SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OFCOMPUTER SCIENCE AND ENGINEERING

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DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

VI SEMESTER

PIT203 - VIRTUALIZATION
Regulation – 2023

Academic Year 2025 – 2026
Even Semester

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SUBJECT CODE & NAME: PIT203 - VIRTUALIZATION

SEM/YEAR: VI/III

UNIT- I: VIRTUALIZATION			
Basics of Virtual Machines - Process Virtual Machines – System Virtual Machines – Emulation – Interpretation – Binary Translation - Taxonomy of Virtual Machines. Virtualization - Management Virtualization - Hardware Maximization – Architectures – Virtualization Management – Storage Virtualization – Network Virtualization			
PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define Virtual Machine.	BTL 1	Remember
2.	What is a Process Virtual Machine? Give Example	BTL 1	Remember
3.	Differentiate between Process Virtual Machine and System Virtual Machine.	BTL 2	Understand
4.	Define Emulation in virtualization.	BTL 1	Remember
5.	What is Interpretation?	BTL 2	Understand
6.	Define Binary Translation.	BTL 1	Remember
7.	What is meant by the Taxonomy of Virtual Machines?	BTL 1	Remember
8.	Explain how Interpretation differs from Emulation.	BTL 2	Understand
9.	What is a Hypervisor?	BTL 1	Remember
10.	Explain the purpose of Binary Translation in Virtualization.	BTL 2	Understand
11.	What is meant by Virtualization?	BTL 1	Remember
12.	Write any two examples of System Virtual Machines.	BTL 1	Remember
13.	List the two categories in the taxonomy of virtual machines.	BTL 1	Remember
14.	What is Hardware Maximization in virtualization?	BTL 1	Remember
15.	Difference between Type 1 and Type 2 hypervisors.	BTL 2	Understand
16.	Define Virtualization Management.	BTL 2	Understand
17.	Compare network virtualization with traditional networking.	BTL 2	Understand
18.	Explain the purpose of Storage Virtualization.	BTL 2	Understand
19.	What is meant by virtualization architecture?	BTL 1	Remember
20.	Describe how Network Virtualization improves resource utilization.	BTL 2	Understand
21.	State two benefits of Virtualization.	BTL 1	Remember
22.	Why VM taxonomy is important.	BTL 2	Understand
23.	List two differences between Emulation and Interpretation.	BTL 2	Understand
24.	State any two features of System VMs.	BTL 2	Understand

PART B			
S.NO	**QUESTIONS**	**BT LEVEL**	**COMPETIENCE**
1	Discuss **t**he different classifications of virtual machines in detail and **describe** how each type differs in functionality and purpose.(16)	BTL 4	Analyze
2	Describe the following in detail i. Process Virtual Machines with examples.(8) **ii.** System Virtual Machines with examples.(8)	BTL 1	Remember
3	Discuss in detail the concepts of emulation, interpretation, and binary translation**.** How does each technique impact performance, compatibility, and hardware abstraction? (16)	BTL 4	Analyze
4	What are the different types of Virtualization? Explain each type with a real-world application. (16)	BTL 3	Apply
5	What is Management Virtualization**?** Explain its architecture, tools, and functionalities in modern data centres. (16)	BTL 3	Apply
6	Discuss how dynamic binary translation works in high-performance VMs. What are the challenges involved in binary translation? (16)	BTL 4	Analyze
7	Discuss the role of *Emulation* in virtualization**.** Describe its advantages and limitations. What impact does emulation have on system performance? (16)	BTL 5	Evaluate
8	Describe the principles of *Hardware Maximization* in virtualization and Evaluate how virtualization technologies improve hardware utilization. (16)	BTL 5	Evaluate
9	Discuss the challenges involved in virtualization management. Evaluate their effectiveness. (16)	BTL 5	Evaluate
10	Discuss the concept of *Management Virtualization* in detail. Explain its architecture and analyze how it simplifies resource management in large-scale IT environments. (16)	BTL 4	Analyze
11	Explain in detail about Network Virtualization with its architecture Diagram(16)	BTL 4	Analyze
12	Illustrate the following Virtualization in detail i. CPU virtualization (6) ii. Memory Virtualization (6) **iii.** I/O Devices(4)	BTL 3	Apply
13	Explain the differences between virtualization of CPU, memory, and I/O devices with hardware support architectures in detail. (16)	BTL 5	Evaluate
14	Analyze the differences between block-level and file-level *Storage Virtualization*. Discuss how each affects performance and scalability. (16)	BTL 4	Analyze
15	Describe the following in detail i. Para Virtualization (8) **ii.** Full Virtualization(8)	BTL 3	Apply
16	Describe how hardware maximization is achieved through resource pooling. (16)	BTL 3	Apply
17	Evaluate how virtualization contributes to *Hardware Maximization*. Assess the benefits and limitations in large-scale deployments. (16)	BTL 5	Evaluate

