VIT
Vellore Institute of Technology

**CAT I – BTech - Fall Semester - 2018-19**

**Duration: 1hr 30 mins**

**Max. Marks : 50**

**Course Name: Operating System**

**Course Code: ITE2002**

**Slot : B1**

**Faculty : Prof. N.Sivakumar, Prof P.J.Kumar**

| S.No | Answer all Questions (5*10=50Marks) |
|---|---|
| 1. | A computer system can have single processor, multiprocessor and multi core processor architecture. A job or program can be executed either sequentially or in parallel based on its design. Enumerate the advantages of having different system architecture and analyse the effect of executing a set of jobs that can be run in sequential or parallel over these architectures. (Provide appropriate sketches). |
| 2. | Given a set of files with different access frequencies by the CPU, suggest different storage locations (with a diagram) for the file content in order to reduce the access time. The access frequency of the file can be low, medium and high. Analyse the benefits and overheads associated with each case. Write your inference on the cost, speed and volatility of the various storage devices. |
| 3. | Case 1: When a program is loaded into main memory it attempts to access the memory region where kernel code is loaded.<br>Case 2: A program attempts to divide a number by zero.<br>Case 3: A program which is running got stuck into an infinite loop.<br>Determine the outcome of the above scenarios and identify the various solutions or mechanism implemented in operating system to handle the above situations. (Provide appropriate sketches). |
| 4. | Assume that you are a software professional writing code for various problems using different programming languages such as c, c++, java, Python etc on windows based platform. Sometime later it happens for you to use the same set of languages on a Unix based platform. Identify the functional changes needed in this scenario. Elaborate your requirements from the "system calls" perspective. (Provide appropriate sketches). |
| 5. | Assume that you have the following jobs to execute with one processor, with the jobs arriving in the order listed here. |

| Process | Burst time | Arrival time | Priority |
|---|---|---|---|
| $P_1$ | 7 | 0 | 1 |
| $P_2$ | 3 | 1 | 2 |
| $P_3$ | 6 | 2 | 4 |
| $P_4$ | 3 | 3 | 3 |
| $P_5$ | 2 | 4 | 5 |

(i). Draw the Gantt charts illustrating the execution of these processes using Preemptive SJF and a Preemptive Priority scheduling.

(ii). Calculate the turnaround time for each process and the average turnaround time for each of the scheduling algorithms in part (i).

(iii). Calculate the waiting time for each process and the average waiting time for each of the scheduling algorithms in part (i).

(iv). Which of the scheduling algorithm in part (i) results in the minimal average waiting time (over all processes)?

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