Name:

Enrolment No:

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

Course: Operating Systems
Semester: II
Program: B.Tech(Hons) Computer Science and Engineering **Time: 03 hrs.**
Course Code: CSEG 1013 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	How are multi computer systems different from multi processor systems?	**4**	**CO1**
Q 2	Explain the process of context switching with necessary diagrams.	**4**	**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 rollback? Explain why rollback process is necessary for deadlock recovery.	**1+3**	**CO3**
Q 5	What is race condition? Explain with proper example.	**1+3**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

6.	Differentiate between multi-programming, multiprocessing and multitasking systems.	**10**	**CO1**
7.	Discuss the relative advantages and disadvantages of implementing Semaphores with integers and structures, with the help of pseudo code.	**10**	**CO2**
8.	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	**10**	**CO3**

	P_4 0 0 2 0 0 2 OR Write down in proper steps, the safety and resource allocation algorithms in Banker's algorithm.		
9.	Perform Priority scheduling (a) preemptive and (b) non preemptive, on the given set of processes and find out the average turnaround and waiting times for both the cases. Process Priority Burst Time Arrival Time P1 1 20 5 P2 2 10 3 P3 3 15 0	**10**	**CO2**
	SECTION-C **(2Qx20M=40 Marks)**		
10.	(a). Consider the following page reference string -1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5. How many page faults would occur for the cases (i) frame size =3 and (ii) Frame size = 4, while applying FIFO page replacement algorithm. (b). Discuss, why paging will lead to internal fragmentation. Explain with the help of an example the requirement for multilevel page tables.	**10+(5+5)**	**CO4**
11.	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. OR (a)Compare between contiguous, linked and indexed file allocation methods in detail with the help of necessary disk and directory diagrams. (10) (b) Consider the disk queue with I/O requests on the following	**20**	**CO5**

	cylinders in their arriving order: 98, 183, 37, 122, 14, 124, 65, 67. The disk head is assumed be at cylinder 53. The disk consists of total 200 cylinders. Show the disk head movement with diagram using FCFS, SSTF, LOOK and C-SCAN scheduling algorithms. Calculate the total head movements. (10)		