

2011**MCA****3rd SEMESTER EXAMINATION****OPERATING SYSTEM****PAPER—2305***Full Marks : 100**Time : 3 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.**Answer Q. No. 1 and any four from the rest.*

1. (a) What do you understand by 'Boot Block' and 'Bad Block'. 2
- (b) Differentiate between (any four) : 4×2
- (i) Logical Address & Physical Address ;
 - (ii) Dynamic Loading & Dynamic Linking ;
 - (iii) Internal & External Fragmentation ;
 - (iv) Distributed & Parallel O.S.
 - (v) Preemptive & Non-preemptive Scheduling.
 - (vi) Paging & Demand Paging.

(Turn Over)

2. (a) What is PCB? What type of information is stored in a PCB. Briefly describe them. 2+2
- (b) Explain IPC and Co-operating Processes. 2+2
- (c) What is context switching. What are its disadvantages. 3+2
- (d) Differentiate between process and thread. 2
3. (a) What is Semaphore? How are P and V operations implemented on a semaphore. 2+3
- (b) Briefly explain Parallel O.S. What are its advantages over other O.S. 2+2
- (c) What do you understand by 'Critical Section Problem'? What are the requirements to solve a Critical Section Problem. 2+3
- (d) What is Race condition. 1
4. (a) Consider the following four processes with the length of their CPU burst time in MS. 3+3

| <i>Process</i> | <i>Arrival Time</i> | <i>Burst Time</i> |
|----------------|---------------------|-------------------|
| P ₁ | 0 | 8 |
| P ₂ | 1 | 4 |
| P ₃ | 2 | 9 |
| P ₄ | 3 | 5 |

- (i) Using SJF scheduling, obtain a Gantt chart and compute average waiting and turn-around time.
- (ii) Repeat with shortest-Remaining Time First Scheduling.

(b) Explain process scheduling. Also explain the three types of schedulers. 2+3

(c) What is the problem with priority scheduling. How is it prevented? 2+2

5. (a) What is deadlock? What are the necessary conditions for deadlock. 2+2

(b) Write the Safety Algorithm with the help of this algorithm determine whether the system is in a safe state. 3+4

| <i>User</i> | <i>Allocation</i> | <i>Maximum Need</i> |
|----------------|-------------------|---------------------|
| P ₀ | 3 | 9 |
| P ₁ | 2 | 4 |
| P ₂ | 2 | 7 |

(c) Draw a Resource Allocation Graph that has a cycle but no deadlock. 2

(d) What is the difference between 'Deadlock Prevention' and 'Deadlock Avoidance'. 2

6. (a) Consider a logical address space of 8 pages of 1024 words each, mapped onto a physical memory of 32 frames. 3

(i) How many bits are in the logical address.

(ii) How many bits are in the physical address.

- (b) Explain — $2\frac{1}{2} + 2\frac{1}{2}$
- (i) Paging;
- (ii) Segmentation.
- (c) Using LRU Algorithm, find the number of page faults, using 4 frames (frame size is 4). 3
- Reference string : 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5.
- (d) Why are page size always power of 2. 1
- (e) What is fragmentation. Explain its types. 3
7. (a) Explain the concept of Virtual Memory. 3
- (b) Write short notes on (any four) : 4×3
- (i) Swapping;
- (ii) Indexed Allocation of file;
- (iii) Hashing;
- (iv) Blocking and Non-Blocking I/O;
- (v) Thrashing;
- (vi) Fragmentation.

Internal Assessment — 30
