Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination December 2024

Roll no.....

Name of the Course and semester: **MCA 1ST SEM**
Name of the Paper: **ADVANCED OPERATING SYSTEM**
Paper Code: **TMC 104**
Time: 3 hour Maximum Marks: 100

Note:
(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)
a. Define operating system. Also, explain the layered architecture of an operating system.**(CO1)**
b. Discuss the file organization concepts in UNIX and WINDOWS. How it is different from each other.**(CO6)**
c. A disk has 200 cylinders numbered from 0 to 199. The current head position is at cylinder 53. The request queue contains the following cylinders in the order they arrive:
98, 183, 37, 122, 14, 124, 65, 67. Determine the total head movement for LOOK and C-LOOK scheduling algorithms, assuming the head moves towards higher-numbered cylinders first.**(CO1)**

Q2. (2X10=20 Marks)
a. Draw and explain the RTOS architecture. Also, explain the RTOS kernel and its functions.**(CO2)**
b. For the following tasks:
Task 1: Period = 5ms, Execution Time = 1ms
Task 2: Period = 10ms, Execution Time = 2ms
Task 3: Period = 20ms, Execution Time = 4ms
Schedule these tasks using the Rate Monotonic (RM) algorithm for the first 20ms and show the timeline.**(CO2)**
c. Explain different types of kernels. Explain the different types of real-time operating systems based on its attributes.**(CO2)**

Q3. (2X10=20 Marks)
a. Differentiate between parallel and distributed systems, providing examples of applications that benefit from each.**(CO3)**
b. Explain the distributed systems. Also, explain its various types. **(CO3)**
c. Write different applications in which distributed systems implemented.Explain any one application covering all the hardware and software details.**(CO3)**

Q4. (2X10=20 Marks)
a. Draw and explain the building block diagram of a virtualization environment. Illustrate the role of the hypervisor in virtualization architecture. **(CO4)**
b. Write a shell scripting to count the number of lines, words and charaters in a file. Explain the access permissions in file. **(CO5)**
c. Explain the fundamental characteristics of cloud computing? Differentiate between SaaS, PaaS, and IaaS, providing examples for each.**(CO4)**

Q5. (2X10=20 Marks)
a. Differentiate between Process and Threads. Describe the process scheduling mechanisms in Linux and Windows. **(CO5)**
b. Explain the following with example: (i) Multiprocessing (ii) Multitasking (iii) Multiprogramming **(CO5)**
c. Write command with syntax and description with example of following : (i) create a file (ii) append a file (iii) hardlink (iv) softlink (v) listing all file with inode number.**(CO6)**