PROVINCIAL MANAGEMENT SERVICE, ETC - 2016

SUBJECT: COMPUTER SCEINCE (PAPER-I)

TIME ALLOWED: THREE HOURS **MAXIMUM MARKS: 100**

NOTE: Attempt Any FIVE Questions in All.

Q No. 1:
a) List all phases of a compiler.
b) What is a Gateway or Router? Define its function.
c) Name the factors that affect the performance of a network.
d) Briefly describe any two software process models.

(6+2+2+10 Marks)

Q No. 2:
a) Write an algorithm to implement PUSH operation of a "Stack" data structure.
b) Write an algorithm to add an item in "Queue" data structure.

(10 +10 Marks)

Q No. 3: You are given two-dimensional arrays A and B of same dimensions i.e., mRows X nCols. Write instructions in C++ or Java computer language to compute their product, and display the resultant array.

(20 Marks)

Q No. 4:
a) What is VPN? Describe it briefly.
b) What are different ways of securing a computer network?
c) How many layers are there under TCP/IP?
d) What is the function of the OSI Session Layer?
e) What are MAC addresses?

(4x5=20 Marks)

Q No. 5:
a) What are firewalls?
b) Describe star topology.
c) What is hybrid network?
d) What software problems can lead to network defects?
e) What advantages does fibre optics have over other media?

(4x5=20 Marks)

Q No. 6:
a) Define important rules used in Boolean Algebra.
b) Write any five Boolean Laws.
c) Briefly describe Flip-flop, Register and Shift-Register.
d) Define signal and its types.

(5x4=20 Marks)

Q. 7:

a) Define process, I/O-bound process and CPU-bound process.

b) List the states of a process. Show their order through diagram.

c) Briefly describe the Process Control Block (PCB).

d) List scheduling queues along with brief description.

e) List schedulers along with brief description.

(4x5=20 Marks)

Q. 8:

a) **You are Given the Following:-**

- A set of Processes P = {P1, P2, P3} ;
- A set of Resources R = {R1, R2, R3, R4}

Resource Instances:

- One instance of resource type R1; Two instances of resource type R2;
- One instance of resource type R3; Three instances of resource type R4.

Process States:

- Process P1 is holding an instance of resource type R2 and is waiting for an instance of resource type R1.
- Process P2 is holding an instance of R1 and an instance of R2 and is waiting for an instance of R3.
- Process P3 is holding an instance of R3.

i. Draw resource-allocation graph by using data as given above.

ii. From resource-allocation graph produced in part (a), conclude whether the system is in deadlock state or not? Give reasons for your conclusion.

b) **Differentiate between:-**

i Logical and physical addresses.

ii External fragmentation and internal fragmentation.

iii Best-fit and worst-fit memory allocation strategies.

iv Segmentation and paging.

(20 Marks)