ANNAI MATHAMMAL SHEELA ENGINEERING COLLEGE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

CS6401 – OPERATING SYSTEMS

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CS6401-OPERATING SYSTEM

UNIT -1 OPERATING SYSTEM OVERVIEW

2 Marks

1. **What are the basic elements of computer system?**
   - Processor
   - Main memory
   - I/O modules
   - System bus

2. **Define interrupt.**
   An interrupt is a signal from a device attached to a computer or from a program within the computer that causes the main program that operates the computer (the operating system) to stop and figure out what to do next.

3. **List the classes of interrupt.**
   - Program
   - Timer
   - I/O
   - Hardware Failure

4. **Specify the techniques of I/O operations.**
   - Programmed I/O
   - Interrupt – driven I/O
   - Direct memory access

5. **What is cache memory?**
   Cache memory, also called CPU memory, is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. This memory is typically integrated directly with the CPU chip or placed on a separate chip that has a separate bus interconnect with the CPU.

6. **Define symmetric multiprocessor(SMP).**
   SMP (**symmetric multiprocessing**) is the processing of programs by multiple processors that share a common operating system and memory. In **symmetric** (or "tightly coupled") **multiprocessing**, the processors share memory and the I/O bus or data path. A single copy of the operating system is in charge of all the processors.

7. **What are the advantages of SMP?**
   - Performance
   - Availability
   - Incremental growth
   - Scaling

8. **What is meant by multicore computer?**
   It is a type of architecture where a single physical **processor** contains the core logic of two or more processors. These processors are packaged into a single integrated circuit (IC). These single integrated circuits are called a die.

9. **Define operating system.**
   An OS is a program that controls the execution of application programs and act as an interface between applications and computer hardware.

10. What is meant by Mainframe Systems?

Mainframe systems are the first computers developed to tackle many commercial and scientific applications. These systems are developed from the batch systems and then multiprogramming system and finally time sharing systems.

11. What is meant by Batch Systems?

In this, operators batched together jobs with similar needs and ran through the computer as a group .The operators would sort programs into batches with similar requirements and as system become available, it would run each batch.

12. What is meant by Multiprogramming?

Several users simultaneously compete for system resources (i.e) the job currently waiting for I/O will yield the CPU to another job which is ready to do calculations, if another job is waiting. Thus it increases CPU utilization and system throughput.

13. What is meant by Time-sharing Systems?

Time Sharing is a logical extension of multiprogramming .Here, CPU executes multiple jobs by switching among them, but the switches occur so frequently that the users can interact with each program while it is running.

14. What is meant by clustered system?

Clustered systems are collection of multiple CPUs to accomplish computational work. Those systems share storage and are closely linked via LAN networking.

15. What are the types of clustering?

Asymmetric Clustering
Symmetric Clustering & Clustering over a WAN

16. What is meant by Asymmetric Clustering?

In this clustering, one machine is in hot standby mode, while the other is running the application. The hot standby machine just monitors the active server. If that server fails, hot stand by host become the active server.

17. What is meant by Symmetric clustering?

In this, two or more hosts are running applications and they are monitoring each other. This clustering requires more than one application be available to run and it uses all of the available hardware.

18. What is meant by parallel clusters?

Parallel clusters allow multiple hosts to access the same data on the shared storage. Each machine has full access to all data in the database.

19. What is meant by symmetric multiprocessing?

In Symmetric multiprocessing, each processor runs an identical copy of the operating system and these copies communicate with one another as needed.

20. What is meant by Asymmetric Multiprocessing?

In Asymmetric multiprocessing, each processor assigned a specific task. A master processor controls the system and the other processors either look to the master for instruction or have predefined tasks. This master processor also schedules and allocates work to the slaves.

21. What are the advantages of distributed systems?

Resource sharing Load balancing Reliability
Communication link easy

22. What is meant by Real time system?

Real time systems are systems that have their in-built characteristics as supplying immediate response. In real time system, each process is assigned a certain level of priority according to the relative importance of the events to be processed.

23. What are the applications of real-time systems?

Controlling the machines Instruments
Industrial process
Landing & tasking off aero planes
Real time simulations Military applications.

