PG/IIS/MCA-305/18(Pr.)

MCA 3rd Semester Examination, 2018

MCA

(*Operating System*)

(Practical)

PAPER –MCA-305

Full Marks : 100

Time : 3 hours

Answer **Q.No.1** and any **four** from the rest

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. Answer any *five* questions : 2×5

   (*a*) What do you mean by system call ?

   (*b*) Differentiate multiprogramming and multiprocessing.

(*c*) Define API.

(*d*) What is a Microkernel system structure ?

(*e*) What is a zombie and orphan process ?

(*f*) State the significance of RPC and RMI.

(*g*) How many to many model between user and kernel thread works ?

2. (*a*) What are the different states of a process in Linux ?

(*b*) Explain the FCFS, preemptive and non -preemptive versions of SJF and Round Robin(time slice = 2) scheduling algorithms with Gnatt charts for the four processes given, Compare their average turnaround and waiting time. 5 + 10

Process	Arrival Time	Burst time(in ms)
P1	0	8
P2	1	4
P3	2	9
P4	3	5

3. (*a*) What is a Critical section problem ? Why Pearson's solution is granted as a remedy to a critical section problem in two process synchronization ?

   (*b*) Define thread. State the advantages of user level thread over kernel level thread.

(2 + 8) + (2 + 3)

4. (*a*) Discuss the methods of deadlock prevention to avoid No preemption.

   (*b*) An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of three resource types *X*, *Y* and *Z* to three processes P0, P1, and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its exceution.

Process	Allocation			Max		
	X	*Y*	*Z*	*X*	*Y*	*Z*
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

Three are 3 units of types *X*, 2 units of type *Y* and 2 units of type *Z* still available. The system is currently in a safe state. Consider the following independent requests for additional resources in the current state and suggest with requests would be considered.

REQ1 : P0 requests 0 units of X, 0 units of Y and 2 units of Z

REQ2 : P1 requests 2 units of X, 0 units of Y and 0 units of Z

(*c*) Justify the statement "Cycle is necessary but not sufficient condition for deadlock". 4 + 7 + 4

5. (*a*) What do you mean by fixed partition and

variable partitions in memory space ? What are the problems that can occur in these partitions ?

(*b*) What do you mean by logical address space and physical address space ?

(*c*) Consider a memory-management system based on paging. Let the total size of the physical memory be 2GB laid out over pages of size 4 KB. Let the logical address space of each process be limited to 128 MB.

Based on the information above, determine the physical address layout in the system(i.e., the total number of bits in a physical address, the number of bits specifying the physical frame number, and the number of bits specifying the page displacement). How many physical frames are there in the system ?

Determine the logical address layout in a similar way. How many pages are there in the logical address space of each process ?

Finally, compute the number of entries in each page table and the size of each page table entry. (4 + 2) + 4 + 5

6. (*a*) What do you mean by sparse address space and Belady's Anamoly ?

(*b*) Distinguish best fit, worst fit and first fit storage allocation technique.

(*c*) Given page reference string : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm. (2 + 2) + 5 + 6

7. Write short notes on (any *three*) : 5 × 3

(*i*) Dispatcher

(*ii*) Kernel

(*iii*) Process Control Block

(*iv*) Mutual Exclusion in Process Synchronization

(*v*) C-SCAN.

[*Internal Assessment* : 30 Marks]