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Scoring Indicators

COURSE NAME : DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/ COMMERCIAL PRACTICE.

COURSE CODE : TED (21) – 5133A **QID :** 2109230294

Q No	Scoring Indicators	Split score	Sub Total	Total score
	PART A			**9**
I	Server, Memory, Network, OS		1	
2	Virtual Box, VMWare, Hyper – V, QEMU etc		1	
3	Improve Network Security, Greater operational efficiency, Reduce network provisioning.		1	
4	Hypervisor		1	
5	Microsoft Azure, AWS, VMWare, Oracle, Google Cloud, IBM, Amazon etc		1	
6	Security and Privacy Concerns Internet Dependency		1	
7	Virtualization Automation and Orchestration:		1	
8	Public , Private, Community , Hybrid		1	
9	Hevo Data, Carbonite, AWS migration service		1	
	PART B			**24**
1	A Type 1 hypervisor, also known as a bare-metal hypervisor, is a virtualization technology that runs directly on the physical hardware of a computer system. It does not require a host operating system to function. Instead, it operates as the lowest-level software layer, directly managing and controlling the hardware resources of the host machine. Key characteristics of a Type 1 hypervisor include: 1. Runs on bare metal: 2. High performance: 3. Resource isolation: 4. Security: 5. Use cases:		3	
2	Virtual Machine (VM) clones are copies of virtual machines that are created from an existing VM, often referred to as the "parent" or "template" VM. Cloning allows you to replicate a VM's configuration, operating system, and software setup quickly, which can be useful for various purposes, including testing, development, backup, or scaling up a virtualized environment.	2 1	3	

	There are typically two types of VM clones: 1. Full Clone: 2. Linked Clone:			
3	The term "Virtualization format" typically refers to a file format or a standardized representation used in the context of virtualization technology. Virtualization is the process of creating a virtual (rather than actual) version of something, such as a virtual machine (VM) that emulates a physical computer. Virtualization formats are used to package and store virtual machines, making it easier to deploy and manage them in virtualized environments. One of the most common virtualization formats is the Virtual Hard Disk (VHD) format, used by Microsoft's Hyper-V and some other virtualization platforms. Another popular format is the Virtual Machine Disk (VMDK) format, primarily used by VMware virtualization products.	2 1	3	
4	A Virtual LAN (VLAN) is a network technology that allows you to segment a physical network into multiple logical networks, or "virtual LANs," regardless of the physical location of devices or their connection to the network infrastructure. VLANs are primarily used to enhance network security, improve network performance, and facilitate network management. Key characteristics and purposes of VLANs include: 1. Segmentation: 2. Security: 3. Broadcast Control 4. Performance Optimization: 5. Simplified Management.	2 1	3	
5	Server Virtualization: Server virtualization is a technology that allows multiple virtual instances or virtual machines (VMs) to run on a single physical server. It involves abstracting and partitioning the physical server's resources, such as CPU, memory, storage, and network, into multiple virtualized environments. Each virtual machine operates as an independent server with its own operating system and applications, even though they share the underlying hardware. Application Virtualization: Application virtualization is a technology that decouples applications from the underlying operating system and encapsulates them in a virtualized package. This package, often referred to as an application container or sandbox, includes all the files, libraries, and dependencies required to run the application, making it independent of the host OS. Users can then run the	1.5 1.5	3	