24. What are the types of Real time systems?

Hard Real Time System
Soft Real Time System

25. What is meant by Hard Real time systems?

They are generally required to and they guarantee that the critical tasks are completed in given amount of time.

26. What is meant by soft real time system?

It provides priority to the tasks based on their criticality. It does not guarantee completion of critical tasks in time.

27. What is meant by distributed systems?

A distributed system is basically a collection of autonomous computer systems which co-operate with one another through their h/w and s/w interconnections.

28. What are the disadvantages of distributed systems?

Security weakness
Over dependence on performance and reliability
Maintenance and control become complex

29. What are the modes of operation in Hardware Protection?

User Mode
Monitor Mode

30. What are Operating Services?

Normally, an operating system provides certain services to programs and to the users of those programs. Some of them are:

Program Execution.
I/O operations
File-system manipulation
Communications
Error Detection

31. What is System Programs?

System programs provide a convenient environment for program development and execution. Some of these programs are user interfaces to system calls and others are more complex. Some of them are:

File Management
Status Information
File modification
Programming Language support
Program loading, execution and communication.

32. What is meant by System Calls?

The System Calls acts as a interface to a running program and the Operating system. These system calls available in assembly language instructions.

33. What is Virtual machine?

The Application programs view everything under them in the hierarchy as though the system programs were part of the machine itself. This layered approach is taken as the logical conclusion in the concept of a Virtual machine.

34. What is meant by Hand held Systems?

Handheld Systems have a small amount of memory including slow processors and also small display screens and are of limited size and they always have connectivity to a network.

35. What is known as system utilities?

Most operating systems are supplied with programs that solve common problems or perform common operations. Such programs include web browsers, word processors and text formatters, spread sheets, database systems, compilers, plotting and games. These programs are known as system utilities.

16 Marks

1. Explain the various types of computer systems.
2. Explain interrupts, Direct Memory Access in detail.
3. What are the system components of an operating system and explain them?
4. List the various services provided by an operating system. Explain them in detail.
5. Explain in detail about the categories of system calls?
6. Discuss briefly about OS Generation and System Boot.
7. Explain the concept of Virtual Machine with neat sketch.
8. Describe in detail about Computer System Organization.

UNIT -2 PROCESS MANAGEMENT

1. Define Process.

Process is defined as

Program in execution
A synchronous activity.
The "animated spirit" of a procedure
The "locus of control of a procedure in execution which is manifested by the existence of a "process control block" in the operating system
That entity to which processors are assigned the dispatch able unit

2. What are the different process states available?

Running, if it currently has the CPU
Ready, if it could use a CPU if one were available
Blocked, if it is waiting for some event to happen before it can proceed

3. What is meant by Dispatching?

The Process of assignment of the CPU to the first process on the ready list is called as Dispatching.

4. What is meant by PSW?

Program Status Words (PSW) controls the order of instruction execution and contains various information about the state of a process. There are three types of PSW's namely

Current PSW
New PSW
Old PSW

5. **What is FPCB?**
   FPCB is a data structure containing certain important information about the process including the following:
   Current state of the process
   Unique identification of the process
   A pointer to the process's parent
   A pointer to the process's child The process's priority
   Pointers to locate the process's memory and to allocated resources.

6. **What is meant by Context Switching?**
   When an interrupt occurs, the operating system saves the status of the interrupted process routes control to the appropriate first level interrupt handler.

7. **What are the different operations that can be performed on a process?**
   Create a process
   Destroy a process
   Change a process's priority
   Wakeup a process
   Enable a process to communicate with others
   Suspend a process
   Resume a process
   Block a process

8. **Define Mutual Exclusion.**
   Each process accessing the shared data excludes all others from doing simultaneously called as Mutual Exclusion.

9. **What is meant by Co-operating process?**
   If a process can affect or be affected by the other processes executing in the system, that process which shares data with other process is called as Co-operating process.

10. **What is meant by CPU-bound process?**
    A CPU-bound process generates I/O requests infrequently using more of its time doing computation than an I/O processes. If all processes are CPU-bound, the I/O waiting queue will almost be empty and the devices will go unused and the system will be unbalanced.

