SRM VALLIAMMAI ENGINEERING COLLEGE
SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

VI SEMESTER

1904603 – GRID AND CLOUD COMPUTING

Regulation – 2019

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SUBJECT   : 1904603 – GRID AND CLOUD COMPUTING

SEM/YEAR : VI/IIII

	UNIT I INTRODUCTION			
	Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers – Grid computing Infrastructures – cloud computing – service oriented architecture – Introduction to Grid Architecture and standards –Elements of Grid – Overview of Grid Architecture.			
	PART-A			
Q.No	**Questions**		**BT Level**	**Competence**
1	Show the evolutionary trend towards parallel distributed and cloud computing.		BTL3	Apply
2	**What** is Grid Computing?		BTL1	Remember
3	**Give** the applications of high performance and high throughput systems.		BTL2	Understand
4	**Tabulate** the difference by High performance Computing and High throughput computing		BTL5	Evaluate
5	**Define** Parallel Computing		BTL1	Remember
6	**State** Cloud Computing		BTL1	Remember
7	**List** the design objectives to yield the system efficiency.		BTL1	Remember
8	**Draw** the Hype Cycle of New Technologies,2022		BTL1	Remember
9	**Analyze** the working of GPUs.		BTL4	Analyze
10	**Classify** the primitive operations of virtual machines.		BTL3	Apply
11	**List** out the advantage of cluster design.		BLT1	Remember
12	**Differentiate** computational, data grid with P2P grids.		BTL2	Understand
13	**Why** the web services are key enabler in grid computing.		BTL3	Apply
14	**Give** the basic operations of a VM.		BTL2	Understand
15	**Differentiate** grid computing and cloud computing.		BTL4	Analyze
16	**Formulate** the features of MPP, Mapreduce and Hadoop.		BTL6	Create
17	**Summarize** the technologies available in grid standards.		BTL4	Analyze
18	Bring out the **differences** between private cloud and public cloud		BTL2	Understand
19	**Highlight** the importance of the term "cloud computing"		BTL3	Apply
20	**Analyze** the features of grid FTP.		BTL4	Analyze
21	**Name** the standards in WSRF.		BTL2	Understand
22	**Describe** the standards related to web service.		BTL5	Evaluate

23	"Grid inherits features of P2P and Cluster Computing System". Is the statement true? **Validate** your answer.		BTL5	Evaluate
24	**Generalize** the layers in grid architecture.		BTL6	Create
	PART-B			
1	i) **Identify** and explain in detail about evolutionary trend of computer technology. ii) **Explain** the three paradigms in detail.	6 7	BTL -1	Remember
2	i) **Summarize** in detail about the degrees of parallelism. ii) **Discuss** the application of high performance and high throughput system.	6 7	BTL -2	Understand
3	**Illustrate** the infrastructure requirement for grid computing.	13	BTL -3	Apply
4.	**Write** short notes on i) Cluster of cooperative computers. ii) Service oriented architecture.	7 6	BTL -2	Understand
5	**Explain** the cloud computing architecture over the internet.	13	BTL -1	Remember
6	**Illustrate** the grid architecture in detail.	13	BTL -3	Apply
7	**Evaluate** virtual machine and virtualization middleware in network-based system?	13	BTL -5	Evaluate
8	**Generalize** the ideas of i) Peer to Peer Network Families. ii) IOT & Cyber Physical Systems.	7 6	BTL -3	Apply
9	i) **Describe** the infrastructure requirements for grid computing. ii) What are the issues in cluster design? How can they be resolved?	7 6	BTL -2	Understand
10	i) **Explain** the layered architecture of SOA for web services. ii) **Compare** the features of grid versus cloud.	7 6	BTL -6	Create
11	i) **Analyse and List** in detail about trends towards distributed systems. ii) **Explain** in detail about parallel and distributed programming models.	7 6	BTL -4	Analyze
12	**Brief** the interaction between the GPU and CPU in performing parallel execution of operations.	13	BTL -5	Evaluate
13	**Describe** the architecture of virtual machine and about its operations.	13	BTL -4	Analyze
14	**Explain** in detail about the elements of grid.	13	BTL -1	Remember
15	**Explain** the memory, storage and wide area networking technology in network based system.	13	BTL -1	Remember
16	**Describe** layered grid architecture. How does it map onto internet protocol architecture?	13	BTL -4	Analyze
17	**Describe** the architecture of cluster with suitable llustrations.	13	BTL -2	Understand
	PART C			
1	**Develop** a narration in detail comparing the various Grid Standards and discuss the Grid Architecture with a neat diagram.	15	BTL -6	Create