	virtualized application on their desktop or server without needing to install it traditionally.			
6	1. Cost Efficiency: 2. Flexibility and Scalability: 3. Reliability and Disaster Recovery:		3	
7	Vendors of cloud computing refer to companies or organizations that provide cloud computing services and infrastructure to customers. These vendors own and operate data centers, servers, networking equipment, and software, which they make available to users over the internet. They offer various cloud services and deployment models, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), to meet the diverse needs of their customers. Some well-known cloud computing vendors as of my last knowledge update in September 2021 include: 1. Amazon Web Services (AWS 2. Microsoft Azure 3. Google Cloud Platform (GCP 4. IBM Cloud 5. Alibaba Cloud 6. Salesforce	2 1	3	
8	Disk provisioning in cloud computing refers to the process of allocating and managing storage resources for virtual machines (VMs) or instances in a cloud environment. It involves determining how much storage capacity a VM needs and how that storage should be allocated from the available pool of storage resources. There are typically two main types of disk provisioning: 1. Thick Provisioning 2. Thin Provisioning Disk provisioning is an important aspect of cloud management, as it affects cost, resource utilization, and the flexibility to scale storage resources up or down as needed. Cloud providers offer tools and services to help users manage disk provisioning and optimize storage resource allocation based on their specific requirements.	1 1 1	3	
9	Load balancing in cloud computing is a critical technique used to distribute network traffic, application requests, and computing workloads across multiple servers, virtual machines (VMs), or resources within a cloud environment.	2	3	

	Resource Distribution Improved Performance High Availability Scalability. 1. Health 2. Session Persistence 3. Algorithm Selection 4. Global Load Balancing 5. Security	1		
I0	**Hybrid Cloud:** A hybrid cloud is a combination of public and private clouds, allowing data and applications to be shared between them. This flexibility allows organizations to run certain workloads or store sensitive data on the private cloud while using the public cloud for scalability and cost-effectiveness. It can also facilitate data backup and disaster recovery.		3	
	PART C			**42**
III.	Virtualization is a technology that allows you to create and manage multiple virtual instances or environments on a single physical hardware system. These virtual instances, often referred to as virtual machines (VMs), can run various operating systems and applications independently of each other, as if they were running on separate physical servers. This abstraction of the underlying hardware offers numerous benefits and has become a fundamental component of modern computing infrastructure. Explanation of virtualization and its importance: 1. Resource Optimization 2. Isolation 3. Resource Management 4. Disaster Recovery 5. Scalability 6. Testing and Development 7. Energy Efficiency 8. Legacy Application Support 9. Mobility and Flexibility	2 5*1	7	7

	10. Cloud Computing Virtualization plays a crucial role in modern IT infrastructure by improving resource utilization, enhancing flexibility, and simplifying management. It enables businesses to reduce costs, increase agility, and enhance overall IT efficiency, making it an essential technology for both on-premises and cloud-based environments			
IV	Type-1 and Type-2 hypervisors are both technologies used for virtualization, but they differ in their architecture, use cases, and performance characteristics. Here's a comparison of Type-1 and Type-2 hypervisors: 1. **Architecture**: • **Type-1 Hypervisor (Bare-Metal)**: Type-1 hypervisors run directly on the host's hardware without the need for an underlying operating system. They have a thin layer of software to manage virtual machines (VMs) and provide hardware access. Examples include VMware vSphere/ESXi, Microsoft Hyper-V (when installed in standalone mode), and Xen. • **Type-2 Hypervisor (Hosted)**: Type-2 hypervisors run on top of a host operating system. They rely on the host OS for resource management and hardware access. Examples include VMware Workstation, Oracle VirtualBox, and Parallels Desktop. 2. **Performance**: • **Type-1 Hypervisor**: Generally, Type-1 hypervisors offer better performance than Type-2 hypervisors because they have direct access to hardware resources. This direct access reduces the overhead associated with running an additional operating system (as in Type-2) and provides better performance for resource-intensive workloads. • **Type-2 Hypervisor**: Type-2 hypervisors introduce some performance overhead because they rely on the host OS for resource management. This additional layer can result in reduced performance for resource-intensive tasks, making them more suitable for development, testing, or less demanding workloads. 3. **Security**: • **Type-1 Hypervisor**: Type-1 hypervisors are generally considered more secure because they have a smaller attack surface. Since there is no host OS that can be compromised, the attack vectors are reduced, making it harder for malicious software to access and manipulate VMs. • **Type-2 Hypervisor**: Type-2 hypervisors have a larger attack surface because they depend on the security of the underlying host OS. If the host OS is compromised, it can potentially affect the security of the VMs running on top of it. 4. **Use Cases**:	2 5*1	7	7