11. **What is meant by Direct Communication?**
    In Direct communication, each process that wants to communicate must explicitly name the recipient or sender of the communication. In this scheme, the Send & Receive primitives are defined as send (p , message) - Send a message to process P receive (p , message) - Receive a message to process p

12. **What is meant by Indirect Communication?**
    In Indirect Communication, the messages are sent to and received from mailboxes or ports. A mailbox is an object into which messages can be placed by processes and from which messages can be removed. In this scheme, the Send & Receive primitives are defined as:
    send (A , message) - Send a message to mailbox A.
    receive (A , message) - Receive a message from mailbox A.

13. **What are benefits of Multiprogramming?**
    Responsiveness Resource Sharing Economy
    Utilization of multiprocessor architectures.

14. What are the conditions that must hold for Deadlock Prevention?

Mutual Exclusion Condition
Hold and Wait Condition
No Pre-emption condition
Circular Wait Condition.

15. What are the options for breaking a Deadlock?

Simply abort one or more process to break the circular wait.
Preempt some resources from one or more of the deadlocked processes.

16. What are the algorithms available for Deadlock avoidance?

1) Resource-Allocation Graph Algorithm
2) Banker's Algorithm
   Safety Algorithm
   Resource-Request Algorithm

17. What is a Monitor?

A Monitor is characterized by a set of programmer-defined operators. The representation of a Monitor type consists of declaration of variables whose value define the state of an instance of the type, as well as the bodies of procedures or functions that implement operations on the type.

18. What is meant by Counting Semaphore?

A Counting Semaphore is a semaphore whose integer value that can range between 0 & 1.

19. What is meant by Binary Semaphore?

A Binary Semaphore is a semaphore with an integer value that can range between 0 and 1. It can be simpler to implement than a counting semaphore, depending on the underlying hardware architecture.

20. What is meant by Race Condition?

A condition, when several processes access and manipulate the same data on currently and the outcome of the execution depends on the particular order in which the access takes place is called as Race condition.

21. What does a solution for Critical-Section Problem must satisfy?

Mutual Exclusion.
Progress Bounded Waiting

22. What is meant by Indefinite Blocking or Starvation?

Indefinite Blocking is a situation where process waits indefinitely within the semaphore. This may occur if we add and remove processes from the list associated with a semaphore in LIFO order.

23. What is meant by CPU Scheduler?

When the CPU becomes idle, the operating system must select one of the processes in the ready queue to be executed .This selection process is carried out by the CPU Scheduler.

24. What is meant by CPU Scheduling?

The process of selecting among the processes in memory that are ready to execute and allocates the CPU to one of them is called as CPU Scheduling.

25. What are the types of Scheduling available?

Preemptive Scheduling
Non - preemptive Scheduling
Priority Scheduling

26. What is meant by Priority Scheduling?

The basic idea here is straight toward. Each process is assigned a priority and the run able process with the highest priority is allowed to run.

27. What is Preemptive Scheduling and Non - Preemptive Scheduling?

A Scheduling discipline is Pre-emptive if the CPU can be taken away before the process completes.
A Scheduling discipline is non pre-emptive if once a process has been given the CPU, the CPU cannot be taken away from the process.

28. What are the properties of Scheduling Algorithms?

CPU Utilization Throughput Turnaround time Waiting time Response time

29. What is known as Resource Reservation in Real time Scheduling?

The Scheduler either admits the process, guaranteeing that the process will complete on time or rejects the request as impossible. This is known as Resource Reservation.

30. What is known as Priority inversion?

The high priority process would be waiting for a lower -priority one to finish. This situation is known as Priority Inversion.

31. What is meant by Dispatch latency?

The time taken by the dispatcher to stop one process and start another running is known as Dispatch Latency.

32. What is meant by Dispatcher?

It is a module that gives control of the CPU to the process selected by the short –term scheduler .This function involves
Switching Context
Switching to User Mode
Jumping to the proper location in the user program to restart that program

33. What is meant by First Come, First Served Scheduling?

In this Scheduling, the process that requests the CPU first is allocated the CPU first. This Scheduling algorithm is Non Pre-emptive.

34. What is meant by Shortest Job First Scheduling?

When the CPU is available, it is assigned to the process that has the smallest next CPU burst. This Scheduling algorithm is either Pre-emptive or Non Pre-emptive.