2	An increasing number of organizations in industry and business sectors adopt cloud systems. Answer the following questions regarding cloud computing: a. **Summarize** and describe the main characteristics of cloud computing systems. b. **Explain** key enabling technologies in cloud computing systems. **Deduce** different ways for cloud service providers to maximize their revenues.	15	BTL -5	Evaluate
3	**Point out** the similarities and differences between traditional computing clusters/grids and the computing clouds launched in recent years. Also discuss the possible convergence of the two computing paradigms in the future.	15	BTL -5	Evaluate
4	**Integrate** the following three cloud computing models and explain the need of Cloud storage a. What is an IaaS (Infrastructure-as-a-Service) cloud? Give one example system. b. What is a PaaS (Platform-as-a-Service) cloud? Give one example system. What is a SaaS (Software-as-a-Service) cloud? Give one example system.	15	BTL -6	Create
5	Draw and explain the Hype cycle for Emerging Technologies, 2021,2022	15	BTL -5	Evaluate

UNIT II CLOUD ENABLING TECHNOLOGIES

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish☐Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU –Memory – I/O Devices – Virtualization Support and Disaster Recovery.

PART A

1	**What** are the major roles within SOA?		BTL -1	Remember
2	**What** is mean by Virtualization?		BTL -1	Remember
3	**Draw** the Layered architecture for web services and the grids.		BTL -2	Understand
4	**Give** the levels of virtualization.		BTL -2	Understand
5	**Compare** Grids versus Clouds		BTL -4	Analyze
6	**Show** the importance of Web services.		BTL -3	Apply
7	**Define** virtual machine monitor.		BTL -1	Remember
8	**What** are the Performance metrics needed to measure various distributed systems.?		BTL -1	Remember
9	**Comment** on REST Architectural Elements.		BTL -6	Create
10	**Give** the sample REST Request-Response for creating a S3 Bucket.		BTL -2	Understand
11	**List** some core WS-Specification areas.		BTL -5	Evaluate
12	**Mention** the several classes of VM architectures.		BTL -4	Analyze
13	**Analyze** the relative merits of virtualization at various levels.		BTL -4	Analyze
14	**Differentiate** full virtualization and para-virtualization.		BTL -4	Analyze
15	**Define** memory virtualization.		BTL -1	Remember

16	How will you **implement** storage virtualization at the server level?		BTL -6	Create
17	**Show** the benefits of CPU virtualization.		BTL -3	Apply
18	**Show** the requirements of VMM.		BTL -3	Apply
19	**Write** a short note about desktop virtualization.		BTL -2	Understand
20	**Show** operating system level of virtualization.		BTL -3	Apply
21	**State** the responsibilities of VMM.		BTL -5	Evaluate
22	**State** hardware abstraction level of virtualization.		BTL -5	Evaluate
23	**What** is mean by I/O virtualization?		BTL -1	Remember
24	**Give the** host based virtualization.		BTL -2	Understand
	PART-B			
1	**Explain** in detail about the characteristics and features of SOA.	13	BTL -1	Remember
2	**Draw and explain** the Layered Architecture for Web Services and Grids	13	BTL -2	Apply
3	**Analyze** the web services interaction reference scenario.	13	BTL -4	Analyze
4	**Analyze** a simple REST interaction between user and server in HTTP specification.	13	BTL -4	Analyze
5	**Describe** in detail about the REST a software architecture style for distributed systems	13	BTL -2	Understand
6	i. Mention about virtual machine manager. **ii. Illustrate** the three major components of virtualized environment.	7 6	BTL -3	Apply
7	Explain the architecture of a computer system before and after virtualization	13	BTL -5	Apply
8	**Explain** the different phenomenon that has gained an interest towards virtualization technologies.	13	BTL -5	Analyze
9	**Analyze** the pros and cons of virtualization in detail.	13	BTL -4	Analyze
10	**Discuss** in detail about the taxonomy of virtualization techniques.	13	BTL -2	Understand
11	**Formulate** what do you understand the technologies that make up the core of today's web services.	13	BTL -6	Create
12	**Describe** the several classes of VM architectures	13	BTL -3	Apply
13	**Describe** in details the tools and mechanisms for virtualization.	13	BTL -1	Remember
14	i. **Describe** the different types of virtualization. ii. What is server virtualization? Explain parallel processing.	7 6	BTL -1	Remember
15	**Illustrate** the following Virtualization in detail i. CPU virtualization ii. Memory Virtualization iii. I/O Devices	 5 4 4	BTL -3	Apply
16	Describe in detail about server virtualization in detail with example	13	BTL -1	Remember
17	i. Express desktop virtualization.	3	BTL -2	Understand

