Seat No.: _____ Enrollment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–III • EXAMINATION – SUMMER 2017

Subject Code: 3630003 **Date: 05/06/2017**

Subject Name: Basic Computer Science-2

Time: 02:30 Pm to 05:00 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. Explain the following services provided by OS. **02**
   (a) Error detection and response (b) Accounting
2. Why monitor requires in batch – processing scheme of OS. **02**
3. Explain the terms:(1) Multiprocessing (2) Starvation (3) Critical Section **03**

(b) Answer the following questions.

1. What is the side effects if time quantum (q) is larger than the longest-running process in round- robin? How? **03**
2. Explain Resource Allocation Graph and its usage with example. **03**
3. Explain the term : Multitasking **01**

Q.2 (a) Answer in Short. **07**

1. In general semaphore implementation if value of semaphore is -3 at certain stage, how many processes are waiting to be unblocked?
2. Explain the term "Mutual Exclusion".
3. What is internal fragmentation.?
4. How page size affects the performance of OS?
5. What is meant by busy waiting or spin waiting?
6. Explain throughput time w.r.t. process scheduling.
7. State True or False : "The deadlock avoidance strategy does not predict deadlock with certainty"

(b)

8M		12 M		22 M		18 M		Last allocated block	8 M		6M		14 M		36 M

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. **03**
2. "Best -fit algorithm usually the worst performer". YES / NO? Justify your answer. **04**

OR

(b) Apply (1) Round Robin for q=1 and q=4 (2) First come first serve (FCFS) and (3) SPN algorithm for following set of processes. **07**

1. Draw Gantt charts describing execution of these processes.
2. What is the turnaround time of each process for each of the scheduling algorithms?
3. What is the waiting time of each process for each of the scheduling algorithm?
4. What is the finish time of each process for each of the scheduling algorithm?

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

Q.3 **(a)** How Internal Fragmentation and External Fragmentation takes place in memory? Explain with suitable example and diagram. **07**

(b) Total No of pages for the process are 5 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 3 2 1 5 2 4 5 3 2 5 2)
Judge which page replacement algorithm among OPT, LRU and FIFO works better. Provide your justification for the same.

OR

Q.3 **(a)** Explain Banker's algorithm with example. **07**

(b) Explain the Readers/Writers problem. Give a solution using semaphore if writers heaving a priority. **07**

Q.4 **(a)** Write and explain an algorithm of 2-pass Assembler. **07**

(b) 1. Explain Classification of Grammars. **03**
2. Build the DFA and STT for regular expression (a|b)*bb(a|b)*. **04**

OR

Q.4 **(a)** 1. Explain (i) Application Domain (ii) PL Domain (iii) Execution domain. **03**
2. Explain different types of statement available in Assembly Language with example. **04**

(b) 1. Differentiate : Variant-1 Vs Variant-II **03**
2. Explain FRT and CRT wrt 1-Pass Assembler. **04**

Q.5 **(a)** Explain status of every stage of parsing operation for given string **07**
|- <id> +<id> * <id> -| using Operator precedence parser.

(b) Define Local Optimization and Basic block. Explain with suitable example – how value number technique is applied on basic block. **07**

OR

Q.5 **(a)** Write a short note of Code Optimization perform by Compiler applying optimizing transformation. **07**

(b) 1. Differentiate between static memory allocation and dynamic memory allocation. **04**

2. Differentiate : Assembly language Vs Machine language. **03**

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