VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

IV SEMESTER

CS8493 – OPERATING SYSTEMS

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SUBJECT   : CS8493 OPERATING SYSTEMS

SEM / YEAR: IV / II

UNIT I - OPERATING SYSTEMS OVERVIEW		
SYLLABUS		
Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization-Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.		
PART - A		
Q.No	**Questions**	**BT**	**Competence**

Q.No	Questions	BT	Competence
1.	Differentiate between tightly coupled systems and systems.	BTL-2	Understand
2.	Consider a Memory system with a cache access time of 10 ns and a memory access time of 110 ns assume the memory access time includes the time to check the cache. If the effective access time is 10% greater than the cache access time, what is the hit ratio H ?	BTL-1	Remember
3.	What are the objective of Operating systems ?	BTL-1	Remember
4.	What are the advantages of peer to peer systems over client server systems?	BTL-1	Remember
5.	Differentiate between hard real time systems and soft real time	BTL-4	Analyze
6.	Tabulate the different interrupt classes.	BTL-4	Analyze
7.	Describe what virtual machine is and what are the advantages	BTL-1	Remember
8.	Illustrate with an example about OS a resource Manager.	BTL-3	Apply
9.	Define system call.	BTL-1	Remember
10.	Describe bootstrap program..	BTL-2	Understand
11.	What is the purpose of system programs?.	BTL-1	Remember
12.	Summarize the functions of DMA.	BTL-5	Evaluate
13.	Discuss any two responsibilities of OS file management activities.	BTL-2	Understand

14.	Illustrate whether the timesharing differs from multiprogramming?	BTL-3	Apply
15.	Summarize the objectives and functions of an operating	BTL-2	Understand
16.	Explain why API's need to be used rather than system calls.	BTL-5	Evaluating
17.	Develop clustered systems.	BTL-6	Create
18.	Explain the function of system programs. Write the	BTL-4	Analyze
19.	Which system program can be divided?	BTL-3	Apply
20.	Illustrate the use of fork and exec system calls.	BTL-6	Create
PART - B			
1.	Explain the purpose and importance of system calls and discuss the calls related to device management and communication in brief. (13)	BTL-5	Evaluate
2.	(i)Demonstrate about the evolution of virtual machine. Also explain how virtualization could be implemented in Operating system (8) (ii)Discuss about Os and DMA in detail (5)	BTL-3	Apply
3.	(i)Describe the various types of system calls and system programs with an example of each (6) (ii)Explain various structures of an operating system structures and explain with a neat sketch (7)	BTL-1	Remember
4.	Summarize the essential properties of the follow types of operating system (i)Batch (4) (ii)Time-Sharing (3) (iii)Real (3) (iv)Distributed (3)	BTL-1	Remember
5.	i)How could a system be designed to allow a choice of operating system from which boot? What would the bootstrap program need to do? (6) ii) Describe the difference between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor system? (7)	BTL-2	Understand
6.	Generalize five services provided by an operating system. Explain how each provides convenience to the users. Explain also in which cases it would be impossible for user level programs to provide these services. (13)	BTL-6	Create

7.	(i)Classify different types of Computer system architecture (7) (ii)Illustrate the operating system structure and functions. (6)	BTL-3	Apply
8.	i)Distinguish between client server and peer to peer model of distributed system. (8) ii)Describe the three general methods for passing parameters to the operating system with example. (5)	BTL-1	Remember
9.	(i)Explain the various memory hierarchies with neat block diagram. (8) (ii) Explain interrupts in detail. (5)	BTL-4	Analyze
10.	Describe in detail about system calls, system programs and OS generation . (13)	BTL-1	Remember
11.	Discuss in detail about Evolution of Operating Systems. (13)	BTL-2	Understand
12.	Summarize the basic elements of computer system. (13)	BTL-2	Understand
13.	Explain the concept of instruction execution in detail. (13)	BTL-4	Analyze
14.	Compare and contrast i) Multi threading Vs Multiprogramming (8) ii) MulticoreVs Multiprocessing (5)	BTL-4	Analyze
	PART - C		
1.	Analyse five services provided by an operating System. Explain how each provides convenience to the users. Explain in which cases it would be impossible for user-level programs to provide these services. (15)	**BTL-4**	Analyze
2.	Recommend the system calls, write a program in either C or C++ that reads data from one file and copies it to another file.	**BTL-5**	Evaluate
3.	Compose two reasons why caches are useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching(for instance ,a cache as large as a disk),why not make it that large and eliminate the device. (15)	**BTL-6**	Creating
4.	Generalize Some CPUs Provide for more than two modes of operation. What are two possible uses of these multiple modes? (15)	**BTL-6**	Create
	UNIT II PROCESS MANAGEMENT		