	ii **Discuss** in detail about it with appropriate example	10		
	PART C			
1	Highlight the key points and identify the distinctions in different approaches of virtualization levels. Discuss their relative advantages, shortcomings and limitations. Also **identify** example systems implemented at each level	15	BTL -6	Create
2	**Explain** the differences between hypervisor and para-virtualization and give one example VMM (virtual machine monitor), that was built in each of the two categories.	15	BTL -5	Evaluate
3	**Explain** the differences between virtualization of CPU, memory, and I/O devices with hardware supoort architecures in detail.	15	BTL -5	Evaluate
4	What is the difference between recovery time objective and recovery point objective? How do they depend on each other? **Justify** your answer with appropriate examples.	15	BTL -5	Evaluate
5	Explain the about Virtualization for Linux and Windows and NT Platform. **Design** the process of Live Migration of VM from one host to another.	15	BTL -6	Create
	UNIT III CLOUD ARCHITECTURE, SERVICES AND STORAGE			
	Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds - laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.			
	PART-A			
1	**State** the types of clouds with proper examples.		BTL -2	Understand
2	**Define** short notes on Community cloud		BTL -1	Remember
3	Differentiate Public cloud and Private cloud.		BTL -4	Analyze
4	**Tabulate** differences between classical and Cloud computing.		BTL -1	Remember
5	**List** out the characteristics of SaaS.		BTL -1	Remember
6	**Tabulate examples** provided by platform as a service.		BTL -1	Remember
7	**Highlights** six design objectives for cloud computing.		BTL -5	Evaluate
8	**Why** does one choose public cloud over private cloud? **Analyze.**		BTL -4	Analyze
9	**Point ou**t the role of cloud auditor in cloud.		BTL -4	Analyze
10	**Define** the advantages of using the cloud storage.		BTL -1	Remember
11	**Differentiate** cloud consumer and provider		BTL -2	Understand
12	**Compare** service aggregation and service arbitrage		BTL -5	Evaluate
13	**Show** the interaction between the Actors in the cloud computing		BTL -3	Apply
14	**Draw** the diagram for conceptual reference model for cloud		BTL -6	Create
15	**Demonstrate** the types of cloud storage.		BTL -3	Apply
16	Develop the major activities of cloud provider		BTL -3	Apply
17	**Identify** the key features of S3.		BTL -6	Create
18	**Express** the characteristics of private cloud		BTL -2	Understand
19	**Give** any three features of IaaS		BTL -2	Understand
20	**Summarize** the benefits and drawbacks of using "Platform as a Service"		BTL -5	Evaluate
21	**Define** cloud storage.		BTL -1	Remember

