N.B. 1) All questions are compulsory. 
2) Figures to the right indicate marks. 
3) Illustrations, in-depth answers and diagrams will be appreciated. 
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt All (Each of 5 Marks) (15M)
(a) Multiple Choice Questions
i. Google App engine Provides 
   a. IaaS  b. PaaS  c. SaaS  d. None of these
ii. Cloud computing is a _______ system and it is necessarily unidirectional in nature. 
   a. stateless  b. stateful  c. restricted  d. None of these
iii. Three major components of virtualized environment are: 
   a. guest, host and port 
   b. guest, host and virtualization layer 
   c. guest, port and virtualization layer 
   d. None of these
iv. Parallel computing implies 
   a. loosely coupled system 
   b. tightly coupled system 
   c. medium coupled system 
   d. none of these.
v. Which is not a common virtualization? 
   a. Execution Virtualization 
   b. Network Virtualization 
   c. Storage Virtualization 
   d. Interface Virtualization
(b) Fill in the blanks
(Live migration, live consolidation, native, private, hybrid, heat)
i. The _______ cloud infrastructure is operated for the exclusive use of an organization.
ii. Openstack orchestration is performed using _______ component.
iii. Cloud Bursting happens in _______ cloud.
iv. Hypervisor that does not need a host operating system is called as _______ hypervisor.
v. Moving a virtual machine while running from one server to other is called as _______

(c) Short Answers
i. What is Keystone?
ii. What is hardware-assisted virtualization?
iii. What is Type II hypervisor?
iv. What is SOA?
v. What is KVM?

67009
Q. 2  Attempt the following (Any THREE)(Each of 5Marks)  
(a) Explain the characteristics of Cloud computing as per NIST.  
(b) Explain the hardware architecture of Parallel Computing.  
(c) Write a short note on Amazon EC2.  
(d) What is utility computing?  
(e) Explain the concept of Cloud Computing stack.  
(f) Explain the concept of public, private and hybrid Cloud.

Q. 3  Attempt the following (Any THREE) (Each of 5Marks)  
(a) What is Virtualization? Give the major causes for diffusion of virtualization.  
(b) Discuss classification or taxonomy of virtualization at different levels.  
(c) Explain the pros and cons of virtualization.  
(d) What are the benefits of virtualization in the context of cloud computing?  
(e) Explain various features of KVM.  
(f) List some of the challenges in cloud computing.

Q. 4  Attempt the following (Any THREE) (Each of 5Marks)  
(a) What is Devstack? Explain the steps to install Devstack.  
(b) What are the key components of OpenStack?  
(c) Explain the concept of Quota in Openstack.  
(d) Explain various deployment models of Openstack.  
(e) Explain the architecture of Neutron.  
(f) Explain the architecture of Nova.

Q. 5  Attempt the following (Any THREE) (Each of 5Marks)  
(a) Write a short note on Distributed computing.  
(b) What are the characteristics of virtualized environments?  
(c) Differentiate between Cinder and Swift in Openstack.  
(d) Explain the benefits for a start up to implement cloud infrastructure.  
(e) Explain RPC in detail.