SYLLABUS

Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication; Threads- Overview, Multicore Programming, Multithreading Models; Windows 7 – Thread and SMP Management. Process Synchronization – Critical Section Problem, Mutex Locks, Semophores, Monitors; CPU Scheduling and Deadlocks.

1	List out the data fields associated with Process Control blocks.	BTL-1	Remember
2	Define the term Dispatch Latency.	BTL-1	Remember
3	Infer whether the context switch an overhead? Justify your answer.	BTL-4	Analyze
4	Under what circumstances is user level thread is better than the kernel level threads.	BTL-2	Understand
5	Examine if IPC is needed ? Name the two fundamental models of IPC.	BTL-1	Remember
6	Define semaphore and mention the operations on semaphore.	BTL-1	Remember
7	Demonstrate when a system is said to be in safe state.	BTL-3	Apply
8	Point out the reason for providing process cooperation.	BTL-4	Analyze
9	Discuss what a critical section is and what requirements must a solution to the critical solution problem satisfied.	BTL-2	Understand
10	Describe what is meant by 'starvation' in operating system.	BTL-2	Understand
11	Differentiate preemptive and non-preemptive scheduling.	BTL-2	Understand
12	Conclude your answer is it possible to have a deadlock with only one process.	BTL-5	Evaluate
13	Define monitor. What does it consists of ?	BTL-1	Remember
14	Priority inversion is a condition that occurs in real time systems where a low priority process is starved because higher priority processes have gained hold of the CPU – Comment on this statement	BTL-4	Analyze
15	Differentiate single threaded and multithreaded processes .	BTL-3	Apply
16	Show that mutual exclusion will be violated if the signal and wait operations are not executed atomically.	BTL-3	Apply
17	Conclude your answer is it possible to prevent the occurrence of deadlock Under what conditions.	BTL-5	Evaluate
18	Convince the statement "If there is a cycle in the resource allocation graph, it may or may not be in deadlock state .	BTL-6	Create

19	Compose a best scheduling algorithm Define any four scheduling criteria used to compare the scheduling algorithms.	BTL-6	Create
20	Define race condition.	BTL-1	Remember
PART - B			
1	(i) Explain the FCFS, preemptive and non-preemptive versions of Shortest Job First and Round Robin (time-slice2) scheduling algorithms with Gantt Chart for the four processes given. Compare their average turn around and waiting time (13) Process Arrival Time Burst Time P1 0.00 8 P2 1.001 4 P3 2 .001 9 P4 3.001 5 p5 4.001 3	BTL-4	Analyze
2	(i) Develop pseudo code for implement operations and Show how wait () and signal () semaphore operations could be implemented in multiprocessor environments, us Test and Set instructions. The solution should exhibit minimal busy wait. (7) (ii)Prepare the issues to be considered with multithreaded programs (6)	BTL-6	Create