UNIT- II: VIRTUALIZATION INFRASTRUCTURE

Comprehensive Analysis – Resource Pool – Testing Environment –Server Virtualization – Virtual Workloads – Provision Virtual Machines – Desktop Virtualization – Application Virtualization -Implementation levels of Virtualization – Virtualization structure – Virtualization of CPU, Memory and I/O devices – Virtual clusters and Resource Management-

Virtualization for Data center automation.

PART – A

Q.No	Questions	BT Level	Competence
1	What is meant by a testing environment in virtualization?	BTL 2	Understand
2	What is a resource pool in virtualization?	BTL 1	Remember
3	List any two benefits of using a resource pool.	BTL 1	Remember
4	Differentiate between physical server and virtual server.	BTL 2	Understand
5	What are virtual workloads?	BTL 1	Remember
6	Explain the purpose of provisioning virtual machines.	BTL 2	Understand
7	What is desktop virtualization?	BTL 1	Remember
8	List the types of desktop virtualization.	BTL 1	Remember
9	Define application virtualization.	BTL 1	Remember
10	State any two advantages of application virtualization.	BTL 2	Understand
11	What are the different implementation levels of virtualization	BTL 1	Remember
12	What is meant by the structure of virtualization?	BTL 1	Remember
13	Why is CPU virtualization required?	BTL 2	Understand
14	What is memory virtualization?	BTL 1	Remember
15	Explain I/O device virtualization.	BTL 2	Understand
16	List any two uses of virtual clusters.	BTL 2	Understand
17	What is data center automation?	BTL 1	Remember
18	Explain how virtualization supports data center automation	BTL 2	Understand
19	State the need for resource scheduling in virtualization.	BTL 2	Understand
20	What is the role of virtualization in improving server utilization?	BTL 2	Understand
21	Differentiate hardware virtualization and OS-level virtualization	BTL 2	Understand
22	What is binary translation in CPU virtualization?	BTL 1	Remember
23	How does trap-and-emulate help in CPU virtualization?	BTL 2	Understand
24	Differentiate full virtualization and para-virtualization.	BTL 4	Analyze

PART – B

S.NO	QUESTIONS	BT LEVEL	COMPETIENCE
1	Explain the following **i.** What is a resource pool in virtualization infrastructure? (8) **ii.** Discuss the importance of a testing environment in the context of virtualization.(8)	BTL 2 BTL 4	Understand Analyze
2	Explain the concept of a *Resource Pool* and discuss how it is used to manage multiple virtual machines in a testing environment. (16)	BTL 3	Apply

3	How are virtual workloads managed and optimized within a virtualized infrastructure? (16)	BTL4	Analyze
4	What are the steps involved in provisioning virtual machines, and what factors influence VM performance? (16)	BTL 3	Apply
5	Demonstrate how *a Testing Environment* can be created using virtual machines. Explain the steps involved in allocating resources from a resource pool. (16)	BTL 3	Apply
6	Evaluate the effectiveness of different *Resource Pool* strategies for testing environments. Justify which approach is best suited for high-demand applications. (16)	BTL 5	Evaluate
7	Explain the role of comprehensive virtual workload analysis in designing and optimizing resource pools. (16)	BTL 3	Apply
8	Describe the strategies and tools for monitoring and balancing resources in a testing environment. (16)	BTL 3	Apply
9	Discuss how virtual memory is managed across multiple VMs and its effect on efficiency. (16)	BTL 4	Analyze
10	Explain in detail about different techniques of I/O device Virtualization. Discuss the advantages, limitations, and performance implications of each approach. (16)	BTL 5	Evaluate
11	What are the different implementation levels of Virtualization? Explain in detail. (16)	BTL 3	Apply
12	Explain the following challenges in cloud i. Virtual Clusters and Physical Clusters in Resource Management.(8) **ii.** CPU Virtualization.(8)	BTL 5	Evaluate
13	Compare and contrast the Physical Clusters and Virtual Clusters and depict how resource management could be carried out in Virtual Machines. (16)	BTL 4	Analyze
14	Explain how virtualization enables data center automation and improves scalability, efficiency, and workload management. (16)	BTL 5	Evaluate
15	Explain in detail about Virtual clusters and resource management with an Example.	BTL 4	Analyze
16	Explain the concept of memory virtualization and its role in optimizing resource utilization. (16)	BTL 3	Apply
17	**i.** What are I/O devices in the context of virtualization, and how are they virtualized to improve system performance? (8) **ii.** Describe the process of resource allocation in a virtualized environment and the techniques used to ensure fair distribution among virtual machines.(8)	BTL 4	Analyze