35. What is meant by Priority Scheduling?

A Priority is associated with each process and the CPU is allocated to the process with the highest priority. This is also either Pre-emptive or Non Pre-emptive.

36. What is meant by Memory-Management Unit?

The run-time mapping form virtual to physical addresses is done by a hardware device is a called as Memory Management Unit.

37. What is Round-Robin Scheduling?

In Round-Robin Scheduling, processes are dispatched FIFO, but are given a limited amount of CPU time. If a process doesn't complete before it's CPU time expires, the CPU is Pre-emptied and given to the next waiting process. The Pre-emptied is then placed at the back of the ready list.

16 Marks

1. Explain briefly about Inter Process Communication.
2. Explain the various threading issues with example?
3. Write briefly about the various CPU scheduling algorithms.
4. Define critical section problem . Explain two process solutions and multiple process solutions?
5. Write about semaphores , their usage, implementation given to avoid busy waiting and binary semaphores.
6. Explain briefly about the various classic problems of synchronization .
7. Give a detailed description about deadlocks and its detection.
8. Explain the Banker's algorithm for deadlock avoidance.

UNIT -3 STORAGE MANAGEMENT

1. What is known as Dynamic loading?

With Dynamic loading, a routine is not loaded until it is called. All routines are kept on disk in a re-locatable load format. The main program is loaded into memory and is executed. When a routine needs to call another routine, the calling routine first checks to see whether the another routine has been loaded. If not, the re-locatable linking loader is called to load the desired routine into memory and to update the program's address tables to reflect this change. Then, Control is passed to the newly loaded routine.

2. What is meant by Swapping?

It is a process of bringing in each process in its entirety, running it for a while and then putting it back on the disk.

3. What is the advantage of Dynamic Loading?

The advantage of Dynamic Loading is that an unused routine is never loaded.(i.e) when large amounts of code are needed to handle infrequently occurring cases, such as error routines. Here although program size may be large, the portion that is used may be much smaller and better memory space utilization.

4. What is known as Dynamic Linking?

In this Dynamic Linking, a stub is included in the image for each library-routine reference. This Stub is a small piece of code that indicates how to locate the appropriate memory-resident library routine or how to load the library if the routine is not already present.

5. What is meant by External Fragmentation and Internal Fragmentation?

External Fragmentation exists when enough total memory space exists to satisfy a request, but it is not contiguous and storage is fragmented into a large number of small holes.

The memory allocated to a process may be slightly larger than the requested memory. The difference between these two numbers is called as Internal Fragmentation.

6. What is meant by Paging? Give its advantages.

Paging is a Memory-management scheme that permits the physical -address space of a process to be Non-contiguous.

Advantages:

Avoids the considerable problem of fitting the varying -sized memory chunks onto the baking store

Fragmentation problems are also prevalent baking store, except that access is much slower, so compaction is impossible.

7. What is meant by Memory Compaction?

When swapping creates multiple holes in memory, it is possible to combine them all into one big one by moving all the processes downward as far as possible.

8. **What is TLB and Hit-Ratio?**
   Translation Lookaside Buffer (TLB) is a small, special and fast cache which is associated with high speed memory.
   The Percentage of times that a particular page number is found in the Translation Lookaside Buffer (TLB) is called as Hit- Ratio.

9. **What is meant by Segmentation?**
   Segmentation is a memory-management scheme that supports the user-view memory. Blocks of different size is called as Segments and its associative virtual storage Organization is called as Segmentation.

10. **What is meant by overlay?**
    The idea of overlays is to keep in memory only those instructions and data that are needed at any given time. So, to enable a process to be larger than the amount of memory allocated to it.

11. **What is meant by Demand Paging?**
    Whenever the CPU tries to fetch the first instruction, it gets a page fault causing the 0S to bring in the page containing that instruction. Thus the pages are loaded only on demand is called as Demand Paging.

12. **What is meant by Locality of reference?**
    During any phase of execution, the page references only a relative small fraction of its pages. This reference of fraction of all pages is called as Locality of Reference.

13. **What are the principal events of Process Creation?**
    System Initialization.
    Execution of a System call by a running process.
    A user request to create a new process.
    Initiation of a batch job.

