ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID-SEMESTER EXAMINATION   SUMMER SEMESTER, 2021-2022
DURATION: 1 HOUR 30 MINUTES   FULL MARKS: 75

CSE 4673: Operating Systems and System Programming
Programmable calculators are not allowed. Do not write anything on the question paper.
Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions.

---

1. a) What is an Operating System? Describe from both the user's point of view and the system's point of view, how an Operating System assures ease of use and good performance of the Computer System by ensuring proper utilization of the resources.   2+8

   b) Emphasis has been placed on the importance of an operating system efficiently utilizing computing hardware. However, there may be instances where forsaking this principle and "wasting" resources is appropriate. Despite the term "waste," such a system is not necessarily wasteful, as there are reasons for this deviation from efficiency.   8

   Explain the circumstances and reasoning behind these decisions.

   c) The Government of Bangladesh has hired you to design a dedicated Weather Forecasting System for Bangladesh. The Bangladesh Meteorological Department operates four (4) sub-stations across the nation. Local forecasting is the responsibility of each sub-station.   7

   As an operating system designer, which of the Single Processor System, Multi-Processor System, and Clustered System should you select to ensure better and more accurate weather forecasting? Explain your answer.

2. a) What are the process states? How does a process migrate from one state to another? Explain with a diagram.   2+8

   b) Why is Message Passing easier to implement than Shared Memory in a distributed system? Also, give an example where Shared Memory will perform better than Message Passing.   4+4

   c) What is a '**Zombie Process**'? What is an '**Orphan Process**'? "A process eventually turns into a Zombie Process but not always into an Orphan Process." - Justify the statement with proper examples.   1+1+4

3. a) What do you understand by the Context Switch? How is a Context Switch related to the Process Control Block (PCB)? Explain in detail with a diagram how the processor executes interruption with the help of the concept of Context Switch when a lower priority process, **P1**, is interrupted by a higher priority process, **P2**.   2+2+5

   b) The original version of Apple's mobile iOS operating system did not support concurrent processing, which is the ability to run multiple processes simultaneously in a single processor system. Apple believed that "offering a simple and straightforward user experience was more important than offering the ability to run multiple processes at the same time."   8

   Do you agree with the statement? Justify your answer.

   c) How is the Local Procedure Call (LPC) different from the Standard Remote Procedure Call (RPC)? What are the similarities between them? Is it possible to use standard RPC instead of LPC to get a similar performance in windows? Explain your answer.   2+2+4