



Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018**

**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 are the advantages of peer-to-peer systems over client-server systems?
- 2 What are the advantages of loadable kernel modules?
- 3 Which are the different process states?
- 4 What is the use of pipe system call?

**PART B**

*Answer any two questions. Each carries 9 marks.*

- 5 a) Differentiate between the operating System structures? (6)
- b) How does the use of bit-maps becomes space efficient? (3)
- 6 a) Explain the process creation in Unix with the help of suitable example. (6)
- b) What is a PCB(Process Control Block)? (3)
- 7 a) Describe the differences among short-term, medium-term and long-term scheduling? (6)
- b) With the help of a diagram, describe the actions taken by the kernel to context switch between process? (3)

**PART C**

*Answer all questions. Each carries 3 marks.*

- 8 What are the three requirements to Critical Section Problem?
- 9 Describe how semaphores can be used as a synchronisation mechanism?
- 10 What is the main problem with Shortest Job First scheduling and what is its solution?
- 11 What are the conditions that lead to a deadlock?

**PART D**

*Answer any two questions. Each carries 9 marks.*

- 12 Enumerate any three classical problems of synchronisation? (9)
- 13 Draw the Gantt Chart , find the average waiting time for the following algorithms (9)
  - i) FCFS ii) Pre-emptive Priority iii) Non-pre emptive priority

Process	Arrival Time(ms)	Burst time(ms)	Priority
P1	0	8	4
P2	2	6	1
P3	2	1	2
P4	1	9	2
P5	3	3	3

- 14 a) Discuss how Resource Allocation Graph can be used for deadlock avoidance? (5)

- b) What are the measures to recover from a deadlock? (4)

### PART E

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

- 15 a) Given six memory partitions of 100KB, 500 KB, 200 KB, 300 KB, 600 KB (in order), how would the first-fit, best-fit and worst-fit algorithms place processes of size 212KB, 417 KB, 112 KB, 426KB (in order). Rank the algorithms in terms of how efficiently they use memory. (5)
- b) Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 64 frames. (5)
- a. How many bits are required in the logical address?
- b. How many bits are required in the physical address?
- 16 a) Discuss the concept of Virtual File Systems? (4)
- b) Suppose that a disk drive has 200 cylinders numbered from 0 to 199. The disk is currently servicing at cylinder 100 and the previous request was at cylinder 120. The queue of pending requests in FIFO order is 23, 89, 132, 42, 187. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the scheduling algorithms? i) FCFS ii) SSTF iii) SCAN (6)
- 17 a) Which are the different access methods of a file? (4)
- b) What are the different allocation methods of a file? (6)
- 18 a) Discuss the principles of protection? (3)
- b) How access matrix is used as a protection mechanism? (7)
- 19 a) Consider the following segment table: (5)

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?

- i. 0, 430
- ii. 1, 10
- iii. 2, 500
- iv. 3, 400
- v. 4, 112
- b) How is segmentation different from paging? (5)
- 20 a) Discuss the different aspects of contiguous memory allocation? (5)
- b) Discuss the steps in handling a page fault? (5)

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