



**JARAMOGI OGINGA ODINGA UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS**

**DIPLOMA IN LINUX ENGINEERING**

**COURSE CODE: ICT 2217**

**COURSE TITLE- DESIGN IMPLEMENTATION OF SANS NAS ENTERPRISE  
STORAGE**

**EXAMINATIONS 2012/2013**

**TIME 2HRS**

**INSTRUCTIONS:**

**This paper contains five (5) questions. Question ONE  
is Compulsory and any other TWO questions**

### Question One 30marks

- i.) Define the following terms (10mks)
  - a. Storage Area Network
  - b. Network attached Storage
  - c. RAID array
  - d. TCP/IP protocol
  - e. SMB
- ii.) Give **FIVE** reasons why Fibre Channel's block level storage interaction is preferred over TCP/IP (10mks)
- iii.) SAN components generally fall into three categories, Discuss. (6mks)
- iv.) State and briefly describe any **TWO** components that constitute the fabric layer. (4mks)

### Question Two 20marks

- i.) Discuss the following SAN fabric topologies (12mks)
  - a. Point to Point
  - b. Arbitrated loop
  - c. Switched fabric.
- ii.) A SAN can be based on either iSCSI or Fibre Channel, Differentiate mentioning the advantages of each. (8mks)

### Question Three 20marks

- i.) Give **TWO** reasons why an organization might opt to use a multi fabric SAN (4mks)
- ii.) Give reasons that might compel you to construct a homogeneous or heterogeneous fabric, Giving the advantages and disadvantage of each (8mks)
- iii.) Discuss the concept of of core switches and edge switches in fiber channel specification. (8mks)

### Question Four 20marks

- (i.) Define Inter Switch Link (ISL) and explain its significance (6 marks )
- (ii.) State how Fibre Channel differs from Ethernet switch ports (4 marks )
- (iii.) Define the following terms (10 marks)
  - a. N\_port
  - b. F\_port
  - c. E\_port
  - d. D\_port
  - e. U\_port

**Question FIVE 20marks**

- a) The IT architects need to consider four key factors that drive the efficiency of data center operations in regard to SAN technology. Discuss (8mks)
- b) Define the following security issues as related to SANs explaining the solutions you would provide

(12marks)

- (i.) Zoning
- (ii.) Persistent Binding
- (iii.) Switch link Authentication Protocol
- (iv.) Route cause analysis
- (v.) “data-in-flight” and “data-at-rest”
- (vi.) Access controls