JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

DEPARTMENT OF COMPUTER SCIENCE & SOFTWARE ENGINEERING

UNIVERSITY EXAMINATION FOR THE DEGREE OF MASTERS OF IT SECURITY & AUDIT

1ST YEAR 2ND SEMESTER 2016/2017 ACADEMIC YEAR

KISUMU LEARNING CENTER

COURSE CODE: IIT 5111

COURSE TITLE: COMPUTER OPERATING SYSTEMS & VIRTUALIZATION

EXAM VENUE: **STREAM: IT SECURITY & AUDIT**

DATE: **EXAM SESSION: 3 HOURS**

TIME:

INSTRUCTIONS

1. **Answer ANY THREE 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 1 [20 marks]

a) Define the following terms in the context of virtualization
   i) Virtualization
   ii) Virtual Machine **(2 marks)**
   iii) Hypervisor **(2 marks)**
   iv) Host **(2 marks)**
   v) Guest **(2 marks)**
   vi) Paravirtualization **(2 marks)**

b) Discuss the difference between local users and domain users. **(4 marks)**

c) Identify and discuss at least *six roles*, *features and services* that may be added to a server during installation of Windows server 2012 AD DS. **(6 marks)**

Question 2 [20 marks]

a) Hypervisors come in several different flavors. They can be categorized, for example, by type—that is, whether they run directly on the physical hardware (Type 1) or within (hosted by) an operating system environment (Type 2) .
   i) Using a diagram discuss the differences between Type 1 and Type 2 hypervisors. Give one example of each.
   ii) Briefly explain why there a difference in performance between the two? **(10 marks)**

b) A recent study that surveyed Chief Information Officers (CIOs) indicated that more than one third of respondents identified server, storage, and cloud virtualization as drivers of their spending decisions, and almost one quarter of respondents also identified desktop virtualization as similar drivers. The study even indicated that virtualization would influence their spending decisions more than issues such as labor optimization, wireless computing, Green computing, or security concerns. Briefly discuss any five common uses of virtualization today. **(10 marks)**

Question 3 [20 marks]

a) In one of your lab activities you installed Windows 2012 server, added various server roles and implemented some security policies. This activity was done in a virtualized environment using VMware. VMware Workstation runs on x86/x64, provides VMM for guests.

i) Briefly discuss this type of virtualization.
ii) Would this be considered a Type 1 or Type 2 hypervisor? Justify your answer **(10 marks)**

b) One of the most common tasks for an administrator is to create an Active Directory user objects. Windows Server 2012 includes several tools you can use to create objects. Briefly describe how you would add a computer to a domain. **(10 marks)**

Question 4 [20 marks]

a) Three common types of *virtualization approaches* are: Full Virtualization, Paravirtualization and Hardware Assisted Virtualization. Briefly discuss each approach and identify advantages and disadvantages of each. **(12 marks)**

b) Microsoft Hyper-V is a hypervisor-based virtualization system for x64 computers starting with Windows Server 2008. The hypervisor is installed between the hardware and the operating system and is the main component that manages the virtual computers. A hypervisor creates a virtual machine environment, and the server operating system runs in that environment. In order to create a virtual machine (VM), you must define the hardware resources that the system should assign to them. Briefly discuss any four of these hardware resources. **(8 marks)**

Question 5 [20 marks]

a) Using a diagram briefly discuss type of virtualization used by Xen **(5 marks)**

b) When installing Windows Server 2012 you have several editions to choose from based on multiple factors including: (1) the server roles (2) virtualization strategy (3) licensing strategy. Using examples discuss the *three categories* of server roles mentioned above. **(9 marks)**

c) A computer running Windows can have one or more local policy objects associated with it. Local Group Policy is managed through the local Group Policy object (GPO). Windows uses 3 layers of local GPOs. Discuss these layers and explain the order in which they are processed. **(6 marks)**
.