14. **What is meant by Page Fault?**
    Whenever memory management unit notices that the page is unmapped and causes the CPU to trap to the Operating System. This trap is called as Page Fault.

15. **What is meant by Thrashing?**
    A Program which is causing page faults every few instructions to occur is called as Thrashing.

16. **What is meant by Text File?**
    A Text File is a sequence of characters organized into lines.

17. **What is meant by Source File?**
    A Source File is a sequence of subroutines and functions, each of which is further organized as declarations followed by executable statements.

18. **What is meant by Object File?**
    An Object file is a sequence of bytes organized into blocks understandable by the system's linker.

19. **What is meant by Executable file?**
    An Executable file is a series of code sections that the loader can bring into memory and execute.

20. **What is meant by Page Table?**
    Page Table is a table which has the ability to mark an entry invalid through a Valid– Invalid bit or special value of protection bits.

21. What are the Access methods available?

Sequential Access
Direct Access
Other Access methods

16 Marks

1. Illustrate briefly about the various contiguous memory allocation schemes with examples.
2. Explain in detail about the basic concepts of segmentation.
3. Explain the concept of memory allocation in variable partitions for multiprogramming.
4. Describe the basic concepts about paging and explain the types of Page Table Structure.
5. Explain about the 32 bit architecture and 64 bit architecture in detail.
6. Explain in detail about the various page replacement strategies.
7. Consider the following page reference string:

   1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

   How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, or seven frames?
   Remember all frames are initially empty, so your first unique pages will all cost one fault each.
   - LRU replacement
   - FIFO replacement
   - Optimal replacement
8. What is demand paging? Describe the process of how can demand paging be implemented with virtual memory?
9. Explain in detail about thrashing and Allocation of kernel memory.

UNIT -4 I/O SYSTEMS

1. What are the various operations performed in a File?

Creating
Deleting
Opening
Closing
Reading
Writing
Appending
Seeking
Renaming
Getting & Setting Attributes.

2. What are the operations performed in a Directory?

Create
Delete
Opendir
Closedir
Readdir
Rename
Link
Unlink

3. What are the different directory structures available?

Single - Level Directory
Two - Level Directory Three - Structured Directory
A cyclic - Graph DirectoryGeneral Graph Directory

4. **What is meant by Swapping?**
   It is a process of bringing in each process in its entirety, running it for a while, then putting it back on the disk.

5. **What is meant by Memory Compaction?**
   When swapping creates multiple holes in memory, it is possible to combine them all into one big by moving all the processes downward as far as possible.

6. **What is meant by Boot Control block?**
   The Block which contains information needed by the system to boot an operating system from that partition is called as Boot Control Block.

7. **What is meant by Partition Control Block?**
   The Block which contains partition details such as the number of blocks in that partition, size of the blocks, free -block count and free - block pointers is called as partition control Block.

8. **What are the different methods for allocation in a File System?**
   Contiguous Allocation
   Linked Allocation Indexed Allocation

9. **What is meant by Free Space List?**
   The list which maintains/records all free disk block which means blocks that are not allocated to some file or Directory.

10. **What is meant by Buffering?**
    Buffering is a process of providing space in the primary storage to hold the physical blocks of files at once.

11. **What is Double Buffering?**
    It is a process in which the first buffer receives and holds the records generated by the running process until it becomes full. Thus the process continues to deposit the generated records in first buffer.

12. **Mention few Page Replacement Strategies.**
    Optimal Page Replacement
    FIFO Page Replacement
    LRU Page replacement
    MFU Page Replacement
    LFU Page Replacement
    Random Page Replacement

13. **What is meant by Global Replacement and Local Replacement?**
    Global Page Replacement allows a process to select a replacement frame from the set of all frames, even if that frame is currently allocated to some other process.
    Local Replacement requires that each process select from only its own set of allocated frames. Here the number of frames allocated to a process doesn't change.

14. **What is meant by Working Set?**
    A Working Set is defined as the collection of pages a process is actively referencing.