	• **Type-1 Hypervisor**: These are typically used in enterprise environments, data centers, and cloud infrastructure to run mission-critical workloads that require high performance and security. Type-1 hypervisors are also suitable for server consolidation. • **Type-2 Hypervisor**: Type-2 hypervisors are commonly used for development, testing, and running multiple operating systems on a single desktop or laptop. They are more user-friendly and easier to set up for non-enterprise use cases. 5. **Resource Utilization**: • **Type-1 Hypervisor**: Type-1 hypervisors are more efficient in terms of resource utilization because they don't have the overhead of running a full host OS alongside the hypervisor. • **Type-2 Hypervisor**: Type-2 hypervisors consume additional resources due to the host OS, which can lead to less efficient utilization of hardware resource			
V	Virtualization software plays a crucial role in modern computing environments by enabling the creation and management of virtual machines (VMs). Virtualization allows multiple operating systems and applications to run on a single physical server or host system. Here's how virtualization software operates: 1. **Hypervisor**: At the core of virtualization software is the hypervisor, also known as a Virtual Machine Monitor (VMM). The hypervisor is responsible for creating and managing virtual machines. There are two main types of hypervisors: a. Type 1 Hypervisor b. Type 2 Hypervisor Virtual Machine Creation Resource Allocation Emulation and Isolation 2. Management and Monitoring 3. Snapshot and Cloning 4. Live Migration 5. Resource Overcommitment 6. Integration with Cloud Services 7. Security and Access Control	2 1*5	7	7
VI	Desktop virtualization is a technology that allows multiple virtual desktop instances to run on a single physical machine or server. This approach offers several advantages, including improved manageability, security, and flexibility. There are various techniques used in desktop virtualization, each with its own strengths and use cases. Here are some of the most common techniques: 1. Virtual Desktop Infrastructure (VDI): 2. Hosted Virtualization (Type 2 Hypervisors 3. Bare-Metal Virtualization (Type 1 Hypervisors 4. Application Virtualization 5. Remote Desktop Services (RDS) / Terminal Services 6. Client Hypervisors	2 1*5	7	7

	7. Cloud-Based Desktop Virtualization			
VII	A Virtual Machine (VM) is a software-based emulation of a physical computer. It allows you to run multiple operating systems on a single physical machine, effectively creating isolated environments where different operating systems and software can coexist independently. Here's how a virtual machine works: 1. Hypervisor 2. Creation of Virtual Machines 3. Guest Operating System 4. Execution 5. Isolation 6. Resource Management 7. Snapshot and Cloning 8. Networking 9. Storage:	1 6*1	7	7
VIII	Advantages of Desktop Virtualization: 1. Centralized Management 2. Security 3. Flexibility 4. Resource Allocation 5. Backup and Disaster Recovery. 6. Legacy Application Support 7. Scalability Disadvantages of Desktop Virtualization: 1. Initial Cost: 2. Hardware Resource Allocation		7	7
IX	Disk provisioning in cloud computing refers to the process of allocating and managing storage resources for virtual machines (VMs) or cloud-based servers. It involves determining how much storage space is allocated to a virtual machine, how it is allocated, and how it grows or shrinks as needed. Disk provisioning plays a crucial role in optimizing resource utilization, cost management, and performance in a cloud environment. There are typically three common disk provisioning methods in cloud computing: 1. **Thin Provisioning**: • In thin provisioning, storage resources are allocated to a virtual machine on an as-needed basis. Initially,	3.5 3.5	7	7

