Question: Differentiate between Parallel, Distributed and Real time Operating System.

Ans.) Parallel O.S, Distributed O.S and Real Time O.S have their own ways of functioning and execution. We will be comparing them on their applications, way of running and their key features.

① Parallel Operating System

A. Applications :
- Scientific simulations
- Image and video processing.

* An task that is resource hungry and requires multiple processes to run at a single time is done on a Parallel O.S.

B. Way Of Running :
- Tasks are divided into subtasks and executed simultaneously.
- Requires synchronisation to combine results.

C. Key features :
- Shared memory across many processes
- Load balancing to make it more efficient.

(II) Distributed Operating System:

A. Applications:
- Cloud Computing platforms
- Online Banking Systems

* For tasks that require being synched on multiple locations/devices.

B. Way of Running:

- Tasks are divided into independent processes and are distributed across different computers.
- Each machine executes its assigned processes independently and results are then coordinated.

C. Key features:

- Resource sharing across systems.
- Scalability and Reliability.

(III) Real Time Operating System:

A. Applications:
- Flight Control Systems
- Medical Devices
- Automotive Control (ABS, airbag, etc)
- Multimedia Streaming

B. Way of Running:

- Tasks are scheduled based on priority and deadlines.
- Ensures time-bound execution.

C. Key Features:

- Deterministic and predictable response time.
- Supports multitasking with strict timing constraints.