Name:

Enrolment No:

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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, Dec 2020

Course: Operating System Concepts **Semester: III**
Program: B. Tech. CSE-IBM + Xebia Specializations **Time 03 hrs.**
Course Code: CSEG-2007 **Max. Marks: 100**

SECTION A

1. **Each Question will carry 5 Marks**
2. **Instruction: Complete the statement / Select the correct answer(s)**

S. No.	**Question**	**CO**
Q 1	Analyze the necessary conditions that a solution to critical section should meet?	**CO2**
Q2	a) How Paging manages to non-contiguous allocation of processes? b) How Paging with TLB is efficient than paging scheme?	CO4
Q3	Simulate the protection mechanism of Operating System in context of Access Control Matrix.	**CO5**
Q4	Differentiate between SCAN and CSCAN Algorithm. Which will have lesser seek time?	**CO3**
Q5	Write down page fault handling steps.	**CO5**
Q6	a) What are the components of a PCB block? b) Write about scheduler which monitors degree of multiprogramming in system.	**CO1**

SECTION B

1. **Each question will carry 10 marks**
2. **Instruction: Write short / brief notes**

Q 7	Compile the completion time for the following processes when the scheduling algorithm is SRTF and each process first spends some time on I/O, then on CPU and again on I/O. Assume that there are multiple I/O devices.	**CO1**

Process	**Arrival Time**	**Execution Time**		
		I/O Time	**CPU Time**	**I/O Time**
P1	0	4	14	2
P2	1	8	28	4
P3	3	12	42	6

Q 8	How many total processes are created if parent is executing two fork system calls as fork(); fork(); Draw its activation tree also.	**CO2**
Q 9	Design solution to Critical Section Problem for 2-process system.	**CO3**
Q 10	a) Compare and Contrast between timesharing and real time systems. b) What is Belady's anomaly? Discuss in context of any page replacement algorithm.	**CO4**
Q 11	Design solution for classical synchronization problem "Dinning Philosophers Problem", with supportive brief explanation.	**CO5**

Section C

1. **Each Question carries 20 Marks.**
2. **Instruction: Write long answer.**

Q12	: Consider the following snapshot of a system *Process* *Allocation* *Max* *need* *Available* A B C A B C A B C A B C *P*0 1 1 2 4 3 3 2 1 0 *P*1 2 1 2 3 2 2 *P*2 4 0 1 9 0 2 *P*3 0 2 0 7 5 3 *P*4 1 1 2 10 2 3 Answer the following questions using the banker's algorithm: a. Determine the total number of resources present of each type (A,B,C) in the system. b. What is the content of the matrix Need? c. Is the system in a safe state? d. If a request from process *P*1 arrives for (2,1,0), can the request be granted ? OR Comply with Paging Memory Management Technique with Suitable diagram. Consider a paging system with the page table stored in memory. i) If a memory reference takes 200 nanoseconds, how long does a paged memory reference take? ii) If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time, if the entry is there.)	**CO3**