22	**Give** the benefits and drawbacks of using "Infrastructure as a Service"		BTL -2	Understand
23	**List** Cloud offerings of IaaS.		BTL -4	Analyze
24	**Draw** S3 bucket.		BTL -3	Apply
PART-B				
1	i. **Describe the** NIST cloud computing reference architecture. ii. List the Pros and Cons of cloud computing.	9 4	BTL -1	Remember
2	**Explain** the various Layered Cloud Architectural Development design for effective cloud computing environment.	13	BTL -4	Analyze
3	**Draw and explain** the Standard data-center networking for the cloud to access the Internet.	13	BTL -3	Apply
4	**Explain** the Public, private, and hybrid clouds illustrated by functional architecture.	13	BTL -5	Evaluate
5	i. Give the diagram Cloud Computing Reference Architecture. ii. **Illustrate** in detail about The Conceptual Reference Model of cloud	3 10	BTL -3	Apply
6	List and **discuss** the principles for designing Public cloud, private cloud and Hybrid cloud.	13	BTL -2	Understand
7	**Describe** Cloud deployment models with neat diagrams.	13	BTL -1	Remember
8	**Explain** the Computing economics between traditional IT users and cloud users	13	BTL -2	Understand
9	Briefly **discuss** the architectural design challenges of the cloud.	13	BTL -2	Understand
10	Analyse Google App Engine for PaaS Applications	13	BTL -4	Analyze
11	**i. Discuss** the features of Infrastructure as a service. ii. Describe in detail about IaaS with example	5 8	BTL -2	Understand
12	i. **Point out** the features of Platform as a Service ii. Discuss in detail about PaaS with example.	5 8	BTL -4	Analyze
13	**Describe** in detail about the cloud Storage in detail with example.	13	BTL -1	Remember
14	**i. Explain** the features of software as a Service. ii. Discuss in detail about SaaS with example	7 6	BTL -5	Evaluate
15	**Compare:** Public. Private and Hybrid clouds.	13	BTL -6	Create
16	i. **List** out the Cloud Storage Providers. ii. Explain in detail about Amazon Simple Storage Service (S3).	4 9	BTL -1	Remember
17	**Demonstrate** thee architectural design of compute and storage clouds.	13	BTL -3	Apply
PART C				
1	I am starting a new company to analyze videos. I'll need a lot of storage as videos consume quite a bit of disk. Additionally, I'll need ample computational power, possibly running applications concurrently. I have discovered some very good tools to facilitate development in Windows but the deployment will be more efficiently handled in the Linux environment. All the pointers say that I need to move to cloud. I have found that SaaS is the most attractive service, followed by PaaS and IaaS, in that order. Given the above information, which service do you **recommend**? Why?	15	BTL -6	Create
2	Under what circumstances should you prefer to use PaaS over IaaS?	15	BTL -6	Create

	Formulate it with an example.			
3	**Draw** and describe the IaaS, PaaS, and SaaS cloud service models at different service levels.	15	BTL -6	Create
4	There are various companies which are offering different applications and services. How the services/applications help a user for business? **Explain** the economical and operational benefits.	15	BTL -5	Evaluate
5	**Describe** the following techniques or terminologies used in cloud computing and cloud services .Use a concrete example cloud or case study to explain the addressed technology. i. Green information Technology ii. Multitenent technique	15	BTL -5	Evaluate
	UNIT IV RESOURCE MANAGEMENT AND SECURITY IN CLOUD			
	Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Security Overview – Cloud Security Challenges – Software-as-a-Service Security – Security Governance – Virtual Machine Security – IAM – Security Standards.			
	PART-A			
1	**List** the three resource-provisioning methods.		BTL -1	Remember
2	**What** are the security challenges in cloud computing?		BTL -1	Remember
3	**List** the security issues in cloud.		BTL -1	Remember
4	**Give** the different security threats in implementing SAAS.		BTL -2	Understand
5	**Define** security governance.		BTL -5	Evaluate
6	**State** the third party risk management.		BTL -4	Analyze
7	**Point out** the layers in security architecture design.		BTL -4	Analyze
8	**Discuss** change management.		BTL -2	Understand
9	**Define** VM security.		BTL -1	Remember
10	**Analyze** the security awareness in cloud.		BTL -4	Analyze
11	**Explain** data privacy.		BTL -4	Analyze
12	**Show** the uses of application security.		BTL -3	Apply
13	**Identify** the phases of SecSDLC.		BTL -6	Create
14	**Illustrate** the security images.		BTL -3	Apply
15	**What** is 24/7/365 monitoring?		BTL -1	Remember
16	**Identify** the services across all technology layers.		BTL -3	Apply
17	**Illustrate** anything as a service.		BTL -3	Apply
18	**List** the results of IDC survey ranking security challenges.		BTL -2	Understand
19	**Design** a suitable security architecture for cloud.		BTL -6	Create
20	**Express** security monitoring.		BTL -2	Understand
21	**Summarize** password assurance testing.		BTL -5	Evaluate
22	**Explain** the issues in providing virtual machine security.		BTL -5	Evaluate
23	**What** is mean by vulnerability assessment?		BTL -1	Remember
24	**Give** the diagram for evolution of cloud services.		BTL -2	Understand
	PART-B			
1	**Describe** in detail with neat diagram in detail about inter cloud resource management.	13	BTL -1	Remember
2	**Draw and explain** the stack of six layers of cloud services and their providers.	13	BTL -1	Remember