3.	(i)Evaluate the following snapshot of the system
	        Allocation Max Available
	        A B C D A B C D A B C D
	                        1 5 2 0
	Po 0 0 1 2 0 0 1 2
	P1 1 0 0 0 1 7 5 0
	P2 1 3 5 4 2 3 5 6
	P3 0 6 3 2 0 6 5 2
	P4 0 0 1 4 0 6 5 6
	Answer the follow based on banker's algorithm.
	1.Define safety algorithm (2)
	2. What is the content of need matrix? (4)
	3. Is the system in a safe state? (4)
	 (ii)Is a request from process P1arrives for(0,4,2,0) can the request be granted immediately? (3)
		BTL-5	Evaluate

4.	i)It is possible to have concurrency but not parallelism ? Explain. (6) ii) Consider a system consisting of four resource of same type that are shared by three process, each of which needs at most two resources. Show the system is deadlock free. (7)	BTL-2	Understand

5.	List the differences in degree to which the follow scheduling algorithms discriminate in favour of short processes
	    i) FCFS (5)
	    ii) RR (4)
	    iii) Multilevel feedback queue (4)
		BTL-1	Remember

6.	i)Describe Thread types and SMP management (8) ii)Give a solution for readers writers problem (5)	BTL-1	Remember
7.	(i)Discuss about monitor solution (10) (ii)Describe the operation on a process in detail. (3)	BTL-2	Understand
8.	(i)Examine the criteria for evaluating the performance of scheduling Algorithms? (4) (ii)Demonstrate with an example about critical section (9)	BTL-3	Apply
9.	(i) Provide two programming examples in which multithreading does not provide better performance than a single threaded solution (7) (ii)How does deadlock avoidance differ from deadlock prevention and describe the action taken by the kernel to context switching between process? (6)	BTL-4	Analyze
10.	(i) Define semaphore. Explain the use of semaphore in synchronization problem with an example (5) (ii) Explain Process control block (2) iii)Describe about short- term,Mid-term, Long-term scheduling (2) iv)Explain about IPC (4)	BTL-1	Remember
11.	What is a race condition ? Explain how a critical section avoids this condition. What are the properties which a data item should possess to implement a critical section? D escribe a solution to the dinning philosopher problem so that no races arise. (13)	BTL- 1	Remember
12.	Discuss in detail about resource allocation graph with suitable example. (13)	BTL-2	Understand
13.	Examine the classic problems of synchronization with suitable examples. (13)	BTL-3	Apply
14.	Infer the necessary condition for deadlock and methods for handling the deadlock. (13)	BTL-4	Analyze
PART -C			

1.	Analyze the interprocess communication scheme where mailboxes are used a) Suppose a process P wants to wait for two messages, one from mailbox A and one from mailbox B. What sequence of send and receive should it execute? (8) b) What sequence of send and receive should p execute if P wants to wait for one message from mailbox A or from mailbox B (or from both)? (7)	BTL-4	Analyze
2.	Assess an operating system maps user-level threads to the kernel using the many-to-many model where the mapping is done through LWPs. Furthermore, the system allows the developers to create real –time threads. IS it necessary to bound a real-time thread to an LEP? Explain. (15)	BTL-5	Evaluate
3.	What do you mean by the term synchronization? What is semaphore? Explain how semaphore can be used as synchronization tool. consider a coke machine that has 10 slots.The producer is the delivery person and the consumer is the student using the machine, it uses the following three semaphores Semaphore mutex: Semaphore full buffer / Number of filled slots Semaphore empty buffer / Number of empty slots 1)Write pseudocode for delivery person ( )and student( ) 2)What will be the initial values of the semaphore? (15)	BTL -6	Create

| 4. | What is deadlock?What are the necessary conditions for dead lock to occur? Explain the deadlock prevention method of handling deadlock. Consider the following information about resource ibn a system.

