



TECHNICAL UNIVERSITY OF MOMBASA
INSTITUTE OF COMPUTING AND INFORMATICS

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.

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)