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# TBC–404

## B. C. A. (FOURTH SEMESTER)
## END SEMESTER
## EXAMINATION, June/July, 2022

OPERATING SYSTEM

**Time :Three Hours**

**Maximum Marks : 100**

**Note :** (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What are system calls ? Explain different categories of system calls with example. (CO1)

(b) List out different services of Operating Systems and explain each service. (CO1)

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(c) Define essential properties of the following types of operating system : (CO1)

(i) Batch operating system

(ii) Interactive operating system

(iii) Time sharing operating system

(iv) Real time operating system

(v) Distributed operating system

2. (a) What do you mean by PCB ? Where is it used ? What are its contents ? Explain. (CO2)

(b) Distinguish between the following : (CO2)

(i) Process and Program

(ii) Multiprogramming and multiprocessing

(iii) Job scheduling and CPU scheduling



(c) For the following set of process, find the average waiting time using Gantt chart for : (CO2)

(i) SJF

(ii) Priority scheduling

| Process | Burst Time | Priority |
|---|---|---|
| p1 | 5 | 5 |
| p2 | 3 | 4 |
| p3 | 8 | 3 |
| p4 | 2 | 1 |
| p5 | 1 | 2 |

The process has arrived in the order p2, p1, p4, p3 and p5.

3. (a) What do you mean by semaphore ? Explain its types. With C struct, explain implementation of wait( ) and signal. (CO3)

(b) What is deadlock ? Explain the necessary conditions for its occurrence. How to remove deadlock from process ? (CO3)

(c) Consider a system that contains five processes P1, P2, P3, P4, P5 and the three

resource types A, B and C. Following are the resource types : A has 10, B has 5 and the resource type C has 7 instances :

(CO3)

| Process | Allocation | | | Max | | | Available | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | A | B | C | A | B | C |
| P1 | 0 | 1 | 0 | 7 | 5 | 3 | 3 | 3 | 2 |
| P2 | 2 | 0 | 0 | 3 | 2 | 2 | | | |
| P3 | 3 | 0 | 2 | 9 | 0 | 2 | | | |
| P4 | 2 | 1 | 1 | 2 | 2 | 2 | | | |
| P5 | 0 | 0 | 2 | 4 | 3 | 3 | | | |

Answer the following questions using the Banker's alogorithm :

(i) What is the reference of the need matrix ?

(ii) Determine if the system is safe or not.

(iii) What will happen if the resource request (1, 0, 0) for process P1 can the system accept this request immediately ?



4. (a) With a diagram, discuss the steps involved in handling a page fault. (CO4)

   (b) Memory partitions of 100 kb, 500 kb, 200 kb, 300 kb, 600 kb are available how would best, worst, first fit algorithm to place processes 212, 417, 112, 426 in order ? Which is the best algorithm ? (CO4)

   (c) The queue of requests in FIFO is 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement needed to satisfy the requests for the following Scheduling algorithms : (CO4)

   FCFS, SJF, SCAN, LOOK, C-SCAN.

5. (a) Explain various types of the files in Linux operating system. (CO5)

   (b) Explain various file handling commands in Linux with example. (CO5)

   (c) Explain the working of logical and relational operators in Linux. (CO5)