i) There are two classes of allocatable resource labelled R1 and R2
ii) There are two instance of each resource
iii) There are four processes labled p1 through p4
iv) There are some instances already allocated to processess as follows:
   • one instance of R1 held by P2,another held by P3
   • One instance of R2 held by p1,another held by p4.
v) Some process have requested additional resources as follows:
• p1 wants one instance of R1.
• P3 wants one instance of R2
1) Draw the resource allocation graph for this system.
2) What is the state(runnable,waiting)of each process?For each process that is waiting for.
3) Is this system Deadlocked? If so, state which processe are involved. If not, give an execution sequence that eventually ends, showing resource acquisition and release at each step. (15) | BTL-6 | Create |

UNIT III	STORAGE MANAGEMENT

SYLLABUS
Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

PART -A

1.	**Discuss** the significance of LDT and GDT in segmentation	BTL-2	Understand
2.	**Differentiate** between page and segment	BTL-2	Understand
3.	**Point out** how the problem of external fragmentation can be solved.	BTL-4	Analyze
4.	**Name** two difference between logical and physical address	BTL-1	Remember
5.	**Formulate** how long a paged memory reference takes if memory reference takes 200 nanoseconds .Assume a paging system with page table stored in memory.	BTL-6	Create
6.	**Define** page fault.	BTL-1	Remember
7.	**Evaluate** the maximum number of pages needed If a system supports 16 bit address line and 1K page size.	BTL-5	Evaluate
8.	**Describe** what is an overlay. What is the use of it?	BTL-2	Understand
9.	**Define** virtual memory. Mention its advantages.	BTL-1	Remember

10.	**Describe** address bind. Mention the different types.	BTL-1	Remember
11	**Discuss** the advantages of dynamic link and load.	BTL-2	Understand
12	**How** does the system detects thrashing?	BTL-4	Analyze
13	**Deduce** the possibility for a process to have two work sets, one represent data and another represent code.	BTL-5	Evaluate
14	**Discuss** what you mean by compaction? In which situation is it applied.	BTL-3	Apply
15	**Describe** about swapping. Let us assume the user process is of size 1MB and the backing store is a standard hard disk with a transfer rate of 5MBPS. Calculate the transfer rate.	BTL-1	Remember
16	**Prepare** a table differentiate preparing and demand paging.	BTL-6	Create
17	**Define** TLB	BTL-1	Remember
18	**Point out** the need for inverted page table.	BTL-4	Analyze
19	Consider the following page-reference string : l, 2, 3, 4, 5, 6,7,9,9, 70, 11, 12.**Calculate** how many page faults and	BTL-3	Apply
20	**Contrast** global vs. local page replacement techniques	BTL-3	Apply
PART -B			
1	(a)**Evaluate** by Consider the follow page reference string assuming four frames. Remember all frames are initially empty. i) LRU replacement ii) FIFO replacement iii) Optimal replacement (9) (b)What are the advantages and disadvantages of contiguous and non-contiguous memory allocation? (4)	BTL-5	Evaluate
2	(i)**Describe** how logical address is translated into physical address us Paging mechanism with a neat diagram (7) (ii)Write short notes on memory-mapped files (6)	BTL-1	Remember
3	(i)**Illustrate** contiguous memory allocation schemes, give examples. (8) (ii)**List** the various operating systems examples (5)	BTL-3	Apply
4	Draw the diagram of segmentation memory management scheme and **summarize** its principle (13)	BTL-2	Understand
5	(i)**Discuss** demand paging. Describe the process of demand paging in OS (8) (ii)**Discuss** in detail about various allocation methods (5)	BTL-2	Understand
6	When do page faults occur? Consider the reference string: l, 2, 3, 4, 2, 1, 5, 6, 2,1, 2, 3,7|, 6, 3, 2, l, 2, 3, 6. Design the number of page faults occur for the FIFO, LRU and optimal replacement algorithms, assuming three, four page frames? (13)	BTL-6	Create

