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| Reg No.: | |  | Name: |  |
| **APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019** | | | | |
| **Course Code: CS204** | | | | |
| **Course Name: OPERATING SYSTEMS (CS)** | | | | |
| Max. Marks: 100 | | Duration: 3 Hours | | |
|  |  | **PART** | **A** |  |
| ***Answer all questions. Each carries 3 marks.*** | | | | |
| 1 | What is the need for system calls in Operating System? | | | 3 |
| 2 | How does the hardware find the Operating System kernel after system switch-on? | | | 3 |
| 3 | The long term scheduler directly affectsthe system performance. Explain how. | | | 3 |
| 4 | Differentiate thread from a process. | | | 3 |
|  |  | **PART** | **B** |  |
| ***Answer any two questions. Each carries 9 marks.*** | | | | |
| 5 | Explain the Kernel data structures with suitable example. | | | 9 |
| 6 | With the help of a diagram explain the different states of a process. | | | 9 |
| 7 | A writer process like to send some bulk information to a reader process. Explain  the IPC mechanism that can be used for the purpose. | | | 9 |
|  |  | **PART** | **C** |  |
| ***Answer all questions. Each carries 3 marks.*** | | | | |
| 8 | What is the difference between counting and binary semaphores? | | | 3 |
| 9 | Explain the syntax | of a monitor. |  | 3 |
| 10 | What is preemptive scheduling? Give one disadvantage of preemptive scheduling. | | | 3 |
| 11 | What are the necessary conditions that cause deadlock in a system? | | | 3 |
|  |  | **PART** | **D** |  |
| ***Answer any two questions. Each carries 9 marks.*** | | | | |
| 12 | Write an algorithm that satisfies all the critical-section requirements for n process. | | | 9 |
| 13 | Find the average waiting time and average turnaround time for the processes given in the table below using:- i) SRT scheduling algorithm ii) Priority scheduling algorithm  Process Arrival Time (ms) CPU Burst Time (ms) Priority P1 0 5 3  P2 2 4 1  P3 3 1 2  P4 5 2 4 | | | 9 |

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1. Consider the following snapshot of a system with five processes P1, P2, P3, P4, 9 P5 and four resources A,B,C,D. Using Bankers Algorithm check whether the system is in safe state or not.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Allocation | | | |  | Max | | | |  | Available | | | |
| A | B | C | D | A | B | C | D | A | B | C | D |
| P1 |  | 1 | 0 | 2 | 2 | 3 | 2 | 5 | 2 | 3 | 0 | 0 | 1 |
| P2 | 0 | 2 | 1 | 2 | 3 | 4 | 1 | 2 |  | | | | |
| P3 | 2 | 4 | 5 | 0 | 2 | 7 | 7 | 3 |
| P4 | 3 | 0 | 0 | 0 | 5 | 5 | 0 | 7 |
| P5 | 4 | 2 | 1 | 3 | 6 | 2 | 1 | 4 |

# PART E

***Answer any four questions. Each carries 10 marks.***

1. a) Differentiate logical address and physical address with an example. 4
   1. What is dynamic storage-allocation problem with respect to contiguous memory 6 allocation? Discuss the three strategies that act as a common solution to this problem.
2. a) What is demand paging? What are its advantages? 4
   1. Consider the reference string: 8 4 6 4 3 5 8 4 3 2 3 5 8. Assuming demand paging 6 with four frames, how many page faults would occur for:-
      1. FIFO replacement algorithm
      2. Optimal replacement algorithm
3. a) With the help of an example explain the paging concept. 6
   1. Does paging suffer from fragmentation? Explain. 4
4. a) Compare sequential access and direct access methods of storage devices. 4
   1. What is the significance of access rights associated with each file in a system? 6
5. a) How can we make a new magnetic disk ready for use (to store files)? 5
   1. What is swap space? How is it managed in Linux system? 5
6. Explain FCFS, SSTF and SCAN disk scheduling algorithms, using thegiven disk 10 queue of requests: - 20, 89, 130, 45 and 180. Assume that, the disk has 200 platters ranging from 0 to 199 and the current position of head is at cylinder 100.

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