



PAN AFRICA CHRISTIAN UNIVERSITY

DEGREE IN INFORMATION & COMMUNICATION TECHNOLOGY

END OF TERM EXAMINATION

DEPARTMENT: COMPUTING & INFORMATION TECHNOLOGY

COURSE CODE: BIT205

CAMPUS: ROYSAMBU

COURSE TITLE: DATA COMMUNICATION

EXAM DATE: TUESDAY 3RD DECEMBER 2019

TIME: 1730HRS-1930HRS

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer **ALL** questions in Section **A** and any other **THREE** questions in Section **B**.
- Write only your **student number** on the answer booklet provided.
- None programmable calculators permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

SECTION A [30 MARKS]

(Answer ALL questions in this section)

Question 1:

- i. Differentiate between the following terms.

[4 Marks]

- a) Data communication
- b) Telecommunication

- ii. Explain the following modes of transmission.

[4 Marks]

- a) Half-duplex
- b) Full-duplex transmission.

- iii.

```
C:\>tracert www.google.com

Tracing route to www.google.com [216.58.223.68]
over a maximum of 30 hops:

  1  30 ms  30 ms  25 ms  10.2.0.1
  2  68 ms  39 ms  25 ms  41.89.50.1
  3  32 ms  37 ms  33 ms  41.204.181.189
  4  43 ms  60 ms  35 ms  kl.seacom-cls-02.s.kenet.or.ke [41.204.184.114]

  5  41 ms  29 ms  32 ms  72.14.220.40
  6  22 ms  25 ms  57 ms  108.170.229.78
  7   8 ms   8 ms   8 ms  72.14.239.179
  8  11 ms   8 ms  10 ms  mba01s07-in-f4.1e100.net [216.58.223.68]

Trace complete.

C:\>
```

Analyze the lab experiment shown above and deduce what is its objective. [4 Marks].

- iv. Philip was a new staff for XYZ LTD, He had no reliable colleague to carry him through orientation program for his new tasks. So, he wanted to extract a network diagram in order to deduce and ascertain some of the basic bottlenecks across his network causing a lot of data loss and DOS(Denial of service) through frequent collision domains and downtimes.

Advice using a lab setup environment on the apparatus and tools of his Lab setup to achieve his requirements.

[6 Marks]

- v. Some of the major Objectives of studying Data communication involves understanding how to deal and handle **Transmission impairment and Channel capacity** within any two transmitting devices across any network. Write brief summary on your understanding of the Transmission Impairment and Channel Capacity.

[6 Marks].

- vi. Explain THREE Main characteristics/Criterion of computer network transmission media.

[6 Marks]

SECTION B

[30 Marks]

(Answer any THREE (3) Questions in this section)

Question 2 (10 Marks)

- a) With the help of appropriate diagrams describe the characteristics of the sound/signal wave/analog signal. **[4 marks]**
- b) Discuss Describe the following types of networks. **[6 Marks]**
 - i. Metropolitan Network (MAN)
 - ii. Wide Area Network (WAN)
 - iii. Virtual Private Network (VPN)

Question 3 (10 Marks)

- a) Define the ISO OSI reference Model. **[2 Marks]**
- b) Discuss three benefits of OSI reference model. **[3 Marks]**
- c) In the OSI reference model, explain the concept of data encapsulating and de-encapsulation. **[5 Marks]**

Question 4 (10 Marks)

- a) Explain the following types of errors, stating their Causes and solutions to each
 - i. Crosstalk
 - ii. Attenuation.
- b) Describe how the following error detection techniques work. **[6 Marks]**
 - i. Checksum **[4 Marks]**
 - ii. CRC

Question 5 (10 Marks)

- a) Explain what happens to a piece of data at the presentation layer of the OSI reference model. **[5 Marks]**
- b) At the data link layer a trailer is added. What does it contain and what is its use **[5 Marks]**.

Question 6 (10 Marks)

- a) With help of a diagram explain the simple Data Communication system (datum). **[5 Marks]**

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- b) Explain FIVE Major benefits of having computer networks in respect to Data communication. **[5 Marks]**

END