7	(i)**Compare** Which algorithms make the most efficient use of memory .Given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB in order, how would each of the first-fit, best-fit, and worst-fit algorithms place processes of size 418 KB, 202 KB, 506 KB,11 2 KB, and 95 KB (in order)? (10) (ii)**Explain** in detail about 32 bit and 64 bit architecture (3)	BTL-4	Analyze
8	**Describe** the various techniques for structuring the page table in a page memory management scheme (13)	BTL-1	Remember
9	(i)**Describe** in detail about thrash (8) (ii)**Describe** in detail about allocation of kernel memory(5)	BTL-1	Remember
10	i)**Describe** a mechanism by which one segment could belong to the address space of two different processes (7) ii)What are segmentation and paging sometimes combined in to one scheme? **Explain** them in detail with example? (6)	BTL-3	Apply
11	i)Under what circumstances page fault occurs? **Describe** the action taken by the OS when a page fault occurs? (4) ii) **Discuss** situation in which the LFU page replacement algorithm generates fewer page faults than the least recently used LRU Page replacement algorithm. Also discuss under what circumstances the opposite holds good (9).	BTL-1	Remember
12	i)**Distinguish** between Internal fragmentation And External Fragmentation (6) ii)**Explain** in detail about Production and Sharing in segmentation (7)	BTL-2	Understand
13	i)**Point out** the Performance of Demand paging in detail (8) ii)**Explain** Counting based page Replacement in detail (5)	BTL-4	Analyze
14	i)**Explain** in detail about Logical versus Physical address (7) ii)**Analyze** Overlays with an example (6)	BTL-4	Analyze
PART C			

1	Consider a paging system with the page table stored in memory. a.If a memory reference takes 200 nanoseconds ,how long does a paged memory reference take? (7) b.If we add TLB s and 75 percent of all page table references are found in the TLBs,What is the effective memory reference time?(Assume that finding a page table entry in the TLBs takes Zero time, if the entry is there.) (8)	BTL-4	Analyze
2	Consider a System where a program can be separated into two parts. Code and data. The CPU knows whether it wants an instruction (instruction fetch) or data (data fetch or store).Therefore, two base-limit register pairs and provided. one for instructions and one for data. The instruction base-limit register pair is automatically set to read only, so programs can be shared among different users. Discuss the advantages and Disadvantages of this scheme. (15)	BTL-5	Evaluate
3	Suppose that your replacement policy(in a paged system) is to examine each page regularly and to discard that page if it has not been used since the last examination .What would you gain and what would you lose by using this policy rather than LRU or second-chance replacement? (15)	BTL-6	Create
4	You have devised a new page-replacement algorithm that you think may be optimal. In some contorted test cases, Belady's anomaly occurs. Is the new algorithm optimal? Explain Your answer (15)	BTL-6	Create

UNIT IV FILESYSTEMS AND I/O SYSTEMS

SYLLABUS

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface – File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

PART A

1	**Compare** the various file access methods .	BTL-5	Evaluate
2	**Differentiate** bit map–based allocation of blocks on disk and a free.	BTL-4	Analyze
3	**Illustrate** the techniques used to protect the user files.	BTL-3	Apply
4	**Compare** file protection and security.	BTL-4	Analyze
5	**List** the responsibility of the file manager.	BTL-1	Remember
6	**Illustrate** the various file allocation methods.	BTL-3	Apply

