

**Q. P. Code: 11243**

**(Time: 2  $\frac{1}{2}$  hours)**

**[Marks: 60]**

**Please check whether you have got the right question paper.**

- N. B.: (1) **All** questions are **compulsory**.  
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.  
(3) Answers to the **same question** must be **written together**.  
(4) Numbers to the **right** indicate **marks**.  
(5) Draw **neat labeled diagrams** wherever **necessary**.  
(6) Use of **Non-programmable** calculator is **allowed**.

**1. Attempt any two of the following: 12**

- Why is cloud computing also referred to as Utility computing? Explain.
- State and explain the Gustafsons's law.
- How is System Availability calculated? Compare system availability in various distributed architectures.
- Explain the dynamic frequency voltage scaling methods used for Energy efficiency.

**2. Attempt any two of the following: 12**

- Explain the design objectives of computer clusters with reference to:  
i. Packaging      ii. Control      iii. Security
- What are the three major design requirements for a VMM.
- What are major design differences between a Compute cluster and a HA cluster
- Explain the following design challenges in cloud architecture:  
i. Data lock-in problem    ii. Distributed storage    iii. Reputation sharing

**3. Attempt any two of the following: 12**

- Compare the offerings of Amazon Web Services and Microsoft Azure.
- Explain the various resource provisioning methods of compute resources in VMs.
- Discuss the various features and databases available in public cloud platforms offered by Amazon, Google and Microsoft.
- Describe the MapReduce Architecture in Hadoop.

**4. Attempt any two of the following: 12**

- Describe the data mutation sequence in Google File System.
- Explain the execution environment of Amazon Elastic Compute Cloud.
- Write a note on OpenNebula architecture.
- Explain the locking service named Chubby.

**5. Attempt any two of the following: 12**

- Explain System Throughput and System Efficiency.
- How is Quality of Service in Cloud computing defined? Which are the attributes considered in measuring Quality of service for clouds.
- Explain the following terms with respect to Social Network Graphs:  
i. Node Degree    ii. Average path length    iii. Betweenness  
iv. Radiality      v. Closeness                  vi. Bridge
- Explain the use of social networks in health care and education.