BCA–401(O)

B. C. A. (Fourth Semester)
EXAMINATION, May, 2013

(Old Course)

Paper First

BASICS OF OPERATING SYSTEM

Time : Three Hours]　　　　　[*Maximum Marks* : 75

Note : Section A is compulsory. Attempt *seven* questions from Section B and *one* question from Section C.

Section – A

1. (a) What is an Operating System (O. S.) ? Why O. S. is called resource allocater ? 　　3

   (b) What is Process Control Block ? 　　2

   (c) What is Scheduler ? 　　1

   (d) Explain the real time operating system and its different types also. 　　2

   (e) Explain the term virtual memory. 　　2

2. Consider a system with a set of processes P_1, P_2 and P_3. their C. P. U. burst times, arrival times and priorities being mentioned as ahead : 　　10

Process	CPU Burst Time	Arrival Time	Priority
P_1	5	0	2
P_2	15	1	3
P_3	10	2	1

Assume 1 is to be highest priority and calculate the following :

(a) Average waiting time using FCFS, SJF (Preemptive and non-preemptive) and priority (preemptive and non-preemptive) scheduling mechanisms.

(b) Average turn-around time using FCFS, . SJF (preemptive and non-preemptive) and priority (preemptive and non-preemptive) scheduling mechanisms.

(c) Assume time quantum to be 2 units of time. Calculate average waiting time and average turnaround time using Round-Robin scheduling.

Section – B

3. What is process state ? Draw a diagram of process state. How can we keep the process in memory ?   6

4. Explain page fault. List necessary steps to handle page fault. Draw the diagram.   6

5. What is Segmentation ? How is segmentation differ than paging ?   6

6. What are the necessary conditions for the occurrence of a deadlock ?   6

7. List the methods of dead-lock recovery.   6

8. What are different scheduling criteria ?   6

9. What is dispatcher ? What are its functions ?   6

10. Explain the functions of I/O traffic controller, I/O device handler and I/O scheduler.

11. Explain demand paging with the help of an example.   6

12. Compare the different page replacement algorithms with respect to time complexity and cost of implementation.   6

Section – C

13. (a) Consider that the pages are referenced in the following sequence : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3 , 2, 1, 2, 3, 6.   10

How many page faults would occur for the following replacement algorthims, assuming one, two, three and four frames :

(i) LRU

(ii) FIFO

(iii) Optimal

(b) How can a dirty bit/modify bit improve the performance of a virtual memory system ?   3

14. (a) What is thrashing ? What is the cause of thrashing ? How can the system eliminate the problem of thrashing ?   7

H-10

(b) Consider the following snapshot of a system : 6

Process	Allocation			Max. Requirement		
	A	B	C	A	B	C
P_0	0	1	0	7	5	3
P_1	2	0	0	3	2	2
P_2	3	0	2	9	0	2
P_3	2	1	1	2	2	2
P_4	0	0	2	4	3	3

List the avilable number of resources be given by avail vector as (3, 3, 2). Use the Banker's algorithm to answer the following :

(i) Find out the need matrix

(ii) Is the system in a safe state ?