

Q1(a) Define operating System & use of op System. (CPU, file, memory management).

(b) Give diff. types of operating System

Q2 Explain following :-

- 1) Process Concept      6) System call & Context
- 2) PCB
- 3) Thread
- 4) Process State
- 5) Process Scheduling.

Ans 1(a)

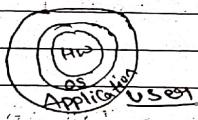
# Definition → operating System is a program. It is called System Software. It works as an interface b/w hardware & software.

It give information that when will be use resource or where.

# Parts of Computer System:-

- 1) Hardware
- 2) OS
- 3) Application Prog.
- 4) User

- 1) Hardware → It include Input output devices memory & CPU.
- 2) Operating System → It work b/w hardware & application.
- 3) Application Prog. → It run on operating system.
- 4) User → It run the app. on hardware.



#### # Characteristics ⇒

- It provide Interface.
- It use multi Programming.
- It use Process & time.
- In this we can Priority.
- Speed is fast.
- Easily recover.
- It can do file management, device manag. & security management.

II Types of OS :- OS are mainly following type :-

- (i) Time Sharing
- (ii) Parallel Processing
- (iii) Distributed
- (iv) Real time.

is Time sharing →

Definition → In this it give equal time for processing. This is called time sharing.

It can be divided into two part.

- Job Priority.
- Time Slice

• Job Priority ⇒ In this processing will be done acc. to priority. It is called Job Priority. If any process have more priority then it can stop low priority process. Due to this low priority process have to wait for long time.

• Time Slice  $\rightarrow$  We divide all process in equal part it is called time slice. It is from 1000 millisecond. It use in multi programming. It use Round Robin method. All programs have to complete in particular time. If any process completed their task then it will be terminate. It run the process automatically.

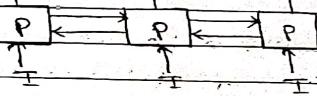
#### # Characteristics :-

- The division of time is called time slice.
- It can be 5 to 100 ms.
- We give equal time to all process using round robin method.
- In this all program takes a particular time & all user use CPU at a time.
- It can do input output & processing tasks in less time.
- It is complex.
- It give immediate output after immediate input.
- It require memory management & protection.
- The process which are not running

It will be stored in waiting queue.  
(x) It use with multi programming.

#### ii Parallel Processing :-

# Definition  $\rightarrow$  When we run more than one program at one time then it is called parallel processing.



#### # Characteristics :-

- It's speed is fast compared to other operating system.
- It use multiple processor.
- It can share memory & input output devices.
- It is called highly coupled system.
- It can run more than one program at a time.

#### # Type

- Symmetric
- Asymmetric
- Symmetric  $\rightarrow$  In this every OS contain their copy.

- ⇒ In this many procedure can run without minimising the process performance.
- (ii) It can control input output devices.
- (iii) If any process fail then it can be reset. Due to this load will be increase on another process.

- 2) Asymmetric ⇒ In this every process contain specific task for work. In this one is master other is slave. It have master slave procedure. It use in large system. It can do all large work. In this all procedure are not equal.

#### Disadvantages:-

- (i) Cost is maximum for manufacturing  
it is difficult to maintain.

etc

#### Distributed OS

Definition → When we want to communicate b/w two or more than two system then we use distributed system. It can share maximum resource. It use in LAN or WAN.

#### Types:-

- (i) Client Server System  
(ii) Peer to Peer System

(i) Client Server System ⇒ When we connect different computer with one server or control system then it is called Client Server System. It have three types:-

- Database Server
- Print Server
- Resource Server
- File Server

(ii) Peer to Peer ⇒ When all computer are

directly interconnected then it is called Peer to Peer System. It is called busily Couple System. It uses network operating System.

## # Advantage :-

(1) Resource sharing → In this one user can use resource of other user like printer, scanner etc.

(2) It uses when we have less per resource.

(3) Improved speed → In this all processing increase the speed because processing can't be complete on one computer then we use load sharing to increase the speed of processing.

(4) Communication → It can send file from one place to another place then we use distributed system like e-mail.

(5) Reliability → If one site fail then the other site can be used so that process can be continuous.

## Disadvantage :-

- i) Less security.
- ii) Insertion, deletion & update difficult.
- iii) Hard to manage.

## (iv) Real time system →

# Definition → When we complete any work in specific time then it is called real time system. For this it requires real time operating system.

## # Application →

- i) It can control aeroplane direction.
- ii) It can control heat in atomic power plant.

iii) It uses in Railway Reservation System for ticket booking.

## # Type :-

- i) Hard real time system.
- ii) Soft real time system.

i) Hard real time system → When it is necessary to comp. task in particular time like To make a car using robot.

2) Soft Realtime System → It also come about And (b) Process Concept  
fix time but it is not necessary to  
complete task in particular time it  
can also check priority. because  
high priority process can stop low  
priority process.

# Advantage →

- i) Speed Fast
- ii) Less time
- iii) less Error
- iv) More Security
- v) Tridiate processing.
- vi) It execute any command in particular time.

# Definition → Process can run one program  
we can store programs as a file if we  
change in one procedure then it can  
be used in another procedure. The running  
status of any program is called process.  
The any program which is from start  
to end can be stop control.

