



**TECHNICAL UNIVERSITY OF MOMBASA**  
**INSTITUTE OF COMPUTING AND INFORMATICS**

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**UNIVERSITY EXAMINATION FOR:**

**BACHELOR OF TECHNOLOGY (INFORMATION TECHNOLOGY)**

**EIT 4419: OPTICAL FIBRE COMMUNICATION SYSTEMS.**

**END OF SEMESTER EXAMINATION**

**SERIES: MAY 2016**

**TIME: 2HOURS**

**DATE:** Pick Date **MAY 2016**

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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**Question ONE**

- (a) Explain the following terms:
- i. Optical Distribution Network. (8 marks)
  - ii. POP. (6 marks)
  - iii. Refraction. (10 marks)
  - iv. Drawing. (4 marks)
- (b) Differentiate between Link protection and path protection. (2 marks)
- (c) Describe the Optical Transport Network. (8 marks)
- (d) Using a suitable diagram, distinguish between the following as used in a fibre channel:
- i. Physical link, a Virtual path and a Virtual circuit. (4 marks)
  - ii. Virtual path Identifier and a Virtual circuit identifier. (2 marks)

**Question TWO**

- (a) State three types of WDM Optical Rings. (3 marks)
- (b) State any four types of PONs. (4 marks)
- (c) Describe the structure and operation of a DWDM system. (8 marks)

- (d) Two main types of optical sources in fibre networks are the LED and a LASER. Outline any five major differences between them. (5 marks)

### Question THREE

- (a) Describe the optic fibre hybrid systems used in the First Mile. (4 marks)
- (b) Outline the benefits of each of the optic fibre hybrid systems you have described in question 3 (a) above. (4 marks)
- (c) Distinguish between Inter-modal dispersion and Intra-modal dispersion in optic fibre channels. (4 marks)
- (d) Outline the functions of:
- i. Optical Transmitter.
  - ii. Optical Receiver. (8 marks)

### Question FOUR

- (a) Discuss the classifications of optic fibre cables. (5 marks)
- (b) Briefly, outline the operation of an EPON. (6 marks)
- (c) Describe the variation of attenuation of an optic fibre channel with increased frequency within the optical spectrum. (5 marks)
- (d) Optical network is mainly a physical layer technology while IP is a layer three technology. Outline any two technologies are used over Optical network to carry IP traffic. (4 marks)

### Question FIVE

- (a) Using a suitable diagram, describe the structure of a PON. (8 marks)
- (b) Explain the difference between Demodulation and Detection. (4 marks)
- (c) Describe the three main standards used in optical communication systems. (6 marks)
- (d) Explain the term 'sooting' as used in the manufacturing of an optic fibre cable. (2 marks)