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

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| **Examination** | **: Block Sessional** | **Seat No.** | **:** |
| **Date** | **: 4/04/2014** | **Day** | **: Friday** |
| **Time** | **: 11:00 to 12:15** | **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) Discuss various categories to get benefits of multithreaded programming. **[2]**

(b) Write down four circumstances where CPU scheduling decision may take place. **[2]**

(c) Give difference between Loosely coupled system and Tightly coupled system. **[2]**

(d) With a single resource deadlock occurs **[2]**
(a)If there is a single process competing for that resource.
(b)If there are more than 2 processes competing for that resource
(c)If there are only two process competing for that resource
(d)None of this

(e) Consider a paging system with the page table stored in memory. **[2]**
a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?
b. If we add associative registers, and 75 percent of all page-table references are found In the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time, if the entry Is there.)

(f) Assume a page reference string for a process with '**m**' frames (initially all empty). The Page reference string has length '**p'** with '**n'** distinct page numbers occurring in it. For any page-replacement algorithms, **[2]**
a. What is a lower bound on the number of page faults?
b. What is an upper bound on the number of page faults?

**Q.2** Attempt following questions. **[12]**

(a) Discuss various multithreading models. **[6]**

(b) Discuss four techniques of deadlock preventions. **[6]**

**Q.3** (a) Consider the following set of jobs with their arrival times, execution time (in minutes). **[6]**

| Job Ids | Arrival Time | Execution time |
|---|---|---|
| 1 | 0 | 5 |
| 2 | 1 | 15 |
| 3 | 3 | 12 |
| 4 | 7 | 25 |
| 5 | 10 | 5 |

Calculate the mean turn-around time, waiting time and response time for FCFS, SJF preemptive scheduling algorithms.

(b) Discuss how internal and external fragmentation arises in paging and segmentation respectively with example. **[6]**