# Process State → Any process have following  
types of state →

- 1) New → It can create new process.
- 2) Waiting → In this process have to wait.
- 3) Running → In this process can be run  
or execute.
- 4) Ready → The process which are in waiting  
stage which is called ready stage.
- 5) Terminate → The process in which executing  
& & is called termination.

# Working → Collection  
⇒ operating system will contain dumpin  
disk & give error message if  
terminate.

DATE: / /

DATE: / /

- This memory dump will be check by debugging.
- Process will be send from one place to another place. So, that it can read next command.

# Process Type → It have two types:-  
 i) User Process  
 ii) System Process

- i) User Process → This coding is given by user.
- ii) System Process → It is made by OS.

Ans (e) PCB (Process Control Block) →

# Definition → We require PCB to maintain related information.

# Component of PCB

- i) Process State →
  - New
  - Ready
  - Waiting
  - Running
  - Terminate

2) Process Counter ⇒ When we want to run new instruction then we get the address of that instruction so, that it can be run.

3) CPU Register → Register will store temporary memory. It can use Index register or Stack Register like.

4) CPU scheduling Information → When we contain process priority & ready que information then it can be run by CPU scheduling.

5) Memory Management Information → It give no. of registers & memory related info.

6) Accounting Info. → It contain CPU time, Job process no. & other info.

7) Input output Info. → It give info. related input output. It check I/O devices.

Ans 2 (a) Thread

1) Definition  $\Rightarrow$  This is light weight process. It is a basic unit of CPU. In this all threads share same process code & data. Using wait process can be sent to the block stage.

2) Benefits

In using thread we can run more than one program at a time, it means other thread automatically leads when connect to the user.

3) Resource Sharing  $\Rightarrow$  Thread can share resource of memory.

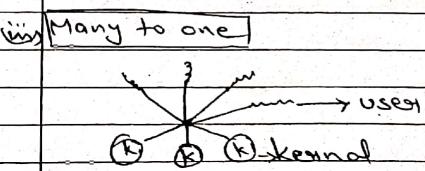
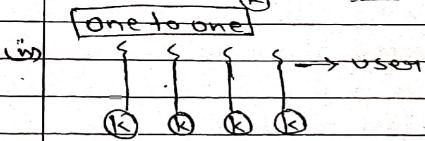
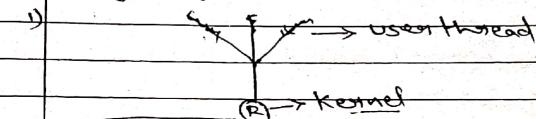
4) Economic  $\Rightarrow$  Process can be switch in minimum cost.

5) Utilization of Multiprocessor  $\Rightarrow$  It can run many threads at a time. It uses parallel processing. Using this we can move from one thread to another thread.

**\* Types of Thread**  $\Rightarrow$  Thread are of types  
 i) User Thread      ii) Kernel Thread

User Thread  $\Rightarrow$  It is made by user. It does not require kernel. It can be made easily & can be maintained easily.

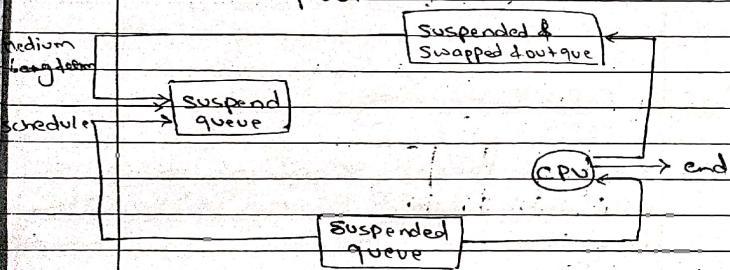
Kernel Thread  $\Rightarrow$  This thread is made by kernel, it means thread can be made by OS. Its speed is slower than user thread.

Diagrams of Thread

Ans 2 (b) Process state  $\Rightarrow$  The starting to end all steps is called process state.

Medium term →

Both or maximum job requires T/D operation. If some job or process suspended at the time of processing then it will be send from main memory to hard disk. So that other process can run. We can include suspended process in list again which is called swap in. otherwise it is called Swapout.



Short term →

It is also called CPU. Short term scheduling It give millisecond time to select new process. It's speed is fast.

Ans (b) System Call →

In any operating system we can run any program. If program can be run using kernel. Kernel is a inbuilt part of OS. Kernel use programming lang. to handle all resources but this can be done using system call. It is a basic programming which is written in high level lang.

#### # Process Switch Characteristics

- (i) CPU register can store value related with program.
- (ii) It can do process state & memory management work.
- (iii) Kernel can store all process information.
- (iv) It can manage time.
- (v) Speed is diff. for diff. machine.
- (vi) According to speed it can define no. of register.
- (vii) It depends on mainly on hardware.
- (viii) It requires extra data will maintain info.

#### # Types for System Call

- (i) Process Control System Call → It is a basic entity in the system which

Can Create delete & abort process

Ex:- fork = Create a process

Exit = Terminate a process

kill      Terminate a Process abnormally

Nice - It give Process Priority.

(2) file management System Call → It can Create, delete, open & close file. It have following function :-

i) Create → Create a file

ii) Open →

iii) Close

iv) Read

v) Write

(3) Device Management sys. Call → It can request or initialise a device

(4) Information Sys. Call → It give time, Date & other information.

(5) Communication sys. Call → It can open or Close Connection, send or receive message, Reading or writing message