UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
RECESS PROGRAMME END OF SEMESTER TWO EXAMINATIONS

ACADEMIC YEAR 20/20

DEPARTMENT: ICT

SEMESTER: TWO

PROGRAMME(S): *DIPLOMA IN TELECOMMUNICATIONS ENGINERING (DTE)*

YEAR OF STUDY: TWO

COURSE: INTRODUCTION TO MICROWAVE TECHNOLOGY

COURSE CODE : TE227

DATE:

TIME:

DURATION: 3 HOURS

INSTRUCTIONS:

(i) This paper contains two Sections: A (40 marks) & B (60 marks).

(ii) Attempt ALL questions in Section A, and ONLY THREE questions in Section B.

(iii) All questions in Section B carry equal marks.

(iv) Credit will be given for use of relevant examples and illustrations.

(v) Begin each number in Section B on a new page of the answer sheet.

(vi) DO NOT write on this question paper

Question 1

a) State four applications of microwave technology. (4 marks)
b) Give two (2) examples of frequency bands in the region (2 marks)
c) What are unlicensed frequency bands, state their limitations and give two examples (4 marks)

Question 2

a) Iron dome is an Israeli all weather defense system. How does it use radar technology in its functionality? (2 marks)
b) What is Doppler effect (3 marks)
c) State two limitations of radar (2 mark)
d) Define the term $microwave$. (1 marks)
e) State two international standardization bodies (2 marks)

Question 3

a) Describe two (2) causes of fading in Microwave Systems. (2 marks)

b) Explain the following transmission limitations [2 marks @] (8 marks)
   (i) Attenuation
   (ii) Dispersion
   (iii) Distortion
   (iv) Noise

Question 4

a) What is the role of UCC in regards to telecommunication (2marks)
b) What is the purpose of the Foil shield (aluminum lining) in coaxial cables (1 mark)
c) Why should we avoid kinks in fiber and waveguides? (1 mark)
d) Two copper wire conductors can transmit Alternating Current of 50Hz with varying cable size depending on current. Can we utilize them to transmit a signal of 15GHz. (2marks)

a) State the transmission medium of transmitting the following frequencies and why they are used?
   i. 50Hz
   ii. 30GHZ 2marks]@((4 marks)

Section B

Question 1

a) How are satellites used in everyday life (6 marks)

b) What is Uplink and down link frequencies and explain the reason for different uplink and downlink frequencies in satellite communication. (4 marks)

c) State the 3 main parts of a satellite and their functions 2marks each (6 marks)

d) State two (2) types of Orbits and the respective type satellites commonly used in those orbit (4 marks)

Question 2

a) Explain 4 factors affecting the range of radar **(**8marks)

b) State 4 applications of CW radar (4marks)

c) Draw a diagram and explain the basic operation of a simple radar (8 marks)

Question 3

a) Explain the following in relation to Antennas

i. Azimuth and Elevation (2 marks)

ii. Horizontal and Vertical Polarization (2 marks)

iii. Side lobes (1 marks)

b) Explain the working principle of the cassegrain Antenna with help of a diagram. (5 marks)

c) Describe four antenna parameters (4 marks)

d) State 2 applications of Travelling wave tubes (2 marks)

e) State 4 application of application of a reflex Klystron (4 marks)

Question 4

a) Describe three (3) categories of transmission lines commonly used in the Microwave Systems. (6 marks)

b) (i) Define *Standing Wave Ratio* . (2 marks)

(ii) State the importance of this ratio in terms of Transmission Line usage. . (2 marks)

(iii) Draw microwave frequency table and state the applications as per band (10 Marks)

END