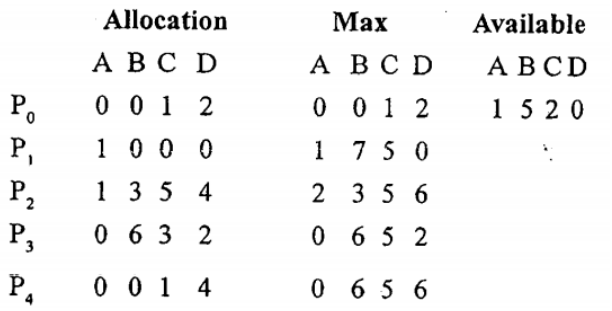
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Operating System **Semester: IV**
Program: B. Tech. CS+CL
Time: 03 hrs. **Max. Marks: 100**

Instructions:

SECTION A

S. No.		**Marks**	**CO**
	Attempt all the questions.	**20**	
1	Explain thrashing.	**4**	**CO1 CO2**
2	Highlight relevance of page table base register.	**4**	**CO2**
3	List out the various attributes of file.	**4**	**CO3**
4	Explain the difference between internal and external fragmentation.	**4**	**CO2**
5	Highlight the need of page replacement. Also discuss the basic approach.	**4**	**CO4**
SECTION B			
	Attempt all the questions.		
6	Explain Interprocess communication. Discuss the ways using which IPC is implemented.	**8**	**CO2**
7	Summarize producer consumer problem. Simulate the problem and solution in C programming language.	**8**	**CO2**
8	Using suitable example elaborate the below mentioned CPU scheduling algorithms. a) FCFS b) SJF c) Priority Scheduling d) Round robin **OR** Using suitable example elaborate the below mentioned page replacement algorithms. a) Optimal Page Replacement b) FIFO Page Replacement LRU Page Replacement	**8**	**CO3 CO4**
9	Consider the following snapshot of a system at instant T_0.	**8**	**CO2**

	 With reference to bankers algorithm. i) Find the need matrix. ii) Is the system in safe state? iii) If the request for process P_1 arrives for (0, 4, 2, 0), can the request be granted immediately.		
10	Write short notes on: a) Demand Paging and various page replacement policies. b) Mutex locks and Semaphore **OR** Write short notes on: a) Directory Structure b) Disk Scheduling	**8**	**CO2**
SECTION-C			
	Attempt all the questions.		
11	For the below mentioned scenario implement Optimal, FIFO and LRU page replacement algorithms. Compute the number of page faults and fault rate. a) Reference String: 0,2,1,6,4,0,1,0,3,1,2,1 b) No. of frames 3. c) Out of all the mentioned algorithms identify which algorithm suffers from Belady's anomaly considering frame size of 3 and 4.	**20**	**CO2** **CO3** **CO4**
12	Consider a paging system with the page table stored in memory. a) If a memory reference takes 200 nanoseconds, how long does a paged memory reference take? b) 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.) **OR** In context to deadlock explain the following: [10 Marks]	**20**	**CO2** **CO3** **CO4**

a) Deadlock Characteristics
b) Deadlock Prevention
c) Deadlock Avoidance
d) Deadlock Recovery

Consider the following segment table: [10 Marks]

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

a) 0,430
b) 1,10
c) 2,500
d) 3,400
e) 4,112