TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR DEGREE IN:
BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY
(BTIT Y4 S2-FT&EV)

EIT 4419: OPTIC FIBRE COMMUNICATION SYSTEMS

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2014
TIME: 2 HOURS

Question One (Compulsory)

a) Explain the following terms:
   (i) Single mode fibre cut-off frequency
   (ii) Passive Optical Component
   (iii) Refractive Index
   (iv) Total Internal Reflection   **(8 marks)**

b) Using a labeled diagram, describe the architecture of the optical fibre communication system and the functions of its components   **(8 marks)**

c) In relation to optical systems:
   (i) State Snell's Law   **(2 marks)**
   (ii) Describe the basic operation principles of the optic fibre cable   **(4 marks)**

d) The spectrum of an optic fibre cable lies between 800nm and 1600nm:
   (i) Determine the Bandwidth of the fibre channel

(ii) Using a suitable diagram describe the response of the fibre channel attenuation with the wavelength **(8 marks)**

Question Two

a) Describe the differences between multi-core and single-core multimode fibre cables **(5 marks)**

b) What is Wavelength Division Multiplexing (WDM) **(3 marks)**

c) Differentiate between CWDM and DWDM systems **(4 marks)**

d) Outline any FOUR benefits of optic fibre communication **(8 marks)**

Question Three

a) Briefly describe the operation of an:
    (i) Optical Amplifier
    (ii) Optical Multiplexer
    (iii)   Optical Demultiplexer **(9 marks)**

b) State TWO major challenges in optical communication systems **(6 marks)**

c) Outline the main standards in optical communication systems **(6 marks)**

d) List THRE main areas of application of fibre communication systems **(3 marks)**

Question Four

a) With respect to optical fibre networks, explain the following and give an example in each case:
    (i) Node
    (ii) Station **(6 marks)**

b) State the difference between switching and routing as applied in optical networks **(4 marks)**

c) Using a suitable diagram, explain the following in relation to optical networks:
    (i) Point of Presence (POP)
    (ii) Access Network
    (iii)   Backbone Network **(10 marks)**

Question Five

a) Describe FTTx schemes **(8 marks)**

b) Outline any THREE types of Fibre system faults **(3 marks)**

c) Describe the following types of optical network topology and state their areas of application
    (i) Point-to-point
    (ii) Switched
    (iii)   Ring **(9 marks)**