Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: IT305
Course Name: OPERATING SYSTEMS

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks. Marks

1 a) Explain three main purposes of Operating Systems. (3)

  b) Explain System call with an Example. (5)

  c) What is Process Control Block? Explain the contents of PCB. (7)

2 a) How does the distinction between kernel mode and user mode function as an elementary form of protection system? Explain with diagram. (5)

  b) What are the two types of real time operating system? (3)

  c) Explain the effect of time quantum in round robin scheduling with required diagrams. (7)

3 a) Consider the following set of process (8)

Process	Arrival Time	Burst Time
P1	0	12
P2	2	4
P3	3	6
P4	8	5

    i) Draw the Gantt chart to show the execution time using FCFS and round robin scheduling with time quantum-4

    ii) Calculate waiting time and turn around time of each of the process for FCFS and round robin. Also calculate the average waiting time and average turn around time for each of the scheduling algorithm.

  b) Explain the layered approach to system design. What are its advantage and disadvantage? (7)

PART B
Answer any two full questions, each carries 15 marks.

4 a) Differentiate cooperative process and independent process. (3)

b) What is race condition? Explain with an example. (5)

c) Differentiate between Internal Fragmentation and External Fragmentation. Whether paging is an effective solution for these fragmentation problems? Justify. (7)

5 a) Explain Critical Section Problem. What are the requirements for the solution of Critical Section Problem? (7)

b) What is demand paging? What are the advantages? (4)

c) What is segmentation table? Where it is used? (4)

6 a) What are semaphores? How producer consumer problem (Bounded buffer problem) is solved using semaphores? (7)

b) Consider a paging system with the page table stored in memory. (5)

    i) If a memory reference takes 50 nanoseconds, how long does a paged memory reference take?

    ii) If we add TLBs, and 75 percent of all page-table references are found in the TLBs, what is the effective memory reference time? (Assume that finding a age-table entry in the TLBs takes 2 nanoseconds, if the entry is present).

c) Explain thrashing. (3)

PART C
Answer any two full questions, each carries 20 marks.

7 a) Consider the following snap shot of the system (10)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	0	0	1	4	2	1	2	3	3	2	1
P1	3	1	2	1	5	2	5	2				
P2	2	1	0	3	2	3	1	6				
P3	1	3	1	2	1	4	2	4				
P4	1	4	3	2	3	6	6	5				

Answer the following questions using Banker's algorithm.

i) How many resources of type A, B, C, D are there?

ii) What are the contents of need matrix?

iii) Find if the system is in safe state? If it is, find the safe sequence.

b) Explain the directory implementation using the Hash table and Linear list. (7)

c) Explain two types of file access methods. (3)

8 a) Explain the following Disk scheduling algorithms with example. (10)

    i) FCFS

    ii) SSTF

    iii) SCAN

    iv) C-SCAN

b) Explain the Linux file system. (10)

9 a) What are the neccessary conditions to occur deadlock? How to prevent deadlock? (6)

b) Does a cycle in a resource allocation indicate deadlock? Justify your answer. (4)

c) Explain any 5 directory structures and its characterestic features. (10)

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