THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION TECHNOLOGY – DIT 2K 9J

ECS 2309: DATA COMMUNICATION IV

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY/MARCH 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A & B**
Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

QUESTION ONE (30 MARKS)

a) Identify your physical threats to computer networks that organizations need to safeguard
(4 marks)

b) Outline **TWO** security levels that can be applied in a network (4 marks)

c) Outline the procedure for manually assigning a computer an IP address. Assume window based operating system environment (4 marks)

d) The following are typical IP addresses for computers in a network
   (i)   129.151.4.8
   (ii)   192.110.103.22
   (iii)   122.117.100.21

   Identify the class for each IP address (3 marks)

e) With the aid of a diagram, describe the use of a bridge and a router in a local area network
(5 marks)

SECTION B (Answer any two questions)

QUESTION TWO

a) Explain the operation of the following multiplexing schemes:
   (i) FDM
   (ii) TDM

b) During network configuration, a student used the commands ping and traceroute. Distinguish between the two commands (4 marks)

c) Explain the SIX factors that determine the scope of security to be implemented in a computer network (6 marks)

d) Briefly explain the following software security models:
   a) User level
   b) Share level (2 marks)

QUESTION THREE

a) Given data as 10110101, sketch the encoded signals on the same plane if the following encoding schemes are used;
   (i) Manchester
   (ii) Differential Manchester
   (iii) Non-return to zero inverted (6 marks)

b) (i) Find the binary equivalent of x^4 x x^3 +x + 1
   (ii) Find the polynomial equivalent of 100001110001 (2 marks)

c) Calculate the VRC and LRC for the following bit pattern using even parity:

   ⟵   0011101 1100111 1111111 0000000 (2 marks)

d) During an exercise to configure the computers to the internet use, the following terms were mentioned frequently by the configuration team. Explain each of the terms:
   (i) Proxy server
   (ii) Subnet address
   (iii) IP address

(iv) Client computer   (10 marks)

QUESTION FOUR

a) Describe the following terms;
   (i)   Auditing
   (ii)   Data encryption
   (iii) Authentication   (6 marks)
b) Briefly explain the six factors to consider when choosing back-up media   (6 marks)

c) Explain the following power problems
   (i)   Black out
   (ii)   Sag
   (iii) Surge
   (iv)   Spike   (8 marks)

QUESTION FIVE

a) Explain four advantages of ISDN network   (4 marks)

b) With the aid of a diagram, explain the process of transmission over an Integrated Services Digital Network (ISDN).   (6 marks)

c) An Ethernet LAN consists of a router, mail server, and two workstations. The LAN devices are to be assigned IP addresses in their respective order of occurrence. Assuming the IP address block allocated to the site is 207.125.048.244, write the;
   (i)   Netmask for the site
   (ii)   Router IP address
   (iii) Mail server IP address
   (iv)   Web server IP address
   (v)   IP address of each of the workstation
   (vi)   Sketch the Ethernet LAN   (6 marks)

d) Within the context of network security, explain the following terms;
   (i)   Encryption
   (ii)   Digital signature
   (iii) Authentication
   (iv)   Message integrity   (4 marks)