



Reg. No. : .....

Name : .....

**Fourth Semester B.Tech. Degree Examination, February 2015  
(2008 Scheme)**

**Branch : Computer Science  
08.406 : OPERATING SYSTEMS (R)  
(Special Supplementary)**

Time : 3 Hours



Max. Marks : 100

Answer **all** questions :

1. Discuss multiprogramming versus single user systems in terms of throughput and CPU utilization.
2. What is spooling ? How can multiprogramming be achieved in spooling ?
3. Explain the external fragmentation problem in contiguous allocation.
4. Explain how protection is provided for the hardware resources by the operating system.
5. Compare and contrast the round robin pre-emptive policy with shortest job first pre-emptive policy.
6. What is critical section problem ? What are the requirements that a solution to the critical section problem must satisfy ?
7. Compare external fragmentation and internal fragmentation. With an example.
8. Explain any two I/O scheduling policies.
9. Is it possible to have a deadlock involving only one process ? Explain your answer.
10. What are the main differences between capability lists and access lists ?

**PART - B**

Answer **any one** question from **each** Module.

**Module - I**

11. a) Explain different directory structure. 15
- b) Compare multiprogramming and time sharing system. 5

OR

P.T.O.



12. a) Explain how linked allocation solves external fragmentation ? 5  
 b) What is the main advantage of the microkernel approach to system design ? 5  
 c) Describe the major features of the operating system. 10

### Module – II

13. a) Explain the CPU scheduling criteria. 5  
 b) Consider the following page 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 fault would occur for following replacement algorithms assuming three, four, six or seven frames ? Remember that all frames are initially empty, so your first unique page will all cost one fault each.

- i) LRU replacement  
 ii) FIFO replacement  
 iii) Optimal replacement. 15

OR

14. a) How can mutual exclusion be implemented by semaphore ? 5  
 b) Consider the following set of processes, with the length of the CPU-burst time given in millisecond

Process	Burst time	Priority
P <sub>1</sub>	10	3
P <sub>2</sub>	1	1
P <sub>3</sub>	2	3
P <sub>4</sub>	1	4
P <sub>5</sub>	5	2

- a) Draw four Gantt charts for FCFs, SJF, a non pre-emptive priority (a smallest priority number implies a higher priority) and RR (quantum = 1), scheduling.  
 b) Also compute turn around time (c) waiting. 15



**Module – III**

15. a) Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	0	0	1	2	0	0	1	2	1	5	2	0
P <sub>1</sub>	1	0	0	0	1	7	5	0				
P <sub>2</sub>	1	3	5	4	2	3	5	6				
P <sub>3</sub>	0	6	3	2	0	6	5	2				
P <sub>4</sub>	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's Algorithm.

What is the content of the matrix need ?

- i) Is the system in a safe state ?
  - ii) If a request from P<sub>1</sub> arrives for (0, 4, 2, 0). Can the request be granted immediately ?
- b) Explain any one disk scheduling algorithm.

15  
5

OR

16. a) Explain the role of access matrix in protection of operating systems.

5

b) Write short notes on :

- a) DMA
- b) Characteristics of deadlock
- c) Security in operating system.

15