15. **What is meant by Double Buffering?**
    A Memory Mapping proceeds by reading in disk blocks from the file system and storing them in the buffer cache. Because the virtual memory system cannot interface with the buffer cache, the contents of file in the buffer cache must be copied into the page cache. This situation is known as Double Caching

16. What are File Attributes?

Identifier
Type, Size Location, protection
Time, Date & User Identification

17. What is meant by Identifier in Files?

This has a unique tag, which is always a number that identifies the file within the file-system and it is non-human readable name for the file.

18. What is meant by File Pointer?

This pointer is unique to each process operating on the file and it is the pointer used by the pointer used by the system to track the last read-write location as a current - file position pointer.

19. What is meant by Seek Time?

It is the time taken for the disk arm to move the heads to the cylinder containing the desired sector.

20. What is meant by Rotational Latency?

It is defined as the additional time waiting for the disk to rotate the desired sector to the disk head.

21. What is meant by Band Width?

Band Width is the total number of bytes transferred, divided by the total time between the first request for service and the completion of the last transfer.

22. What is meant by Low-level formatting?

Low-level formatting fills the disk with a special data structure for each sector .The Data structure for a sector typically consists of a header, a data area and a trailer.

23. What is meant by Swap-Space Management?

It is a low-level task of the operating system .Efficient management of the swap space is called as Swap space management. This Swap space is the space needed for the entire process image including code and Data segments.

24. What is meant by Disk Scheduling?

Disk scheduling is a process of allocation of the disk to one process at a time. In multi-programmed system, many processes try to read or write the records on disks as the same time. To avoid disk arbitration, it is necessary.

25. Why Disk Scheduling necessary?

To avoid Disk arbitration which occurs when many processes try to read or write the records on disks at the same time, Disk Scheduling is necessary.

26. What are the characteristics of Disk Scheduling?

Throughput
Mean Response Time
Variance of Response time

27. What are the different types of Disk Scheduling ?.

Some of the Disk Scheduling are
(i).SSTF Scheduling
(ii).FCFS Scheduling
(iii) SCAN Scheduling
(iv).C-SCAN Scheduling
(v).LOOK Scheduling.

28. What is meant by SSTF Scheduling?.

SSTF Algorithm selects the request with the minimum seek time from the current head position. and SSTF chooses the pending request to the current head position.

29. What is meant by FCFS Scheduling ?

It is Simplest form of Disk Scheduling. This algorithm serves the first come process always and is does not provide Fast service.

30. What is meant by SCAN Scheduling ?.

In the SCAN algorithm, the disk arm starts at one end of the disk and moves toward the other end of the disk. At the other end, the direction of head movement is reversed and servicing continues across the disk.

31. What is meant by C-SCAN Scheduling?

C-SCAN means Circular SCAN algorithm. This Scheduling is a variant of SCAN designed to provide a more waiting time. This essentially treats the cylinder as a circular list that wraps around from the final cylinder to the first one.

32. Define Throughput .

It is defined as the number of requests serviced per unit time.

16 Marks

1. Write briefly about file attributes, operations, types and structure.
2. Discuss in detail about file allocation methods.What are the possible structures for directory? Discuss them in detail.
3. Explain about disk scheduling and any of its two algorithms with suitable example.
4. Explain the following:
   a. RAID
   b. I/O in Linux
5. Write a detailed note on various file access methods with neat sketch.
6. Explain in detail about free space management with neat diagram.
7. Describe the two level and tree type directory structures in detail.
8. Describe the life cycle of an I/O request in detail.
9. Describe the Windows XP file system in detail.
10. Explain the directory structure of Linux operating system.
11. Explain in detail the process management and file system in LINUX system.
    Suppose that the disk drive has 5000 cylinders number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is:
    86,1470,913,1174,948,1509.1022,1750,130 starting from the current head position, what is the total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the disk scheduling algorithms.
        i. SSTF
        ii. SCAN
        iii. LOOK
        iv. C-LOOK

UNIT 5 - CASE STUDY

1. **What are the design principles of LINUX system?**
   - Linux is a multiuser, multitasking system.
   - Main design goals are speed, efficiency and standardization
   - Its file system adheres to traditional Unix
   - Linux programming interface adheres to SVR4 unix semantics.

