Seat
No.

[4918]-401

T.Y. B.Sc. (IV Semester) EXAMINATION, 2016
COMPUTER SCIENCE
Paper I
CS-341 : Operating Systems
(2013 PATTERN)

Time : Two Hours   Maximum Marks : 40

N.B. :— (i) Neat diagram must be drawn wherever necessary.

(ii) Figures to the right indicate full marks.

(iii) *All* questions are compulsory.

1. Attempt *all* of the following :   [10×1=10]

    (a) What is function of bootstrap loader ?

    (b) What will happen if all processes are CPU bound in system ?

    (c) List any *two* examples of many to many model.

    (d) Define dispatch latency.

    (e) What is race condition ?

    (f) Define starvation.

    (g) What are various dynamic allocation memory management methods ?

    (h) Give any *two* disk allocation methods.

    (i) State *two* general approaches that are used to handle critical section in operating system.

    (j) Define turnaround time.

2. Attempt any *two* of the following :

(a) Explain PCB with proper diagram.

(b) Consider the following set of processes, with the length of CPU burst time and arrival time in milliseconds :

Process	Burst time	Arrival time
P1	4	2
P2	6	0
P3	2	1

Illustrate the execution of these processes using Round Robin (RR) CPU scheduling algorithm (quantum = 3 milliseconds). Calculate average waiting time and average turn around time. Give the contents of Gantt chart.

(c) Consider a system with 7 processes A through G and six types of resources R through W with one resource for each type. Resource ownership is as follows :

A holds R and wants S

B holds nothing but wants T

C holds nothing but wants S

D holds U and wants S and T

E holds T and wants V

F holds W and wants S

G holds V and wants U.

Is the system deadlocked, and if so, which processes are involved ?

3. Attempt any *two* of the following :
$\qquad$ [2×5=10]

(a) What is a semaphore ? Explain dining philosopher problem.

(b) Discuss the various techniques of free space management in file system.

(c) Consider the following page reference string :

$$1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5.$$

How many page faults would occur for the following page replacement algorithms ?

(i) LRU

(ii) FIFO.

4. Attempt any *one* (A or B) :
$\qquad$ [1×10=10]

(A) (i) State and explain criteria for computing various scheduling algorithms. [4]

(ii) Explain internal and external fragmentation. [4]

(iii) Explain any *two* benefits of multithreading. [2]

Or

(B) (i) Explain tree-structured directories along with advantages and disadvantages. [4]

(ii) Explain the term "Select a victim and Rollback" in the context of deadlock recovery. [4]

(iii) Explain any *two* benefits of virtual machine. [2]