UNIT- III: HIGH LEVEL LANGUAGE VIRTUAL MACHINES AND SERVER VIRTUALIZATION

HLL virtual machines: Pascal P-Code – Object Oriented HLLVMs - Java VM architecture - Java Native Interface - Common Language Infrastructure. Server virtualization: Partitioning techniques - virtual hardware - uses of virtual servers - server virtualization platforms

PART – A

Q.No	Questions	BT Level	Competence
1	What is a High-Level Language Virtual Machine (HLLVM)?	BTL 1	Remember
2	State the purpose of P-Code in Pascal.	BTL 1	Remember
3	List the main components of a Pascal P-Code virtual machine.	BTL 1	Remember
4	List any two components of Java Virtual Machine (JVM) architecture.	BTL 2	Understand
5	List the main components of a Pascal P-Code virtual machine.	BTL 1	Remember

6	What is the function of the Java Class Loader?	BTL 1	Remember
7	Why is JNI used?	BTL 2	Understand
8	What is Common Language Infrastructure (CLI)?	BTL 1	Remember
9	Mention the main goal of CLI.	BTL 1	Remember
10	What is server virtualization?	BTL 2	Understand
11	State any one use of server virtualization.	BTL 1	Remember
12	Why is virtual hardware important?	BTL 2	Understand
13	What is meant by virtual server consolidation?	BTL 1	Remember
14	Give two advantages of server consolidation.	BTL 1	Remember
15	What is meant by resource pooling?	BTL 1	Remember
16	What is a virtual machine snapshot?	BTL 1	Remember
17	List any two features of object-oriented HLLVMs.	BTL 2	Understand
18	Identify a benefit of object-orientation in VMs.	BTL 2	Understand
19	Name an example of an object-oriented HLLVM.	BTL 2	Understand
20	Differentiate stack-based and register-based HLLVMs.	BTL 2	Understand
21	Define Java Bytecode.	BTL 1	Remember
22	Summarize the role of the JIT compiler in JVM execution.	BTL 2	Understand
23	Give the purpose of the JVM's garbage collector.	BTL 1	Remember
24	Compare P-Code with native machine code**.**	BTL 2	Understand
	PART – B		
1	Explain the concept and working of High Level Language Virtual Machines (HLLVMs).(16)	BTL 4	Analyze
2	Explain the architecture and working of the Pascal P-Code Virtual Machine.(16)	BTL 3	Apply
3	Describe the execution process of Pascal P-Code VM.(16)	BTL4	Analyze
4	Explain Object-Oriented High-Level Language Virtual Machines (OO-HLLVMs).(16)	BTL 3	Apply
5	(i) Analyze the advantages of Object-Oriented HLLVMs.(8) (ii). Analyze the advantages and limitations of Pascal P-Code VM.(8)	BTL4	Analyze
6	Explain the architecture of Java Virtual Machine (JVM).(16)	BTL 3	Apply
7	(i) Define Java bytecode and explain its role.(8) (ii) Analyze how JVM achieves platform independence.(8)	BTL4	Analyze
8	Apply Pascal P-Code VM to achieve portability across heterogeneous platforms(16)	BTL 3	Apply
9	(i) Explain Java Native Interface (JNI).(8) (ii) Analyze differences between JVM and CLI.(8)	BTL 4	Analyze
10	(i) Analyze advantages of virtual hardware abstraction.(8) (ii) Explain different server virtualization platforms.(8)	BTL 3	Apply
11	Explain server partitioning techniques.(16)	BTL 3	Apply
12	Explain the role of virtual hardware in virtualization.(16)	BTL 3	Apply

13	Analyze the impact of server virtualization on data centers.(16)	BTL 4	Analyze
14	Explain server virtualization and its role in modern IT infrastructure.(16)	BTL 5	Evaluate
15.	Explain the role of virtual servers in cloud computing.(16)	BTL 4	Analyze
16.	Analyze the components of Common Language Infrastructure.(16)	BTL 3	Apply
17.	Evaluate the adoption of server virtualization in enterprise environments.(16)	BTL 5	Evaluate