3	i. What is resource provisioning? ii. **Discuss** different types of resource provisioning.	2 11	BTL -2	Understand
4	**Illustrate** the following in detail i. Demand-Driven Resource Provisioning ii. Event-Driven Resource Provisioning iii. Popularity-Driven Resource Provisioning	 5 5 3	BTL -3	Apply
5	**Explain** Cloud resource deployment using an IGG (intergrid gateway) to allocate the VMs from a Local cluster to interact with the IGG of a public cloud provider.	13	BTL -3	Apply
6	i. What are the cloud security challenges? Explain. ii. **Explain** in detail about security monitoring and incident response.	5 8	BTL -4	Analyze
7	List and explain Gartners seven security issues which one should discuss with a cloud-computing vendor.	13	BTL -4	Analyze
8	**Summarize** the following i. Security governance ii. Security monitoring iii. Risk management	 5 5 3	BTL -5	Evaluate
9	**Describe** the Secure Software Development Life Cycle with neat diagram.	13	BTL -1	Remember
10	**Discuss** in detail about the security architecture of cloud.	13	BTL -2	Understand
11	i. Define Application security and its use. ii. **Illustrate** the application security in detail.	3 10	BTL -3	Apply
12	**Analyze** the methods for providing data security and virtual machine security in cloud.	13	BTL -4	Analyze
13	i. List the different types of services offered by cloud. ii. **Describe** in detail about Extended Cloud Computing Services	4 9	BTL -1	Remember
14	**Recommend** a model to provide resource management among multiple cloud providers	13	BTL -6	Create
15	**Discuss** Virtual Machine Creation and Management in detail with suitable diagram	13	BTL -2	Understand
16	**Explain** in detail about Global Exchange of Cloud Resources	13	BTL -5	Evaluate
17	**Describe** the following in detail i. Data security ii. Application security iii.Virtual machine security	4 5 4	BTL -2	Understand
	PART C			
1	Explain the security architecture design of a cloud environment and **relate** how it can be made possible to include such measures in a typical banking scenario.	15	BTL -6	Create
2	**Compare and Contrast** the Key privacy issues in Cloud and explain the steps to overcome the issues with necessary examples.	15	BTL -5	Evaluate
3	**Assess** in detail the Cloud Infrastructure Security at Network, Host	15	BTL -6	Create

	and application Level by discussing their pros and cons.			
4	Explain the baseline Identity and access Management(IAM) factors to be practiced by the stakeholders of cloud services and common key privacy issues likely to happen in the environment	15	BTL -5	Evaluate
5	Explain the data governance framework which should describe who can take what actions with what information and when, under what circumstances, and using what methods?	15	BTL -5	Evaluate

UNIT V   CLOUD TECHNOLOGIES AND ADVANCEMENTS

Hadoop – MapReduce – Virtual Box -- Google App Engine – Programming Environment for Google App Engine — Open Stack of – Four Levels of Federation – Federated Services and Applications – Future of Federation

