



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATION 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

SCT209/SCO105: DATA COMMUNICATION TECHNOLOGIES

DATE: THURSDAY, 12TH APRIL 2012

TIME: 8.00 A.M – 10.00 A.M

INSTRUCTIONS:

Answer question **ONE** and other **TWO** questions.

Question One (30 marks)

- (a) Define the term data communication.

(2 marks)

- (b) Using suitable diagram(s) explain following parameters that define a sine wave.

- (i) Amplitude
- (ii) Frequency
- (iii) phase

(6 marks)

- (c) (i) Explain the two possible scenarios of the signal-to-noise ratio.
(ii) The power of a signal is 10mW and that of the noise is 1μW. What are the values of SNR and SNR_{dB}.

(6 marks)

- (d) State and explain the three broad classes into which the Internet layers can be classified.

(6 marks)

- (e) Briefly explain two reasons that have facilitated the development of LANs.
(4 marks)
- (f) Circuit switched networks are the oldest and simple approach to WAN circuits and use a cloud architecture. With aid of a suitable diagram explain the cloud architecture.

(6 marks)

Question Two (20 marks)

- (a) One of the functions of the data link layer is to perform error control. Using suitable example illustrate how longitudinal redundancy checking technique can be used to detect errors.
(4 marks)
- (b) Packetizing is one of the functions of the transport layer and one of the challenges is to decide how big the packet will be. Explain how the transport layer overcomes this challenge.
(4 marks)
- (c) Explain the dynamic routing and outline its two major drawbacks.
(6 marks)
- (d) State and explain any three general functions that can be done by an application program from an application architecture point of view.

(6 marks)

Question Three (20 marks)

- (a) Define the term virtual local area network (VLAN) and give an example.
(3 marks)
- (b) Using suitable diagrams explain physical and logical topologies of the wireless LAN.
(8 marks)
- (c) In improving the performance of the LAN a checklist is developed that contain basically three broad areas to be considered. List and explain these three broad areas.

(9 marks)

Question Four (20 marks)

- (a) State and explain any three design challenges faced by designers of the ATM (Asynchronous Transfer Mode).

(6 marks)

- (b) With aid of suitable diagram explain how the Fiber –Distributed Data Interface (FDDI) manages a network when the ring breaks.

(8 marks)

- (c) Explain the following backbone architectures.

- (i) Routed backbone
- (ii) Collapsed backbone

(6 marks)

Question Five (20 marks)

- (a) Using suitable diagram explain the three basic architecture used in dedicated circuit networks.

(9 marks)

- (b) Packets-switched networks enable packets from separate messages with different destinations to be interleaved for transmission. Briefly explain this packet-switching concept.

(5 marks)

- (c) Explain the following packet-switched services.

- (i) X.25
- (ii) Frame relay
- (iii) Switched Multimegabit Data Service (SMDS)

(6 marks)

