

2017

M.Sc. Part-II Examination
APPLIED MATHEMATICS WITH OCEANOLOGY
AND
COMPUTER PROGRAMMING

PAPER—VI

Full Marks : 50

Time : 2 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

Group—A

1. Answer any *two* of the following : 2×5
- (a) Draw a block diagram of organization of a stored program computer system.
 - (b) (i) Explain with block diagram the construction of a 4-bit register using D flip-flops.

(Turn Over)

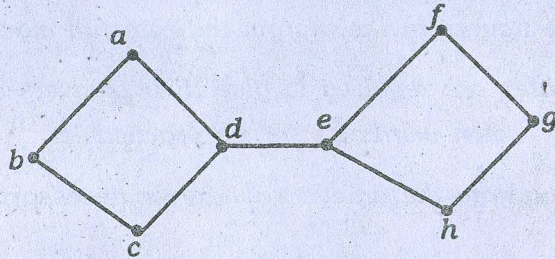
(ii) Construct a 3-to-8 decoder using two 2-to-4 decoders.

(c) Explain Von Neumann architecture of computer. Discuss all of its components.

2. Answer any *three* questions : 3×5

(a) Write an algorithm to evaluate a postfix expression. Write the limitations of your proposed algorithm.

(b) What do you mean by a linked list? Write algorithms to insert a node to a linked list and to remove a node from the linked list. (Here a single non-circular linked



list is meant for linked list).

(c) Write an algorithm for quick sort.

(d) Write recursive algorithms for BFS. Find the BFS tree for the following graph starting from the vertex *a*.

In the tree unique ?

(e) Write an algorithm to find the shortest distance between two given vertices on a weighted directed graph. Calculate time and space complexities.

3. Answer any *two* questions : 2×5

(a) What services are provided by the Internet? Describe them briefly.

(b) Write a note on network topologies.

(c) Explain the following terms in connection with data flow: simplex, half-duplex and full-duplex.

4. Answer any *three* questions : 3×5

(a) Explain round robin scheduling.

(b) Explain producer-consumer problem.

(c) What are the rules of naming a file? Which types of files are used in an operating system?

(d) A minicomputer uses the buddy system for memory management. Initially it has one block of 256 K at address 0. After successive requests for 5 K, 25 K, 35 K and 20 K come in, how many blocks are left and what are their sizes and addresses?

(e) Write a note on computer viruses.