



TECHNICAL UNIVERSITY OF MOMBASA
INSTITUTE OF COMPUTING AND INFORMATICS

Select department

UNIVERSITY EXAMINATION FOR:
BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY
EIT: OPTICAL FIBRE COMMUNICATION SYSTEM
SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2HOURS

DATE: Sep2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. AttemptChoose instruction.

Do not write on the question paper.

Question ONE

- (a) What is an optical fibre communication system? **(2mks)**
- (b) With illustrations, differentiate between multimode and single mode of transmission in an optical fibre. **(4mks)**
- (c) Using block diagram briefly describe the key components in an optical fibre communication system. **(8mks)**
- (d) Describe two types of attenuation in optical fibre transmission. **(4mks)**
- (e) State two advantages of optical transmission over other guided transmission. **(2mks)**

Question TWO

- Q2. (a)** What is wavelength division multiplexing in optical communication system. **(2mks)**
- (b) What is the purpose of the following devices in optical communication?

- (i) Laser diode **(2mks)**
- (ii) Photodiode **(2mks)**

(c) Explain why it is necessary to convert electrical signal to light signal and then back to electrical signal in fibre optics communication. **(3mks)**

(d) With illustration differentiate between a single hop and a multihop optical network. **(4mks)**

(e) Using Ray theory of transmission explain the total internal reflection in an optical fibre **(7mks)**

Question THREE

(a) What is an optical fibre network? **(2mks)**

(b) Differentiate between optical packet switched network and optical burst switched network. **(4mks)**

(c) Describe the following concepts;

- (i) Wavelength routing **(2mks)**
- (ii) Wavelength assignments **(2mks)**
- (iii) Virtual topology **(2mks)**
- (iv) Wavelength conversion **(2mks)**

(d) With the help of a diagram explain a passive optical network (PON). **(6mks)**

Question FOUR

(a) Describe fault management of a network. **(2mks)**

(b) State and explain three types of failures in a WDM network **(6mks)**

(c) Explain the functions of the following optical components;

- (i) Isolator. **(2mks)**
- (ii) Coupler **(2mks)**
- (iii) Optical amplifier **(2mks)**

(d) What is Protection Scheme? Describe two approaches in Protection Scheme. **(6mks)**

Question FIVE

(a) Using illustrations differentiate between Time Division Multiplexing (TDM) and Wavelength Division Multiplexing techniques. **(6mks)**

(b) What is traffic grooming? Explain its importance. **(3mks)**

(c) Explain the following types of networks;

- (i) Broadcast Network **(1mk)**
- (ii) Multicast Network **(1mk)**
- (iii) Metro Access Network **(1mk)**

(d) What is Routing and Wavelength assignment? **(2mks)**

(e) Discuss the need for optical fibre technology in communication networks today. **(6mks)**