S.No. : **197**   MCA **305**

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| Following Paper ID and Roll No. to be filled in your Answer Book. |
| **PAPER ID : 1268** Roll No. |

MCA Examination 2018-19

(Third Semester)

OPERATING SYSTEM

Time : Three Hours]   *[Maximum Marks : 100*

Note :– Attempt all questions.

1. Attempt any four parts of the following :   5×4=20

    (a) Describe the services that an operating system provides to users, processes and other systems.

    (b) Write about monolithic kernel, layered and microkernel structures of operating system.

    (c) With a neat diagram, explain the layered structure of unix operating system.

    (d) Explain how multiprogramming increases the utilization of CPU?

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(e) Mention the objectives and functions of real time embedded systems.

(f) Distinguish between client-server and peer-to-peer models of distributed systems.

2. Attempt any four parts of the following :   5×4=20

(a) What is a process? Explain about various fields of process control block.

(b) What are the advantages and disadvantages of using same system call interface for manipulating both files and devices?

(c) Find the TAT (turn around time) and average waiting time using non preemptive FCFS and preemptive SJF CPU scheduling algorithms using Gantt chart on the given snapshot :

Process	Arrival Time	Burst Time
1	0	3
2	2	6
3	4	4
4	6	5
5	8	2

(d) With a neat diagram, explain various states of a process.

(e) What are the various data structures used for implementing banker's algorithm? Provide a brief description of each with example.

(f) Define a Thread. Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created?

3. Attempt any two parts of the following :   10×2=20

(a) What are the advantages of inter-process communication? How communication takes places in a shared-memory environment? Explain.

(b) What is a Semaphore? List the types of semaphores and show that. Discus the solution to dining philosopher's problem using semaphore.

(c) What is a deadlock? How deadlocks are detected? Explain the resources-allocation-graph algorithm for deadlock avoidance.

4. Attempt any two parts of the following :   10×2=20

    (a)   (i)   Define fragmentation. How to solve the fragmentation problem using paging.

         (ii)   Why virtual memory require? Discuss the benefits of virtual memory technique.

    (b)   What are the disadvantages of single contiguous memory allocation? Explain. Discuss the hardware support required to supporrt demand paging.

    (c)   What is a page fault? Consider the following page reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page fault would occur for the :

      (i)   FIFO

      (ii)   LRU

      (iii)   Optimal page replacement

Page replacement algorithm, assuming three frames and all frames are initially empty.

5. Attempt any two parts of the following :   10×2=20

    (a) (i) Briefly explain about file attributes, operations, types and structure.

         (ii) Explain in detail about various ways of accessing disk storage.

    (b) (i) Write in detail about single-level, two-level and tree-structured directories.

         (ii) Explain and compare the SCAN, C-SCAN and FCFS disk scheduling algorithms with example.

    (c) (i) Explain the various methods for free space management.

         (ii) What is system threats? Define the importance of user authentication and the concepts of "one-time password".

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