Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA – SEMESTER – III • EXAMINATION – SUMMER 2018

Subject Code: 2630004 **Date: 23-May-2018**

Subject Name: Operating Systems

Time: 02.30 pm to 5.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** **Answer in short.**

1. What is Process? Explain. **02**
2. Explain the term – "Critical Section". **02**
3. Explain the term – "mutex". **02**
4. Explain the term – "starvation" **01**

(b) **Answer the following questions.**

1. Write Necessary conditions for Deadlock. **03**
2. Explain Resource Allocation Graph and its usage with example. **03**
3. Explain the term : Throughput. **01**

Q.2 **(a)** **Answer in Short.**

1. Explain the usage of sem_wait() and sem_signal() functions of semaphore implementation. **03**
2. Explain Shared Memory? **02**
3. Explain the need of virtual memory concept. **02**

(b) A buddy system allocator is allocated an area of 64K bytes. Blocks of size 2K, 11K, 120 bytes and 20K are allocated in that order. **07**

(a) Show the allocation status and free lists of the allocator. How many splits were performed?

(b) Show the allocation status and free lists of the allocator after the block of 120 bytes is freed. How many coalesce operations were performed?

(c) Determine the value of n if the minimum block size in the buddy system is 16 bytes.

OR

(b) Apply Round Robin (time slice = 2 seconds), Shortest Process Next and First come first serve (FCFS) algorithm for following set of processes. **07**

Process	Arrival Time	Service Time
A	0	3
B	2	5
C	4	5
D	6	6
E	8	7

Discuss the pros and cons of each.

Q.3 **(a)** Discuss ULT and KLT. **07**

(b) Explain Bankers algorithm with example. **07**

OR

Q.3 **(a)** Explain different types of schedulers. **07**

(b) How Internal Fragmentation and External Fragmentation take place in memory? Explain with suitable example. **07**

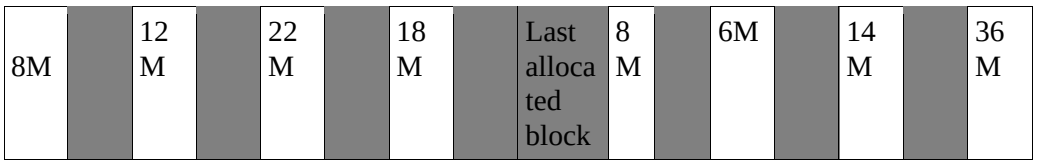
Q.4 **(a)** What is RAID? Explain any 3 levels of RAID. **07**

(b) Total No of pages for the process are 4 and total number of frames allocated to this process are 3 (using Fixed frame allocation) . **07**
The page address stream formed by executing the program is as follows:
(2 1 4 2 3 1 5 2 3 5 4 1 3 4)
Judge which page replacement algorithm among OPT, LRU and FIFO works better. Provide your justification for the same.

OR

Q.4 **(a)** 1. What is memory management? How page fault occurred and resolve using virtual memory? **05**
2. Differentiate : Segmentation Vs Paging **02**

(b) **07**



A dynamic partitioning scheme is being used. Consider the above memory status. First free block is 8 MB and Last free block is 36M of size. Shaded parts indicate Allocated Blocks and plain indicate Free Blocks of memory. Figure in the cell indicates the size of free Block of memory in MB. Answer the following questions.

1. Suggest you next allocation for 16-Mbyte allocation request, by applying Best-fit, Next-fit and First-fit placement algorithm.

2. “Best -fit algorithm usually the worst performer”. YES / NO? Justify your answer.

Q.5 **(a)** Consider the following set of processes, with the length of the CPU burst time given in milliseconds: **07**

Process Arrival Time Service

Process	Arrival Time	Service Time
P1	0	3
P2	2	6
P3	4	4
P4	6	5
P5	8	2
P6	9	5

1. Draw four Gantt charts describing execution of these processes using RR
2. q=1 and q=4, SRT, and HRRN a non preemptive priority.
3. What is the turnaround time, waiting time and finish time of each process for each of the scheduling algorithms?

(b) Explain Process State Transition Diagram with Suspended States in detail. **07**

OR

Q.5 **(a)** **1.** Explain the different stages for Basic Instruction Execution Cycle. Also explain the format for 16 bits instruction. **04**

2. What is PCB? Explain the elements of PCB. **03**

(b) **1.** Explain - serial processing, batch processing. **04**

2. Explain (i) Semaphore (ii) Uni-processing (iii) multiprocessing **03**

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