	only a small portion of the allocated storage space is reserved, and the rest remains unallocated or free. • As the virtual machine writes data to its virtual disk, additional storage space is allocated dynamically. This approach is efficient in terms of resource utilization because it avoids allocating large amounts of storage upfront. • However, there is a risk of running out of storage space if the virtual machines collectively consume more storage than is physically available. Proper monitoring and management are essential to prevent this situation. 2. **Thick Provisioning**: • In thick provisioning, the entire storage space allocated to a virtual machine is reserved and pre-allocated upfront. This means that even if the virtual machine doesn't use all the space, it is still reserved for that VM and cannot be used by others. • This method provides predictable and consistent performance since the allocated space is guaranteed to be available at any time. • However, it can be less efficient in terms of resource utilization because a significant amount of storage may be allocated but remain unused. This can lead to increased costs. 3. **Eager Zeroed Thick Provisioning**: • This is a variation of thick provisioning that not only allocates all the storage upfront but also zero-fills the allocated space. Zero-filling involves writing zeros to the entire allocated space before the virtual machine uses it. • Eager zeroed thick provisioning is commonly used in environments where performance and security are critical, as it ensures that no residual data from a previous user or operation is present in the allocated space. Choosing the right disk provisioning method depends on factors such as cost considerations, performance requirements, and the flexibility to scale storage as needed: • Thin provisioning is often used when resource optimization is a priority, and you want to avoid over-allocating storage resources upfront. • Thick provisioning is preferred when you need consistent and predictable performance and are willing to pay for the reserved storage space. • Eager zeroed thick provisioning is suitable for environments where data security and performance are paramount..			
X	Cloud computing architecture refers to the structure and components that make up a cloud computing environment. Cloud computing is a technology that enables the delivery of various computing services (such as storage, processing, networking, and software) over the	2	7	7

	internet. This architecture is designed to provide on-demand access to resources while abstracting the underlying infrastructure complexity. Here's an overview of cloud computing architecture: 1. Cloud Service Models: • Infrastructure as a Service (IaaS) • Platform as a Service (PaaS • Software as a Service (SaaS 2. Cloud Deployment Models: • Public Cloud • Private Cloud • Hybrid Cloud • Multi-Cloud 3. Cloud Infrastructure Layers • Physical Infrastructure • Virtualization Layer • Orchestration and Management Layer • Application Layer 4. Key Components • Compute Resources • Storage • Network Infrastructure • Identity and Access Management (IAM • Monitoring and Management Tools • Security and Compliance Services • Data Centers and Regions 5. Cloud Services	5*2		
XI	SaaS (Software as a Service) and LaaS (License as a Service) are both cloud-based service models, but they serve different purposes and have distinct characteristics. Here's a comparison of SaaS and LaaS: 1. Purpose: • SaaS: SaaS delivers software applications over the internet on a subscription basis. Users access the software through a web browser, and the software is hosted and maintained by a third-party provider. SaaS is typically used for a wide range of applications, such as office productivity tools (e.g., Microsoft 365), customer relationship management (CRM) software (e.g., Salesforce), and collaboration platforms (e.g., Slack). • LaaS: LaaS, on the other hand, focuses on providing software licenses as a service. It allows organizations to manage and distribute software licenses on-demand, usually in a cloud-based environment. LaaS is commonly used for software vendors to offer flexible licensing options and manage license compliance. 2. Software Delivery: • SaaS: SaaS applications are fully hosted and managed by the service provider. Users don't need to	2 5*1	7	7

