NEW

2017

BCA

4th Semester Examination

OPERATING SYSTEM

PAPER—2202

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions : 5×2

(a) What are the disadvantage of batch processing system ?

(b) What is virtual memory ?

(c) When do we say a system is "multi-programming" ?

(d) What do you understand by turn-around time and response time ?

(e) When is a system in a safe state ?

(f) How many child processes are created from the below code.

```
fork ( );
fork ( );
fork ( );
fork ( );
```

Consider the following reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page faults will occur for LRU replacement algorithms ? Assume three frames (All frames are initially empty).

(g) What do you mean by shell ?

2. (a) What is process control block ? Explain with diagram and its contents.

(b) Describe demand paging. 8+7

3. (a) What is a dead lock ? Describe the tour conditions which are necessary to occur a dead lock.

(b) State the difference between preemptive scheduling.

(c) What is TLB ? Explain. 8+3+4

4. (a) Consider the following set of process :

Process	*Arrival Time*	*CPU Burst Time*	*Priority*
P_1	0	15	3
P_2	2	11	5
P_3	6	7	4
P_4	9	2	1
P_5	12	4	2

Where 1 – highest priority

5 – least priority

Draw the Gantt chart for preemptive priority and preemptive SJF scheduling. Also find out average waiting time and average turn-around time.

(b) Write down the difference between fixed partition and variable partition.

(c) Write the Goals of protection. 8+4+3

5. (a) What do you mean by a critical section ? 3

(b) Describe Dining Philosopher's problem with its solution. 4

(c) What is "response time" ? 1

(d) Consider a movie player application that supports functions like play movie, skip forward x frames and skip backward x frames. Suggest a memory management policy that will be best suited for this application. 3

(e) If the hit ration to a TLB is 80% and it takes 15 manoseconds to reach the TLB, and 150 nanoseconds to access the main memory, then what must be the effective memory access time in nanoseconds? 4

6. (a) What is multilevel feedback queue ? Why it is necessary ? 1+2

(b) What is thrashing ? 1

(c) Explain semaphores and write a short note on it. 3

(d) Consider a system with five processes P_0 to P_4 and three resource types A, B, C. Resource type A has 7 instances, B has 2 and C has 6 instances. Suppose at 't_0' time we have the following state :

Process	Allocation	Request	Available
	A B C	A B C	A B C
P_0	0 1 0	0 0 0	0 0 0
P_1	2 0 0	2 0 2	
P_2	3 0 3	0 0 0	
P_3	2 1 1	1 0 0	
P_4	0 2 2	0 0 2	

Answer the following questions using Banker's Algorithm :

(i) What is the content of matrix need ?

(ii) Is the given system in dead lock state ?

(iii) Suppose P_2 makes an additional request (0, 0, 1). What will be the effect of this request to the system ? 2+3+3

7. Write short notes on (any *three*) : 3×5

(a) i-node ;

(b) Belady's Anomaly ;

(c) Device Driver ;

(d) First-fit, Best-fit, Worst-fit ;

(e) RAID Architecture ;

(f) Boot block ;

(g) Inter process Communication.

[*Internal Assessment — 30*]

———