MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL AND ELECTRONICS ENGINEERING)

EEE 544 TELETRAFFIC ENGINEERING

DATE: 12/8/2021 **TIME: 2:00 – 4:00 PM**

INSTRUCTIONS

Answer questions One and any other Two Questions. Question One is Compulsory and carries 30Marks.The remaining questions carry 20marks each.

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Discuss with illustration call types in a telephone system and their network implications. (3 marks)

b) Explain the terms call blocking and time blocking as applied in teletraffic engineering (3 marks)

c) Explain significance of busy hour in teletraffic engineering (6 marks)

d) Discuss the variants of SS7 signaling system (6 marks)

e) Briefly explain teletraffic models as used in circuit and packet switching systems (6 marks)

f) Discuss key features of an ISDN telephone system. (6 marks)

QUESTION TWO (20 MARKS)

a) With reference to telephone traffic, explain the following:-
   i. Stochastic process (2 marks)
   ii. Measure of traffic (2 marks)

b) Briefly discuss major advantages gained in the development from step by step (strowger) switching to crossbar switching. (4 marks)

c) Distinguish with illustration an exclusive and multiparty lines in a telephone system (4 marks)

d) Discuss the Erlang B formula as used in a telephone system. (4 marks)
e) Explain the following abbreviations and their significance as relates to tele-traffic engineering.
   i) BHCA (2 marks)
   ii) BHCC (2 marks)

QUESTION THREE (20 MARKS)

a) For each of the following, state what the abbreviation stands for and give an example of its use.

   i) GSM
   ii) CDMA
   iii) ISDN
   iv) PSTN
   v) TDMA

(5 marks)

b) In a telephone system with 3 channels and total offered traffic of 2 erlangs, calculate the blocking probability (5 marks)

c) Given a data network where data is arriving at 40packets per second and the link speed is 64kbps, calculate the probability that a packet has to wait for more than 0.1 sec (5 marks)

d) In a local exchange there is an average of 1500 calls in an hour. Calculate the traffic intensity if the average holding time is 3 minutes. (5 marks)

QUESTION FOUR (20 MARKS)

a) Discuss considerations in the design of a switching system (5 marks)
b) With illustration, discuss the types of switching systems. (5 marks)
c) A 64kbps link connects two packet routers where 10 new packets arrive per second. If the packet length is 400 bytes, calculate the traffic load. Assume 1 byte =8 bits. (5 marks)
d) Discuss four transmission options you may use in a telephone network giving examples with applicable circumstances. (5 marks)

QUESTION FIVE (20 MARKS)

a) You are required to provide a LAN in the SET premises to be linked to the servers at the IT Department. Explain the steps and considerations you will take to design and install a well performing network. (8 marks)
b) Discuss the various network topologies and their application. (6 marks)
c) Give highlights on the common multiple access methods available (6 marks)