JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION COMMUNICATION TECHNOLOGY

MAIN CAMPUS

COURSE CODE: IIS 3212

COURSE TITLE: PRINCIPLES OF COMPUTER SYSTEMS DESIGN

EXAM VENUE: **STREAM:**

DATE: **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**

QUESTION ONE - 30 MARKS

a) In reference to Webster's definition, define the word system**. [2 marks]**

b) Briefly explain what you understand by the following systems design goals. (**3marks)**

i. **Modularity**
ii. **Abstraction**
iii. **Layering**

c) Define the I/O module of a computer system briefly explaining how it operates. **(5marks)**

d) Name the three areas where the Concept of abstraction has been applied in the design of Computer Systems and list three benefits of using the Concept in Computer Systems design.
(**6marks)**

e) Explain the following problems one encounters while dealing with systems. **(9marks)**

i. Emergent Properties,
ii. Propagation of Effects,
iii. Trade-Offs.

f) Briefly explain any five signs of complexity. **[5 marks]**

QUESTION TWO 20 MARKS

Computer systems use names in many ways in their construction, configuration, and Operation.

a) A system designer creates a naming scheme, which consists of three elements, Explain the three elements with a model depicting of how they are related to one another. **(9 marks)**

b) Mention any Three Frequently Used Name-Mapping Algorithms **(3 marks)**

c) The design of Computer Networks follows the layered approach of Computer Systems design. Briefly explain two benefits of layering computer networks**. (4 marks)**

d) Differentiate between a default and an explicit context reference used to resolve names in an object. **[4 marks]**

QUESTION THREE 20 MARKS

a) A possible and widely accepted compromise between the system memory performance and cost is the hierarchical memory organization.

   i. With the use of a diagram, name and briefly explain the various components of the System hierarchy. (**7marks)**
   ii. Explain the principal of locality and how it justifies this type of hierarchical Memory organization. **(7marks)**

b) RAID Systems are important components of enterprise Computing systems because of the many benefits they offer. Explain the Operation of RAID system highlighting their benefits to enterprise business units. **(6marks)**

QUESTION FOUR 20 MARKS

a) One way to limit interactions between software modules is to organize systems as clients and service.
   Explain three main benefits of this kind of organization. **[3 marks]**

b) A good way to enforce modularity is to limit the interactions among modules to Explicit messages.
   With a clear message timing diagram explain the interaction between the client and the service. **(10 Marks**)
c) State any three features of **NTFS file system [3 marks]**
d) Differentiate between block, frames and sets in the cache memory organization**. [3 Marks]**

QUESTION FIVE 20 MARKS

a) Construction of reliable systems from unreliable components is one of the most important application of modularity.
   i. Explain the three basic steps in building reliable systems. **[3 marks]**
b) Differentiate between fault avoidance and fault tolerance. **[2 marks]**
c) Threats are potential security violations caused either by a planned attack by and adversary or unintended mistakes by legitimate users of the system.
   ii. Explain the three broad categories of threats. **[3 marks]**
d) Define an operating system, mention any two functions of an operating system **(2 marks)**
e) Discuss the concept of Virtualization as used in Computer Systems design and highlight how it can help reduce the problem of Electronic waste disposal as experienced in Kenya today. **[10 Marks]**