7	**How** does DMA increases system concurrency?	BTL-4	Analyze
8	**Illustrate** the pros and cons of a fixed head disk and a moving head.	BTL-3	Apply
9	Suppose that the disk rotates at 7200 rpm. **Identify** the following. a) what is the average rotational latency of the disk drive ? b) Identify seek distance can be covered in the time?	BTL-1	Remember
10	**Define** UFD and MFD.	BTL-1	Remember
11	**Give** the disadvantages of Contiguous allocation .	BTL-2	Understand
12	**Formulate** any four common file types. Write the various file attributes.	BTL-6	Create
13	**List** out the different types of directory structure.	BTL-1	Remember
14	**Summarize** the characteristics that determine the disk access speed.	BTL-2	Understand
15	**Discuss** the objectives of file management system.	BTL-2	Understand
16	**Examine** the need for disk scheduling? Give the various disk Scheduling methods.	BTL-1	Remember
17	**Define** log structured file. What are the disadvantages of log Structured file systems?	BTL-1	Remember
18	**Conclude** which disk scheduling algorithm would be the best to Optimize the performance of a RAM disk.	BTL-5	Evaluate
19	**Formulate** any three disadvantages of placing functionality in a device controller, rather than in the kernel.	BTL-6	Create
20	**Give** the importance of swap space management .	BTL-2	Understand
PART B			
1	(i)**Formulate** by assuming the head of a moving disk with 200 tracks, numbered 0….199, is currently the disk head starts at 53 and the queue request is kept in the FIFO order, 98, 183, 37,122,14, 124,65, 67. What is the total head movement needed to satisfy these requests for the SCAN,C-SCAN,LOOK and C-LOOK disk scheduling algorithms? (9) (ii)**Compare** the various disk scheduling algorithms. (4)	BTL-6	Create
2	i)**Why** it is important to balance file system I/O among the disk and controller on a system in a multitasking environment. (7) ii)**Discuss** the advantage and disadvantages of supporting links to files that cross mount points. (6)	BTL-1	Remember

3	i)**Explain** why logging metadata updates ensures recovery of file system after a file system crash. (7) ii) Could a RAID level 1 organization achieve better performance for read request than a RAID level 0 organization ? If so How? (6)	BTL-5	Evaluate
4	(i)**Describe** with a neat sketch about the various directory structure. (7) (ii)**Describe** in detail about free space management. (6)	BTL-1	Remember
5	(i)**Describe** in detail about the commonly used file operations with example . (6) (ii)**Distinguish** between the different file access methods . (7)	BTL-1	Remember
6	(i)**Give** in detail about application-I/O interface . (7) (ii)**Explain** the services provided by kernel I/O subsystems (6)	BTL-2	Understand
7	In a variable partition scheme, the operating system has to keep track of allocated and free space. **Discover** a means of achieving this. Describe the effects of new allocations and process terminations in your suggested scheme (13)	BTL-3	Apply
8	**Classify** the different file allocation methods with neat diagram. Mention the advantages and disadvantages. (13)	BTL-3	Apply
9	**Analyze** the common schemes available for defining the logical structure of a directory. (13)	BTL-4	Analyze
10	(i)**Describe** how the disk space from deleted can be reused. (8) (ii)**Describe** the life cycle of I/O request in detail. (5)	BTL-2	Understand
11	(i)**Classify** in detail about file types with usual extension and functions. (7) ii) **Explain** the different allocation methods in disk storage with the neat sketch. (6)	BTL-4	Analyze
12	i)**Infer** in detail about a tree structure directory in file system interface (10) ii)**Prepare** a general graph directory in file system (3)	BTL-4	Analyze
13	i)**Summarize** in detail about Virtual file system (8) ii)**Express** the views on –disk structure in file system implementation (5)	BTL-2	Understand
14	**Examine** in detail about Tertiary Storage Structure (13)	BTL-1	Remember
PART C			
1	Infer with an example of an application in which data in a file should be accessed in the following order: (15) a. Sequentially b.Randomly	BTL-4	Analyze

2	Evaluate a system where free space is kept in a free-space list. a. Suppose that the Pinter to the free-space list is lost. Can the system reconstruct the free-space list? Explain your answer. (7) b. Suggest a scheme to ensure that the pointer is never lost as a result of memory failure. (8)	BTL-5	Evaluate
3	Develop a system which uses interrupt-driven I/O to manage a single serial port, but polling I/O to manage a front-end processor, such as a terminal concentrator. (15)	BTL-6	Create
4	Formulate why logging metadata updates ensures recovery of a file system after a file system crash? (15)	BTL-6	Create

UNIT V   CASE STUDY
SYLLABUS
Linux System – Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS – iOS and Android – Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