UNIT IV -NETWORK AND STORAGE VIRTUALIZATION

Design of Scalable Enterprise Networks – Layer2 Virtualization – VLAN - VFI - Layer 3 Virtualization – VRF - Virtual Firewall Contexts - Network Device Virtualization - Data- Path Virtualization - Routing Protocols. Hardware Devices – SAN backup and recovery techniques – RAID – Classical Storage Model – SNIA Shared Storage Model – Virtual Storage: File System Level and Block Level

PART – A

Q.No	Questions	BT Level	Competence
1.	What is a VLAN?	BTL 1	Remember
2.	State two benefits of using VLANs.	BTL 1	Remember
3.	Define VFI	BTL 1	Remember
4.	How does VFI help in Layer 2 virtualization?	BTL 2	Understand
5.	Why is VRF used in enterprise networks?	BTL 1	Remember
6.	How does VRF improve network scalability?	BTL 1	Remember
7.	What is a virtual firewall context?	BTL 2	Understand
8.	Mention one advantage of virtual firewall contexts.	BTL 1	Remember
9.	How do virtual firewall contexts enhance security?	BTL 1	Remember
10.	What is network device virtualization?	BTL 2	Understand
11.	Give an example of network device virtualization.	BTL 1	Remember
12.	Why is network device virtualization used?	BTL 2	Understand
13.	What is data-path virtualization?	BTL 1	Remember
14.	How does data-path virtualization support QoS?	BTL 1	Remember
15.	Name any two dynamic routing protocols.	BTL 1	Remember
16.	What is the purpose of routing protocols?	BTL 1	Remember
17.	Which routing protocol uses link-state algorithm?	BTL 2	Understand
18.	State one SAN backup technique.	BTL 2	Understand
19.	What is SAN?	BTL 2	Understand
20.	Mention one advantage of RAID	BTL 2	Understand
21.	What is the classical storage model?	BTL 1	Remember
22.	What is the SNIA shared storage model?	BTL 2	Understand
23.	Differentiate block-level virtualization from file-level virtualization.	BTL 1	Remember
24.	What is file system level virtualization?	BTL 2	Understand

PART – B			
1	Explain the design principles of scalable enterprise networks.(16)	BTL 4	Analyze
2	Apply VLAN segmentation in an enterprise network to improve performance and security. (16)	BTL 3	Apply
3	Apply Layer-2 virtualization using VLAN architecture to support multiple logical networks over a shared infrastructure. (16)	BTL 3	Apply
4	Analyze the role of VLANs in reducing broadcast traffic in large enterprise networks. (16)	BTL 4	Analyze
5	Explain the concept and working of Virtual Forwarding Instance (VFI). (16)	BTL 3	Apply
6	(i) Analyze how VFI supports scalable Layer-2 VPN services. (ii) Apply appropriate routing protocols to support scalability and redundancy in an enterprise network design..	BTL 5	Evaluate
7	Explain Layer-3 virtualization using Virtual Routing and Forwarding (VRF). (16)	BTL 3	Apply
8	Evaluate the role of virtual storage in designing scalable and resilient enterprise systems. (16)	BTL 5	Evaluate
9	(i) Analyze the impact of dynamic routing protocols on enterprise network convergence.(8) (ii) Analyze the advantages of block-level virtualization over file-level virtualization.(8)	BTL 4	Analyze
10	Evaluate the selection of routing protocols for large enterprise networks. (16)	BTL 5	Evaluate
11	Explain SAN architecture and its components in enterprise environments. (16)	BTL 3	Apply
12	Apply SAN backup and recovery techniques to ensure data protection and disaster recovery in data centers. (16)	BTL 3	Apply
13	Analyze the performance and fault-tolerance trade-offs of various RAID levels. (16)	BTL 4	Analyze
14	Explain the classical storage model and its limitations. (16)	BTL 3	Apply
15	Explain the SNIA shared storage model and its advantages. (16)	BTL 4	Analyze
16	Analyze the differences between classical storage model and SNIA shared storage(16)	BTL 4	Analyze
17	Apply virtual storage architecture to optimize storage utilization in enterprise data centers. (16)	BTL 3	Apply

