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|  | <p>COMSATS University Islamabad</p> <p><b>Department of Computer Science</b></p> <p>Mid Term Examination – Spring 2025</p> |
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Class: (BS) CS/SE/AI/CYS/DS Semester: 5<sup>th</sup>

Course Code & Title: CSC323 Principles of Operating Systems Date: 16-4-2025

Time Allowed: 80 mins Max Marks: 25

Instructors: Ms. Madiha, Mr. Yasir, Ms. Zahida, Dr. Memoona

**Name:** \_\_\_\_\_ **Registration #** \_\_\_\_\_

**CLO1 Marks[4+3+4]**

**CLO1 : Elaborate concepts and principles of operating systems.**

Q1) Discuss the functions and services provided by a Mobile operating system and a cloud based operating system.

Q2) Describe the role of device drivers in an operating system.

Q3) Explain the pros and cons of microkernels and hybrid kernels.

**CLO- 2 Marks [7+3+4]**

**CLO2: Analyze various operations performed by operating system for process management.**

Q4) Suppose there are 7 processes that enter the system at different times and demand the CPU for their execution. The scheduler will maintain two queues, one for foreground processes and another for background processes. Scheduling algorithm of foreground queue is SJF preemptive and FCFS for background queue. Both queues will be given equal time of 10s. If at  $t=0$ , the CPU starts executing jobs from foreground queue, then after 10s CPU will jump to the background queue and execute processes for the next 10s. In case of interrupts, CPU will also switch the queue after serving an interrupt. Considering this scheduling system, draw a Gantt chart showing the execution order and total time taken by CPU for execution of the following processes.

| Process        | Name           | Type       | Arrival Time | Priority | Burst Time |
|----------------|----------------|------------|--------------|----------|------------|
| P <sub>1</sub> | OS update      | Background | 0            | HIGH     | 9          |
| P <sub>2</sub> | MS PAINT       | Foreground | 1            | HIGH     | 30         |
| P <sub>3</sub> | Network update | Background | 2            | NORMAL   | 5          |

|                |                   |            |    |        |    |
|----------------|-------------------|------------|----|--------|----|
| Interrupt      |                   |            | 3  |        | 3  |
| P <sub>4</sub> | Anti-virus update | Background | 4  | NORMAL | 8  |
| P <sub>5</sub> | MS-WORD           | Foreground | 10 | MEDIUM | 15 |
| Interrupt      |                   |            | 11 | HIGH   | 2  |
| P <sub>6</sub> | Printer           | Foreground | 12 | MEDIUM | 20 |
| P <sub>7</sub> | C program         | Foreground | 20 | LOW    | 10 |

Q5) Illustrate the difference between parallelism and concurrency.

Q6) Examine the pros and cons of the two methods of inter process communication.