

**Note : 1) All questions are Compulsory**

**2) Use of Non-Programmable calculator is allowed.**

- Q.1.** a) What are the different types of operating system? (15M)  
 b) Draw and explain process state transition diagram.  
 c) Explain different multithreading Models.  
 d) Write short note on Interprocess communication.  
 e) Write short note on a system call.  
 f) Consider the following set of processes, with the arrival time and the CPU burst times given in milliseconds.

Process	CPU Burst Time	Arrival Time
P <sub>1</sub>	3	0
P <sub>2</sub>	5	1
P <sub>3</sub>	2	2
P <sub>4</sub>	5	3
P <sub>5</sub>	5	4

Draw Gantt Chart, Calculate waiting time and turnaround time for each process for round Robin algorithm (Time slice = 2)

**Q.2. Attempt any Three of the following** (15M)

- a) Explain Memory management with fixed and variable partition.  
 b) What is paging?  
 c) Explain different file allocation methods.  
 d) Explain directory structure in operating system.  
 e) Consider following page reference string.  
 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5  
 Assume frame size=3. How many page faults would occur for optimal and FIFO algorithm.  
 f) Explain CD-ROM file system.

**Q.3. Attempt any Three of the following** (15M)

- a) Explain different categories of I/O devices.  
 b) Write short note on RAID.  
 c) Explain Goals of I/O software.  
 d) Explain the different functions carried out by device independent software.  
 e) Explain user interface offered by operating system for I/O devices..  
 f) What are the necessary conditions to occur deadlock.

Q.4. **Attempt any Three of the following**

(15M)

- a) Explain type 1 hypervision.
- b) Explain organization of CPU and memory in multi processor, multicomputer and distributed system.
- c) Explain master slave model of multi processor.
- d) Explain various interconnect topologies for multi computer
- e) Explain the operation of remote procedure call.
- f) Explain object – based middleware.

Q.5. **Attempt any Three of the following**

(15M)

- a) Explain different layers in Linux System.
- b) Explain process management system calls in Linux.
- c) Explain I/O system call in Linux.
- d) Explain Android architecture.
- e) Explain booting procedure of window.
- f) Explain security in window.

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