	worry about installation, maintenance, or updates, as these are handled by the SaaS provider. • LaaS: LaaS primarily deals with the distribution and management of software licenses. It may involve providing licenses for on-premises software, cloud-based software, or hybrid solutions. 3. Payment Model: • SaaS: SaaS follows a subscription-based pricing model, where users pay a regular fee (monthly or annually) to access the software. Pricing is often based on the number of users or features used. • LaaS: LaaS can have various pricing models, including subscription-based licensing, pay-per-use, or other flexible options. It provides more flexibility for software vendors to tailor their pricing to customer needs. 4. Use Cases: • SaaS: SaaS is suitable for organizations looking for ready-to-use software solutions that require minimal IT infrastructure and management. It's commonly used for productivity, communication, and collaboration tools. • LaaS: LaaS is beneficial for software vendors that want to offer their products with dynamic licensing options, support on-demand scalability, and ensure compliance with licensing agreements. 5. Maintenance and Updates: • SaaS: SaaS providers handle all aspects of software maintenance, including updates, security patches, and server management. • LaaS: While LaaS providers may manage license distribution and compliance, the software itself may require maintenance and updates by the end user or their IT team, depending on the deployment method.			
XII	Computing on Demand" typically refers to a model of computing where resources such as processing power, storage, and software are allocated and utilized as needed, rather than in a fixed or dedicated manner. This model is often associated with cloud computing and can encompass a range of services and technologies. A. Cloud Computing B. Virtualization C. Scalability D. Resource Orchestration E. Networking Technologies III. Benefits of Computing on Demand A. Cost Efficiency B. Scalability and C. Accessibility D. Reliability and Redundancy E. Resource Optimization IV. Use Cases and Applications	1 1 1 1 1	7	7

	A. Cloud-Based Services B. Big Data and Analytics C. Web Hosting and Content Delivery D. Software Development and Testing E. Disaster Recovery and Backup V. Challenges and Considerations A. Security and Privacy B. Data Transfer and Bandwidth C. Vendor Lock-In D. Cost Management VI. Future Trends in Computing on Demand A. Edge Computing B. Serverless	1 1		
XIII	1. Data Backup: Cloud backup primarily revolves around copying and storing data. This can include files, databases, emails, and more. The data is typically compressed and encrypted before transmission to ensure security and reduce storage costs. 2. Key Components: • Client Software • Cloud Storage • Data Encryption 3. Data Transfer Methods • Incremental Backups. • Full Backups 4. Retention Policies 5. Disaster Recovery. 6. Versioning 7. Cross-Platform Compatibility 8. Security and Compliance 9. Scalability 10. Cost Efficiency 11. Monitoring and Management 12. Hybrid Solutions	7*1	7	7
XVI	Cloud storage refers to the practice of storing data on remote servers that can be accessed over the internet. It has become an integral part of modern computing and is used for a wide range of purposes, from personal file storage to enterprise-level data management. Here are some key aspects to discuss when it comes to cloud storage: 1. **Accessibility**: One of the primary advantages of cloud storage is its accessibility. Users can access their data from anywhere with an internet connection, using various devices such as computers, smartphones, and tablets. This makes it convenient for remote work, collaboration, and sharing files with others.	7*1	7	7

	2. **Scalability**: Cloud storage services offer scalability, meaning you can easily expand or reduce your storage space as needed. This eliminates the need for upfront investments in physical hardware and allows organizations to adapt to changing storage requirements. 3. **Cost-Efficiency**: Cloud storage is often cost-effective because it eliminates the need for on-premises infrastructure maintenance, such as servers and storage devices. Users typically pay for the storage capacity they use on a subscription basis, which can be more cost-efficient than maintaining and upgrading physical hardware. 4. **Data Redundancy and Durability**: Cloud storage providers typically replicate data across multiple servers and data centers to ensure data redundancy and durability. This means that even if one server or data center experiences a failure, your data remains accessible and intact. 5. **Security**: Security is a critical concern with cloud storage. Reputable providers implement robust security measures, including encryption, access controls, and authentication protocols, to protect data from unauthorized access and breaches. However, users must also take responsibility for their data security by using strong passwords and encryption where necessary. 6. **Collaboration**: Many cloud storage services offer collaboration features, such as real-time document editing and file sharing. This is particularly useful for teams working remotely, as it allows for seamless collaboration on documents and projects. 7. **Backup and Disaster Recovery**: Cloud storage can serve as a backup and disaster recovery solution. Data stored in the cloud is less susceptible to physical damage or loss, and it can be easily restored in the event of data loss or hardware failure. 8. **Compliance and Regulations**: Depending on the industry and location, organizations may need to comply with specific data regulations and standards. Cloud			