(Please write your Exam Roll No.) *Exam Roll No.* 00421402014

END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2016

Paper Code: BCA-301 ***Subject: Operating Systems***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each Unit.

Q1 Attempt the following: **(2.5x10=25)**

(a) What are the main functions of operating system?
(b) Is it possible to have a deadlock involving only one process? Explain.
(c) Explain the various states of a process.
(d) Differentiate between logical and physical address.
(e) Explain thrashing.
(f) What is Belady's anomaly?
(g) Explain Race condition.
(h) Explain RAID.
(i) What are the various types of devices? Explain.
(j) Differentiate between starvation and deadlock.

Unit-I

Q2 (a) Define operating systems. Discuss in detail how the operating system can be classified into different categories? **(8.5)**

(b) Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? **(4)**

Q3 (a) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs. **(4.5)**

(b) Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. If 3 frames are there in the memory then how many page faults will be there using FIFO, Optimal and LRU page replacement algorithms? **(8)**

Unit-II

Q4 Consider the following set of processes, with the length of the CPU-burst time given in nanoseconds:

Process	Arrival Time	Burst Time	Priority
P_1	0	10	3
P_2	1	1	1
P_3	3	2	3
P_4	4	1	4
P_5	6	5	2

Time Quantum = 2ns.

Calculate the average waiting time and average turnaround time using FIFO, SJF(Preemptive and Non-Preemptive), RR, Priority Algorithm. **(12.5)**

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Q5 (a) Explain PCB. **(8.5)**
(b) Explain Dining Philosophers Problem in detail. **(4)**

Unit-III

Q6 Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 147, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all FIFO, SSTF, SCAN, LOOK, C-SCAN, C-LOOK. **(12.5)**

Q7 (a) Consider the following snap shot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using the banker's algorithm: **(8.5)**
(i) What is the content of Need matrix?
(ii) Is the system in safe state?
(iii) If a request from process p_1 arrives for (0, 4, 2, 0). Can be request be granted immediately.

(b) What are the various ways for deadlock prevention? Explain. **(4)**

Unit-IV

Q8 (a) How will you protect files of a user from other user in a computer? Discuss. **(6)**
(b) Describe directory structure of a file system. **(6.5)**

Q9 List the advantages and disadvantages of the following File-Allocation methods: **(12.5)**
(a) Contiguous Memory allocation
(b) Linked Allocation
(c) Indexed Allocation

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