END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE-2019

Paper Code: MCA-106	**Subject: Operating System**
Time : 3 Hours	**Maximum Marks :75**

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1
(a) Operating system is also called Resource manager. Why? (2.5)
(b) Define preemption and non-preemption with the help of example. (2.5)
(c) Describe process Scheduling and process states. (2.5)
(d) What are cooperating processes? (2.5)
(e) Mention the necessary conditions for a deadlock to occur. (2.5)
(f) What is Belady Anomaly? (2.5)
(g) Define internal and external Fragmentation. (2.5)
(h) Compare program threats and system threats. (2.5)
(i) Explain cryptography in OS? (2.5)
(j) What are different file attributes and file operations in a typical file system. (2.5)

UNIT-I

Q2
(a) What is operating system structure? Explain the different components of operating system with merits and demerits. (6.5)
(b) Explain Process Control Block. Draw the block diagram of process transition states. (6)

Q3   Consider the processes listed in the following table:-

Processes	Arrival Time	Burst Time	Priority No.
P1	1	20	2
P2	4	16	1
P3	5	04	3

Note that the small value (of priority No.) indicates high order of priority. Answer the following.

(a) Draw 3 Gantt charts for Priority (preemptive), SJF (non-preemptive) and RR (with the quantum 4). (5)
(b) Calculate avg. waiting time for each of the above scheduling. (4)
(c) Calculate avg. Turnaround time for each of the above scheduling. (3.5)

UNIT-II

Q4
(a) What is a semaphore? Which are operations done on semaphore? Give implementation of producer-consumer problem with bounded buffer using semaphore. (5)
(b) Consider following Snapshot of a system. (7.5)

	Allocation	Max	Available
	A B C	A B C	A B C
P₀	0 1 0	7 5 3	3 3 2
P₁	2 0 0	3 2 2	
P₂	3 0 2	9 0 2	
P₃	2 1 1	2 2 2	
P₄	0 0 2	4 3 3	

Answer the following questions using banker's algorithm.
(i) What is the content of the matrix need? Is the system in a safe state?
(ii) If the request from process P1 arrives for (1 0 2), can the request be granted immediately?

Q5
(a) Explain the process of logical to physical address translation in paging system. Give the respective block diagram. (5)
(b) Consider the following page reference strings:-
1, 2, 3, 4, 2, 1, 5, 2, 3, 7, 6, 3, 5, 1, 2, 3, 6.
How many page faults would occur for the following replacement algorithms, assuming four frames? Assuming all frames are initially empty and first unique pages will cost one fault each. (7.5)
(i) LRU replacement (ii) FIFO replacement (iii) Optimal replacement.

UNIT-III

Q6
(a) Define the device management. Explain various techniques for device management. (5)
(b) Write short notes on the following: (7.5)
(i) Disk Reliability (ii) Buffering (iii) Block Multiplexing

Q7
(a) How swap space is managed by the operating system? Explain. (5)
(b) Suppose that a disk drive has 2000 cylinders numbered 0 to 1999. The drive is currently at 10 and previous record was at 140. The queue of pending requests in FIFO is 68, 1460, 811, 200, 1500, 1022, 28, 1389, 887, 160. Starting from current head position, what is total distance that disk moves to satisfy all pending request for each algorithms:- (7.5)
(i) SSTF (ii) C-SCAN (iii) Look

UNIT-IV

Q8
(a) Explain the sequential and direct file access methods. How can a sequential file be simulated on a direct access file? Explain. (6)
(b) Compare different directory structure implementation in a file system. (6.5)

Q9   List the differences between Linux Operating System and Windows XP operating system in view of operating system's resources. (12.5)

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