



**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 FORENSICS**

**1<sup>st</sup> YEAR 2<sup>ND</sup> SEMESTER 2016/2017 ACADEMIC YEAR**

**MAIN CAMPUS**

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**COURSE CODE: IIT 3121**

**COURSE TITLE: DATA COMMUNICATION PRINCIPLES**

**EXAM VENUE: STREAM: BSc. Computer Security & Forensics**

**DATE: APRIL 2017 EXAM SESSION:**

**TIME: 2.00 HOURS**

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**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) Assume six devices are arranged in a mesh topology. How many cables are needed?  
How many ports are needed for each device? **(2marks)**
- b) What are the two types of line configuration? **(2marks)**
- c) What is an internet? What is the Internet? **(2marks)**
- d) What's the difference between static and Dynamic IP addressing **(2marks)**
- e) What are the three criteria necessary for an effective and efficient network?  
**(3marks)**
- f) What advantages are associated with network segmentation? **(3marks)**
- g) State three reasons why you would use DHCP over static addressing **(3marks)**
- h) What is the difference between half-duplex and full-duplex transmission modes?  
**(4marks)**
- i) Explain by the use of a diagram the difference between analogue and digital signal  
**(4 marks)**
- j) Identify the five components of a data communications system. **(5marks)**

### QUESTION TWO [20 MARKS]

- a) What are the advantages of distributed processing? **(10marks)**
- b) What are the advantages of a multipoint connection over a point-to-point connection?  
**(4marks)**
- c) What advantage does a switch have over a hub? **(4marks)**
- d) What are the two types of network architecture? **(2marks)**

### QUESTION THREE [20 MARKS]

- a) Name the four basic network topologies, and cite an advantage of each type. **(8marks)**
- b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology? **(4marks)**
- c) Convert the following into binary 234, 1092 (do not use a calculator) **(4 marks)**
- d) Explain at least two advantages of networked computing relative to standalone computing **(4 marks)**

#### **QUESTION FOUR [20 MARKS]**

- a) State and explain four factors that determine whether a communication system is a LAN or WAN? **(8 marks)**
- b) For each of the following four networks, discuss the consequences if a connection fails. **(4marks)**
- i. Five devices arranged in a mesh topology
  - ii. Five devices arranged in a star topology (not counting the hub)
  - iii. Five devices arranged in a bus topology
  - iv. Five devices arranged in a ring topology
- c) State the several instances as to when a switch would be forced to broadcast **(4marks)**
- d) When a bridge is introduced in a network of a hub what happens to the collision domain using a diagram explain **(4marks)**

#### **QUESTION FIVE [20 MARKS]**

- a) Explain why a switch is considered an intelligent device **(2marks)**

- b) You have a network of 48 computers connected to a central hub of late network has been terribly explain how you would go about to solve this problem with the aid of a diagram **(10 marks)**
- c) Using a diagram Explain what you understand by Point-to-point transmission Point-to-multipoint transmission **(6 marks)**
- d) What is an internet? What is the Internet? **(2marks)**