United College of Engineering and Research, Allahabad
Department of Computer Science & Information Technology
IInd Sessional Examination, 2018-19
B.Tech. -IVTH Sem(CS & IT)
OPERATING SYSTEMS

Subject Code: RCS-401
Time: 2.00 hours **Max. Marks: 30**

Note: There are three sections in this paper. All sections are compulsory.

Section-A

Note: All questions are **compulsory**. Each question has equal marks. **10*1=10**

1. What do you understand by critical section?
2. What is busy waiting?
3. Why page size always power of 2?
4. List the various techniques to remove fragmentation.
5. Differentiate between binary and counting semaphore.
6. Differentiate page and segment.
7. Define "Dirty Bit".
8. Define "Page Fault".
9. What is demand paging.
10. Write short note on Cache Memory.

Section-B

Note: Attempt any **six** questions. Each question has equal marks. **6*2=12**

1. Write and explain Peterson solution to the critical section problem
2. Give the solution of Readers-Writers problem by using the concept of semaphore?
3. Explain the "Dining Philosopher Problem" or "Sleeping Barber Problem" with suitable diagram?
4. How can the interprocess communication be achieved?
5. On a system using paging and segmentation, the virtual address space consists of up to 8 segments where each segment can be up to 2^{29} bytes long. The hardware pages each segment into 256-byte pages. Determine the bits needed in the virtual address to specify the
   - Segment number
   - Page number
   - Offset within page
   - Entire virtual address
6. Explain Belady's anomaly with example? Which algorithm suffers from Belady's anomaly.
7. Explain the difference between internal fragmentation and external fragmentation? Which one occurs in paging system?
8. What is the cause of Thrashing? What steps are taken by the system to eliminate this problem.

Section-C

Note: Attempt any **two** questions. Each question has equal marks. **2*4=8**

1. State the finite buffer Producer-Consumer Problem. Give solution of the problem using semaphores.

P.T.O.

2. How many page faults will occur for the following reference string for three frames
   1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2
   using the following page replacement algorithms:
   a. LRU
   b. Optimal
3. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order). How would each of the first-fit, Best-fit and worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory?