



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN
SECURITY AND FORENICS**

4th YEAR 2nd SEMESTER 2015/2016 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: IIT 3444

COURSE TITLE: HPC CLUSTER, VIRTUALIZATION AND CLOUD COMPUTING

EXAM VENUE:

STREAM:

DATE: DECEMBER 2016

EXAM SESSION:

TIME: 2.00 HOURS

INSTRUCTIONS:

- 1. Answer Question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on the question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE [30 MARKS]

- a) SIIS is using virtualization technology to deploy IT security courses some LAB exercise involve studying the characteristics of computer viruses and worms, what is an advantage of conducting the Lab exercise inside the virtualized environment as opposed to using actual PC **(2marks)**
- b) Compare and contrast dual boot and virtualization **(2marks)**
- c) Distinguish between a virtualized-server environment, and traditional server environment **(2marks)**
- d) How does server virtualization make a data center more efficient? **(3marks)**
- e) True or false? A virtualized server uses less energy than a non-virtualized server. Explain your answer **(2marks)**
- f) True or false? Microsoft System Center Virtual Machine Manager can manage VMware environments. Explain your answer **(2marks)**
- g) True or False? IT managers will be able to reduce the size of their staff by virtualizing servers. Explain you answer **(2marks)**
- h) How many virtual machines can you run on one host? **(2marks)**
- i) What are Top 3 Economic Reasons For Virtualization? **(3marks)**
- j) What are some of the important feature a virtual machine would offer? **(3marks)**
- k) Platform as a Service (PaaS) and Infrastructure as a Service are two of the three main categories of cloud computing. What's the third category? **(1mark)**
- l) How did virtualization boost the emergence of Cloud computing? **(1mark)**
- m) Between Availability, Network bandwidth, Network latency and Security which one is an important concern for the customer in multi-tenant cloud environments? **(2marks)**
- n) What is an important requirement for applications to be accessible in the Cloud? **(1mark)**
- o) What is a benefit of Cloud computing for IT staff? **(1mark)**
- p) What is private cloud? **(1mark)**

QUESTION TWO [20 MARKS]

- a) Define the following terminologies in relation to virtualization **(7marks)**
 - i. Virtual Machine
 - ii. Guest Operating System
 - iii. Virtual Machine Monitor

- iv. Hypervisor:
 - v. Hosted Virtualization
 - vi. Para-virtualization:
 - vii. Operating system–level virtualization
- b) What are some of the important feature a virtual machine would offer? **(3marks)**
- c) Explain three advantages associated with cloud computing **(3marks)**
- d) Single System Image (SSI) is the collection of interconnected nodes that appear as a unified resource. It creates an illusion of resources such as hardware or software that presents a single powerful resource. Briefly Explain at least three importance it provide in clustering **(3marks)**
- e) Explain what you understand Resource Management and Scheduling (RMS) **(2marks)**
- f) Most people separate cloud computing into two distinct sets of models explain **(2marks)**

QUESTION THREE [20 MARKS]

- a) Briefly explain conditions you would be required to employ bare metal virtualization **(8marks)**
- b) What do you understand by the term server sprawl? **(1marks)**
- c) With the aid of a diagram explain the following types of virtualization **(4marks)**
- Shared Kernel Virtualization
 - Kernel Level Virtualization
- d) What is the difference between ESX Server and VMware Server? **(2marks)**
- e) Briefly explain five essential characteristics that cloud computing systems must offer **(5marks)**

QUESTION FOUR [20 MARKS]

- a) With the aid of a diagram distinguish between type1 and type two virtualization **(4mark)**
- b) How can virtualization assist in the following areas? **(12marks)**

- i. Server Consolidation and Containment
 - ii. Infrastructure Provisioning
 - iii. Business Continuity
 - iv. Test and Development
 - v. Enterprise Desktop
 - vi. Legacy Application Re-hosting
- c) What the difference between a host and guest OS? **(4marks)**

QUESTION FIVE [20 MARKS]

- a) Which category of virtualization does the following belong to? **(3marks)**
- i. Citrix XenServer,
 - ii. VirtualBox,
 - iii. QEMU
 - iv. Microsoft Hyper-V
 - v. VMware ESX/ESXi.
 - vi. VMware Workstation,
- b) What is the difference between emulation, native virtualization, and par virtualization? **(6marks)**
- c) Briefly explain Three importance of server virtualization **(3marks)**
- d) By aid of diagram explain the concept of traditional vs virtual server concept **(8marks)**