PART A			
1	**Give** the design principles of LINUX system.	BTL-2	Understand
2	**Give** the various components of a Linux System.	BTL-2	Understand
3	**List** the components of kernel modules.	BTL-1	Remember
4	**Define** LINUX virtualization.	BTL-1	Remember
5	**Point out** the purpose of using virtualization.	BTL-4	Analyze
6	**Define** hypervisor.	BTL-1	Remember
7	**Give** the two components of hypervisor.	BTL-2	Understand
8	**Compare** the types of hypervisor.	BTL-4	Analyze
9	**Define** Mobile OS.	BTL-1	Remember
10	**Prepare** the advantages of Linux OS	BTL-6	Create
11	**Tabulate** the all the types of mobile OS.	BTL-2	Understand
12	**What** is Domain Name System (DNS)?	BTL-1	Remember
13	**Prepare** a list of LINUX system administrator	BTL-6	Create
14	**Illustrate** the requirements needed for LINUX system.	BTL-3	Apply
15	**Illustrate** the key features of android framework.	BTL-3	Apply
16	**Explain** guest operating system.	BTL-4	Analyze
17	**Define** the function of caching only servers	BTL-5	Evaluate
18	**Define** demand-zero memory.	BTL-1	Remember
19	**Illustrate** the types of LINUX device classes.	BTL-3	Apply
20	**Summarize** the three layers of network in LINUX kernel.	BTL-5	Evaluate

PART B			
1	**Explain** in detail about the process management in Linux. (13)	BTL-4	Analyze

2	(i)**Discuss** about the requirements to become a Linux system Administrator. (5) (ii) How to install and configuring network services in LINUX (8)	BTL-2	Understand
3	(i)**Describe** in detail about Domain Name System. (7) (ii)**Describe** the steps for scheduling in Linux OS. (6)	BTL-1	Remember
4	**Describe** about the network structure of LINUX system.(13)	BTL-2	Understand
5	i)**Explain** the components of Linux system with neat sketch (5) ii) **Explain** the various system administrator roles in LINUX OS (8)	BTL-5	Evaluate
6	**Examine** virtualization and discuss in detail about classification of virtualization and basic concepts involved in virtualization . (13)	BTL-1	Remember
7	(i)**Prepare** the design principles of kernel modules. (8) (ii) **Explain** about process management and scheduling in LINUX system . (5)	BTL-6	Create
8	(i)**Explain** in detail about Linux architecture (8) (ii)**Explain** in detail about Linux Kernel with neat sketch.(5)	BTL-4	Analyze
9	**Discuss** in detail about I/O in LINUX system. (13)	BTL-3	Apply
10	**Examine** in detail about file system in LINUX (13)	BTL-1	Remember
11	i)**Compare** IOS architecture with Android Architecture (8) ii) **Point out** the benefits of virtualization in LINUX OS. (5)	BTL-4	Analyze
12	i) **Why** live migration possible in virtual environments but much less possible for a native operating system. (7) ii)**What** are the primary goals of the conflict resolution mechanism used by the Linux kernel for loading kernel modules (6)	BTL-1	Remember
13	i)**Discuss** in detail about Core OS layer of IOS. (7) ii)**Describe** in detail about process context in Linux. (6)	BTL-2	Understand
14	**Explain** the step by step procedure for setting up a linux multifunction server (13)	BTL-3	Apply
PART C			
1	Explain why Linux runs on a variety of hardware platforms. What steps must the Linux developers take to ensure that the system is portable to different processors and memory management architectures, and to minimize the amount of architecture –specific kernel code? (15)	BTL-4	Analyze
2	Conclude why Multithreading is a commonly used programming technique. Describe three ways that threads could be implemented. Explain how these ways compare to the Linux clone mechanism. When might each alternative mechanism be better or worse than using clones? (15)	BTL-5	Evaluate
3	Design an architecture and SDK framework for Android OS (15)	BTL-6	Create
4	Develop Linux File System in detail. (15)	BTL-6	Create