2. **What are the Components of a Linux System?**
   Linux system is composed of three main modules.They are :
   (i).Kernel
   (ii).System libraries
   (iii).System utilities

3. **What are the main support for the Linux modules?**
   The Module support under Linux has three components. They are :
   (i). Module Management
   (ii).Driver Registration.
   (iii).Conflict Resolution mechanism.

4. **Write note on linux kernel.**
   Kernel is the heart of the Linux operating system. It is responsible for all major activities of Linux OS. It provides important abstraction to hide low level hardware information to user or application program.

5. **Differentiate internal and external command.**
   Internal commands are the commands that are executed directly by the shell. These commands will not have a separate process running for each.
   External commands are the commands that are executed by the kernel. These commands will have a process id running for it.

6. **List the components of Kernel module.**
   - Process Management
   - Memory Management
   - Hardware Device Drivers
   - File System Drivers
   - Network Management

7. **What is meant by System Libraries?**
   System Libraries define a standard set of functions through which applications can interact with the kernel and that implement much of the operating -system functionality that doesn't need the full privileges of kernel code.

8. **What is meant by System Utilities?**
   System Utilities are system programs that perform individual, specialized management tasks. Some of the System utilities may be invoked just to initialize and configure some aspect of the system and others may run permanently, handling such tasks as responding to incoming network connections, accepting logon requests from terminals or updating log files.

9. **Specify the services provided by DNS.**
   - Host aliasing
   - Mail server aliasing
   - Load distribution

10. List the components of BIND.

- Service or Daemon
- Resolve Library
- Dig command

11. What is the function of Module management?

The module management allows modules to be loaded into memory and to talk to the rest of the kernel.

12. Write note on DNS.

Domain Name System assigns meaningful names to a large set of machines and handles the mapping of those names to a machine IP address.

13. Name the components of DNS.

- Domain
- Domain name
- Name server
- Name resolver
- Name cache
- Zone

14. What is domain name resolution? Specify its types.

Domain Name Resolution is the task of converting domain names to their corresponding IP address. Types are:

- Recursive resolution
- Iterative resolution
- Reverse name resolution

15. What is meant by virtualization?

Virtualization means running multiple machines on a single hardware. The real hardware invisible to operating system. OS only sees an abstracted out picture. Only Virtual Machine Monitor(VMM) talks to hardware.

16. Define hypervisor.

Hypervisor is a virtualization platform that allows multiple operating systems to run on a host computer at the same time. The term usually refers to an implementation using full virtualization.

17. What is VMware?

VMware is a popular commercial full virtualization solution that can virtualize unmodified operating systems.

18. Specify the types of virtualization.

- Platform virtualization
- Resource virtualization

19. Write note on Xen.

Xen is a free open source solution for operating system level paravirtualization from XenSource.

20. What are the benefits of virtualization?

- Isolation
- Encapsulation
- Hardware independence

21. What is the function of Driver registration?

Driver Registration allows modules to tell the rest of the kernel that a new driver has become available.

22. What is guest OS?

A guest OS is an operating system that is installed in a virtual machine or disk partition in addition to the host or main OS.

23. What is the Disadvantage of Static Linking ?

The main disadvantage of static linking is that every program generated must contain copies of exactly the same common system library functions.

24. What is meant by Kernel in Linux system ?

Kernel is responsible for maintaining all the important abstractions of the operating system including such things as virtual memory and processes.

25. What is the function of Conflict Resolution mechanism?

This mechanism allows different device drivers to reserve hardware resources and to protect those resources from accidental use by another driver.

26. What is meant by Device drivers?

Device drivers include

(i) Character devices such as printers, terminals

(ii) Block devices (including all disk drives) and network interface devices.

16 Marks

1. Explain in detail the design principles, kernel modules, process management, scheduling in LINUX system.
2. Explain in detail the memory management in LINUX system.
3. Explain in detail the file system in LINUX system.
4. Explain in detail about I/O in LINUX system.
5. Describe about the network structure of LINUX system.
6. Explain in detail about the system administration of LINUX system and the requirements for LINUX system administrator.
7. Explain in detail about setting up a LINUX multifunction server.
8. What is virtualization? Explain its concepts in detail.
9. Illustrate the procedure for setting XEN on LINUX host and adding guest OS.
10. Give the procedure for setting VMware on LINUX host and adding guest OS.