PART-A

1	**Outline** the main services that are offered by AWS.		BTL -1	Remember
2	**What** is the use of cloud Watch in Amazon EC2?		BTL -1	Remember
3	**Give** some of the Applications of GAE.		BTL -2	Understand
4	**List** the functional models of GAE.		BTL -1	Remember
5	**Name** the different modules in Hadoop framework.		BTL -1	Remember
6	**Define** Map Function.		BTL -2	Understand
7	**Analyze** Amazon Simple Storage Service (S3).		BTL -4	Analyze
8	**Point out** the use Amazon elastic block store.		BTL -2	Understand
9	**Define** SQS and SNS services of AWS cloud		BTL -1	Remember
10	**Differentiate** name node with data node in hadoop file system.		BTL -4	Analyze
11	**Analyze** the open stack components		BTL -4	Analyze
12	**Define** Extensible Messaging and Presence Protocol (XMPP) and its advantages.		BTL -1	Remember
13	**List** four basic types of federation.		BTL -4	Analyze
14	**How** Encrypted Federation Differs from Trusted Federation		BTL -3	Apply
15	State and **discover** the core components of AppEngine.		BTL -3	Apply
16	**Identify** the development technologies currently supported by AppEngine.		BTL -6	Create
17	**Demonstrate** the AWS Architecture.		BTL -3	Apply
18	**Illustrate** Amazon EC2 and its basic features.		BTL -3	Apply
19	**Create** a DataStore. What type of data can be stored in it?		BTL -6	Create
20	**Express** What is a bucket? What type of storage does it provide?		BTL -2	Understand
21	**Explain** the compute services offered by AppEngine.		BTL -5	Evaluate
22	**Discuss** how a data is read from hadoop URL.		BTL -5	Evaluate
23	**List** different Perspectives of cloud Providers, Vendors, and Users		BTL -5	Evaluate
24	**Give** the diagram for Google cloud platform and its major building blocks.		BTL -2	Understand

PART-B

1	**Discuss** in detail about the working process of Google App Engine.	13	BTL -2	Understand
2	**Describe** the following in detail i. Google Cloud Infrastructure ii. GAE Architecture	7 6	BTL -1	Remember

3	i. Write the functional Modules of GAE ii. **Discuss** in detail about GAE Applications	7 6	BTL -2	Understand
4	**Draw and explain** Programming environment for Google AppEngine.	13	BTL -2	Understand
5	**Illustrate** any five web services of Amazon in detail	13	BTL -3	Apply
6	**Draw and explain** the architecture of MapReduce in Hadoop	13	BTL -3	Apply
7	**List** the four levels of cloud federation and **explain** in detail.	13	BTL -4	Analyze
8	**Explain** Cloud federation, benefits and implementation with neat diagram.	13	BTL -5	Evaluate
9	**Compare and contrast** Google App Engine and Amazon AWS	13	BTL -4	Analyze
10	**Describe** in detail about it Map Reduce technique.	13	BTL -1	Remember
11	**Summarize** the distinct steps of the MapReduce framework	13	BTL -4	Analyze
12	**Explain** the open source software environment –Hadoop in detail with appropriate diagram	13	BTL -1	Remember
13	**Depict** the data flow of running a MapReduce job in Hadoop	13	BTL -5	Evaluate
14	**Describe** in detail about the Hadoop Core.	13	BTL -1	Remember
15	**Elaborate** HDFS concepts with suitable illustrations.	13	BTL -2	Understand
16	i) **Discuss** mapreduce with suitable diagrams. ii) **Express** in detail about the phases of map and reduce.	8 5	BTL -6	Create
17	What are the programming supports of Google App Engine? **Illustrate** in detail about the Google File system	13	BTL -3	Apply
	PART C			
1	**Combine** the role of a distributed file system in a job execution environment such as MapReduce in a large-scale cloud system and explain in detail.	15	BTL -6	Create
2	**Pointout** the basic file system operations in hadoop and **Tabulate** the hadoop file system in detail.	15	BTL-5	Evaluate
3	**MapReduce framework and** explain the data flow of a word-count problem using the MapReduce functions (Map, Sort, Group and Reduce) in a cascade operations.	15	BTL-5	Evaluate
4	**Explain** in detail about how to set up a private cloud for an academic university using any one of the cloud environments	15	BTL-5	Evaluate
5	**Integrate** Map and Reduce functions, and explain how Input Splitting can be perfomed in Hadoop Framework.	15	BTL-6	Create