**Roll No……..…..** **Total No. of Printed Pages: 2**
**Total No. of Questions: [09]**

**B. Tech. CSE (Semester – 4th)**
**OPERATING SYSTEMS**
**Subject Code: BCSES1402/BCSEM1002**
**Paper ID: [18111117]**

**Time: 03 Hours** **Maximum Marks: 60**

**Instruction for candidates:**

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

**Section – A** **(2 marks each)**

Q1. Attempt the following:

a. What is an operating system? Explain any two functions of operating system?
b. What does PCB contain?
c. Define critical section?
d. Differentiate between paging and segmentation?
e. What do you mean by process synchronization?
f. Write two advantages of virtual memory concept?
g. Differentiate between internal and external fragmentation?
h. Difference between process and thread?
i. Explain belady's anamoly?
j. What is thrashing? How it can be overcome?

**Section – B** **(5 marks each)**

Q2. What is important feature of critical section? State the readers writers problem and give solution using semaphore?

Q3. What do you mean by raid structure? Also discuss different types of raid levels?

Q4. What is process? Explain process state transition with diagram?

Q5. Consider the set of processes whose arrival and burst time given below:

| PID | ARRIVAL TIME | BURST TIME |
|---|---|---|
| P1 | 0 | 9 |
| P2 | 1 | 4 |
| P3 | 2 | 9 |

If the scheduling policy is shortest remaining time first, calculate the average waiting time and average turnaround time.

Q6. What is term deadlock? Explain various necessary conditions for deadlock to occur? Explain in brief about deadlock prevention?

**Section – C** **(10 marks each)**

Q7. (a) Consider page reference string (1,3,0,3,5,6,3 ) with 3 page frames, find the number of page faults, use FIFO page replacement algorithms.

(b) Consider the page references string (7,0,1,2,0,3,0,4,2,3,0,3,2,3) with 4 pages frames. Find the number of page fault, use optimal page replacement (OPR) algorithm, and least recently used (LRU) algorithm.

Q8. Assume some OS needs to schedule four processes using different scheduling algorithms

| PROCESSES | BURST TIME | PRIORITY | ARRIVAL TIME |
|---|---|---|---|
| P1 | 12 | 3 | 0 |
| P2 | 6 | 4 | 2 |
| P3 | 4 | 1 | 4 |
| P4 | 18 | 2 | 6 |

What is average waiting time? Draw a GANTT chart for each algorithm

a) FCFS
b) Non-Preemptive Shortest Job First
c) Preemptive Shortest Job First
d) PRIORITY
e) Round Robin (Time Quantum is 5 time units)

Q9. Write note on followings:

a) UNIX operating system
b) WINDOW operating system