UNIT - V: APPLYING VIRTUALIZATION

Practical Virtualization Solutions: Comparison of Virtualization Technologies: Guest OS/ Host OS – Hypervisor – Emulation – Kernel Level – Shared Kernel, Enterprise Solutions: VMWare Server – VMWareESXi – Citrix Xen Server – Microsoft Virtual PC – Microsoft Hyper-V – Virtual Box, Server Virtualization: Configuring Servers with Virtualization – Adjusting and Tuning Virtual servers – VM Backup – VM Migration, Desktop Virtualization: Terminal services – Hosted Desktop – Web-based Solutions – Localized Virtual Desktops, Network and Storage Virtualization: Virtual Private Networks – Virtual LAN – SAN andVSAN – NAS

PART – A

Q.No	Questions	BT Level	Competence
1	Define Guest OS, Host OS.	BTL 1	Remember
2	Explain Kernel-level virtualization.	BTL 1	Remember
3	Define VMware Server.	BTL 1	Remember
4	Describe the function of a hypervisor.	BTL 2	Understand

5	Define Emulation in the context of virtualization.	BTL 1	Remember
6	Mention two examples of Type-1 hypervisors.	BTL 1	Remember
7	Define VMware ESXi.	BTL 2	Understand
8	What is Microsoft Virtual PC used for?	BTL 1	Remember
9	Compare VMware ESXi and VMware Server.	BTL 1	Remember
10	Define Microsoft Hyper-V.	BTL 2	Understand
11	Define Server Virtualization.	BTL 1	Remember
12	What does adjusting and tuning virtual servers mean?	BTL 2	Understand
13	Define Thin Provisioning in virtual servers.	BTL 1	Remember
14	What is over commitment in server virtualization?	BTL 1	Remember
15	Define Terminal Services.	BTL 1	Remember
16	What is Web-Based Desktop Virtualization?	BTL 1	Remember
17	Define Localized Virtual Desktops	BTL 2	Understand
18	Mention two benefits of Desktop Virtualization.	BTL 2	Understand
19	Define Virtual Private Network (VPN).	BTL 2	Understand
20	Define Network-Attached Storage (NAS)	BTL 2	Understand
21	What is a Virtual SAN (VSAN)?	BTL 1	Remember
22	Define localized virtual desktops	BTL 2	Understand
23	Differentiate between SAN and NAS	BTL 1	Remember
24	Mention the advantages of Storage and Network Virtualization.	BTL 2	Understand
PART-B			
1.	Explain the differences between Guest OS and Host OS with examples.(16)	BTL 4	Analyze
2.	Describe the working of Type-1 and Type-2 hypervisors in enterprise environments.(16)	BTL 3	Apply
3.	(i) Analyze the advantages and limitations of kernel-level virtualization in modern servers.(8) (ii) Analyze the impact of enterprise virtualization solutions on data center scalability and cost reduction.(8)	BTL 4	Analyze
4.	Analyze the advantages and limitations of kernel-level virtualization in modern servers.(16)	BTL 4	Analyze
5.	Evaluate the suitability of shared kernel virtualization for cloud computing environments.(16)	BTL 5	Evaluate
6.	Apply hypervisor concepts to design a scalable virtualization infrastructure for a medium-sized enterprise.(16)	BTL 3	Apply
7.	Explain the architecture and functions of hypervisors in server virtualization.(16)	BTL 3	Apply
8.	Explain the architecture of VMware ESXi and its benefits for enterprise virtualization.(16)	BTL 5	Evaluate
9.	(i) Describe Microsoft Virtual PC and its role in desktop virtualization.(8) (ii) Describe how adjusting and tuning virtual servers improves performance and resource utilization.(8)	BTL 4	Analyze
10.	Explain Virtual Private Networks (VPNs) and their role in enterprise network virtualization.(16)	BTL 5	Evaluate

11.	Explain the steps involved in configuring servers with virtualization for an enterprise environment.(16)	BTL 4	Analyze
12.	Apply VSAN concepts to design a virtual storage network for an enterprise data center.(16)	BTL 3	Apply
13.	Apply server virtualization techniques to implement high availability and load balancing.(16)	BTL 3	Apply
14.	Describe terminal services and their advantages in a virtual desktop environment.(16)	BTL 4	Analyze
15.	Compare web-based virtual desktops and localized virtual desktops in terms of usability and security.(16)	BTL 4	Analyze
16.	(i) Analyze the benefits of desktop virtualization for remote work and enterprise IT support.(8) (ii) Analyze the advantages of network and storage virtualization in optimizing enterprise IT.(8)	BTL 4	Analyze
17.	Evaluate different desktop virtualization solutions (Hosted, Web-based, Localized) for cost and performance.(16)	BTL 5	Evaluate