DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER VI [INFORMATION TECHNOLOGY]
SUBJECT: (IT 607) Applied Operating System

Examination	**Third Sessional**	**Seat No.**	**:**
Date	**09/04/2016**	**Day**	**: Saturday**
Time	**12:30 pm - 01:45 pm**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. **Figures to the right indicate maximum marks for that question.**
2. **The symbols used carry their usual meanings.**
3. **Assume suitable data, if required & mention them clearly.**
4. **Draw neat sketches wherever necessary.**

Q.1 Do as directed.

(a) Why deadlock detection algorithm is run on wait-for-graph instead of directed resource allocation graph? [2]

(b) What is starvation problem in resource preemption based deadlock recovery? How starvation problem can be handled? [2]

(c) Suppose a disk rotates at 7200 RPM (Round Per Minute). Find its average rotational latency. [2]

(d) Consider a disk queue with requests for I/O to blocks on cylinders 47, 38, 121, 191, 87, 11, 92, 10. The head is initially at cylinder number 63, moving towards larger cylinder numbers on its servicing pass. The cylinders are numbered from 0 to 199. Find total head movement (in number of cylinders) incurred while servicing these requests for C-LOOK and C-SCAN algorithms. [2]

(e) List out four major advantages of using virtual memory. [2]

(f) Differentiate between Global and Local frame allocation algorithms. [2]

Q.2 Attempt *Any TWO* of the following questions. [12]

(a) Explain any two LRU Approximation Page Replacement Algorithms with appropriate examples. [6]

(b) Consider a computer system with ten physical page frames. The system is provided with an access sequence (p1, p2, …, p20, p1, p2, …, p20), where each p_i is a distinct virtual page number. Find the difference in the number of page faults between the first-in-first-out page replacement policy and the optimal page replacement policy. [6]

(c) Discuss the techniques made available by virtual memory scheme that enhances performance during creating and running processes. [6]

Q.3 (a) Discuss bakery algorithm for solving the critical section problem for n processes. [6]

(b) **Total resources** in a system are (R1,R2,R3,R4)=(6,7,12,12). **Current Allocation**: (0,0,1,2) for process P1, (2,0,0,0) for process P2, (0,0,3,4) for process P3, (2,3,5,4) for process P4 and (0,3,3,2) for process P5. **Max. resource requirement**: (0,0,1,2) for process P1, (2,7,5,0) for process P2, (6,6,5,6) for process P3, (4,3,5,6) for process P4 and (0,6,5,2) for process P5. [6]
(i) Calculate available resource matrix and need matrix for the above state of the system.
(ii) Determine safety if it exists for the system applying the Banker's algorithm.
(iii) P3 requests for (0,1,0,0). Does this request lead to a deadlock?

OR

Q.3 (a) Draw and discuss working of monitors. Also discuss how dining philosopher problem is solved using monitors. [6]

(b) Answer the following: [6]

1. State difference between deadlock avoidance and deadlock prevention.
2. How can we break "No preemption" condition to prevent deadlock?
3. In deadlock detection method, how can we know which processes are involved in deadlock for following two cases (i) single resource instance per each resource type and (ii) multiple resource instances per each resource type.