departments located in Kolkata.

(iv) Find all employees who earn salary between ₹ 30,000 to ₹ 80,000.

3+3+3+3

(b) Explain super key and primary key with examples.

4

9. Write short notes on *any four* :

4×4

(a) Loss less decomposition

(b) Aggregate functions in SQL

(c) ANSI/SPARC architecture

(d) File organization

(e) Role of DBA

(f) Network data model
