Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2140702 **Date:06/06/2016**

Subject Name:Operating System

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

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

MARKS

Q.1 **Short Questions** **14**

1 The operating system is the interface between _____and _____.

2 Two basic functions of operating system are: _____, _____.

3 Draw structure of THE operating system.

4 A system call to create a child process is _____.

5 A process running in background is called _____.

6 Define: Race Condition and Mutual Exclusion.

7 Explain GREP command of Linux OS.

8 Define fragmentation.

9 Define Deadlock.

10 State the four conditions which must occur to have deadlock in the system.

11 Define Hard link and Symbolic link.

12 Define Physical dump and Incremental dump.

13 List the different filters that are used in Linux programming.

14 How files are protected in UNIX/LINUX file system?

Q.2 **(a)** State different types of operating system. Explain any one of them. **03**

(b) Draw process state diagram. Explain each transition among them in detail. **04**

(c) Explain producer-consumer problem and solve it using semaphore. Write pseudo code for the same. **07**

OR

(c) What is Mutex? Write a pseudo code to achieve mutual exclusion using mutex. **07**

Q.3 **(a)** List the four events that cause processes to be created. Explain each in brief. **03**

(b) Consider a soft real time system with three periodic events, with periods of 100, 200 and 500 msec respectively. If these events require 50, 30 and 100 msec, will the system be schedulable? **04**

(c) Following table gives arrival time and expected run time of five processes. **07**

Process	Expected Run time (in sec.)	Arrival Time (in sec.)
A	8	1
B	1	4
C	2	2
D	1	5
E	5	6

Ignore process switching overhead. Find average turnaround time for following scheduling algorithm.

1. Round robin (quantum = 1 sec)

2. Shortest Job First.

OR

Q.3	**(a)**	Explain monolithic operating system structure.	**03**
	(b)	How TSL instruction can be used to achieve mutual exclusion? Explain with proper pseudocode.	**04**
	(c)	If FIFO page replacement algorithm is used with 4 page frames and 8 pages, how many page faults will occur with reference string 0124720347 if four page frames are initially empty? Solve the same problem for LRU page replacement algorithm.	**07**
Q.4	**(a)**	Which algorithms are used to allocate memory for a newly created process or any existing process being swapped in from disk?	**03**
	(b)	How deadlock can be prevented? Explain any two ways of doing deadlock prevention.	**04**
	(c)	Explain thread implementation in user space with its advantages and disadvantages.	**07**

OR

Q.4	**(a)**	What is called TLB? How does it help to speed up paging?	**03**
	(b)	Explain Bankers' algorithm to avoid deadlock.	**04**
	(c)	Explain the structure of a page table entry. If a machine has 48 bit virtual addresses and 32-bit physical addresses and pages are of 8 KB, how many entries are needed for the page table?	**07**
Q.5	**(a)**	What is called segmentation? How it differs from paging?	**03**
	(b)	What is called device driver? Explain its function in brief.	**04**
	(c)	List the different file implementation methods and explain them in detail.	**07**

OR

Q.5	**(a)**	What is RAID? Explain in brief.	**03**
	(b)	What is I-node? Explain in detail.	**04**
	(c)	Disk requests come in to the disk driver for cylinders 10, 22, 20, 2, 40, 6, and 38, in that order. A seek takes 6 msec per cylinder moved. How much seek time is needed for 1. First-come, first served 2. Elevator algorithm. (initially moving upward) In all cases, the arm is initially at cylinder 20.	**07**

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