Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Operating Systems
Semester: II
Program: BCA   Time: 03 hrs.
Course Code: CSBC 1009   Max. Marks: 100

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	What are system calls? Explain the process of interrupt caused due to system calls, in brief.	1+3	CO1
Q 2	What is meant by degree of multiprogramming? Explain, why long term schedulers are responsible for controlling the degree of multiprogramming in a system.	1+3	CO2
Q 3	What are the necessary conditions for deadlock? Will there be a deadlock if any one of those conditions does not appear?	4	CO3
Q 4	What is the limitation of resource allocation graphs in deadlock avoidance? How can we get rid of that limitation?	3+1	CO3
Q 5	What are process control blocks? What information about a process do they contain?	1+3	CO2

SECTION B
(4Qx10M= 40 Marks)

6.	Differentiate between multi-programming, multiprocessing and multitasking systems.	10	CO1
7.	What are Semaphores? What are their types? Show how semaphores may be used for process synchronization.	1+2+7	CO2
8.	Apply Banker's algorithm for the given system snapshot and find out if the system is in safe state or not. If yes, show all the possible safe sequences.	10	CO3

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	0	2	0	0	4	1	0	2

P1	1	0	0	2	0	1	
P2	1	3	5	1	3	7	
P3	6	3	2	8	4	2	
P4	1	4	3	1	5	7	

OR

Find out if the following system is in deadlock for the given system snapshot. If not, then what is/are the possible safe sequence(s)? If it is in deadlock, then name the processes, which has, lead it to deadlock. Consider resource type A is having 10 instances, B is having 5 instances and C is having 7 instances.

	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 0 2	0 0 2	

9.	Perform SRTF and FCFS on the given set of processes and find out the average turnaround and waiting times for both the cases. 	Process	Burst Time	Arrival Time
P1	20	5
P2	10	3
P3	15	0		10	CO2
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SECTION-C
(2Qx20M=40 Marks)

10.	(a). Discuss in detail about the process of selecting an appropriate disk scheduling algorithm, for different types of system load. (b). Differentiate between paging and segmentation techniques. What are the relative advantages and disadvantages of both?	10+(5+5)	CO4
11.	Consider the disk queue with I/O requests on the following cylinders in their arriving order: 67, 12, 15, 45, 48, 50, 109, 89, 56, 59, 34, 88, 130, 24. The disk head is assumed be at cylinder 80 and moving in the direction of increasing number of cylinders. The disk consists of total 150 cylinders. Show the disk head movement with diagram using FCFS, SSTF, LOOK and C-SCAN scheduling algorithms. Calculate the total head movements. OR Discuss the working of hard disk with necessary diagram. The diagram should help one to comprehend the concepts of tracks, sectors and cylinders. Also explain the terms seek time and rotational latency in the present context.	20	CO5