JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF   INFORMATICS AND INNOVATIVE SYSTEMS
UNIVERSITY EXAMINATIONS: 2013/2014
COURSE CODE: IIT 3223
COURSE TITLE: Systems Programming
KLC

DATE: DECEMBER 2013
TIME: 2 HOURS

INSTRUCTIONS:

i.   This paper contains five (5) questions.
ii.   Question ONE is Compulsory and any other TWO questions
iii.   Answer the questions on the booklet provided

Question 1 30 marks

a) Explain the meaning of TCP/IP and describe how these protocols relate to the internet

(4 marks)

b) With the aid of suitable diagrams, explain the various classes of IP networks in use

(6 marks)

c) Explain the meaning of the following internet protocols: UDP, DHCP, SMTP, HTTPS and SNMP (5 marks)

d) Explain the meaning of a transaction in the realm of computing and its four main properties (10 marks)

e) Explain the meaning of mutual exclusion in distributed systems and describe how token ring algorithm can be sued in implementing it. (5 marks)

Question 2 20marks

a) In developing a network layer application, a server has two steps in order to begin the server and wait for connections. The first is setting up the socket to listen on a specific port, and the second is to actively wait for incoming connections. Functions bind () and listen () are used to begin the server. The bind command attaches the socket to a port, and the listen command tells the interface to prepare to queue incoming connection requests. Write program segments that would perform these tasks. (12 marks)

b) Explain the meaning of the following terminologies in relation to computer transactions processing: abort, commit, log and commit protocol. (8 marks)

Question 3 20marks

a) With the aid of suitable diagrams, compare and contrast the open systems interconnection (OSI) network model and the TCP/IP model. (12 marks)

b) Explain the meaning of distributed operating system and discuss any three general advantages of distributed systems. (8 marks)

Question 4 20marks

a) In the design and implementation of distributed systems, the following key issues must be considered: Transparency, flexibility, reliability, performance and scalability. Exhaustively discuss these issues. (15 marks)

b) An Internet socket is characterized by a unique combination of components. Explain the meaning of a socket and what constitutes internet sockets. (5 marks)

Question 5 20marks

a) Discuss the concept of remote procedure call in distributed systems and explain the weaknesses in its implementation. (10 marks)

b) Explain what a fault tolerant system means and discuss the basic characteristics required for fault tolerant systems. (10 marks)