



ELIZADE UNIVERSITY ILARA MOKIN, ONDO STATE

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL AND
ELECTRONICS ENGINEERING

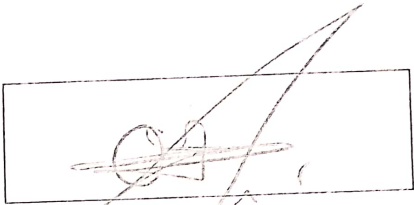
SECOND SEMESTER EXAMINATION, 2018/2019 ACADEMIC SESSION

COURSE TITLE: COMMUNICATION SYSTEMS

COURSE CODE: EEE 536

EXAMINATION DATE: 15TH JULY, 2019

COURSE LECTURER: PROF. SOLOMON ADENIRAN



HOD's Signature

TIME ALLOWED: 2 HOURS 40 MINUTES

INSTRUCTION

1. ANSWER ANY FIVE QUESTIONS
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE NOT ALLOWED TO BORROW ANY WRITING MATERIALS AND CALCULATORS DURING THE EXAMINATION.
4. SMART WATCHES ARE NOT ALLOWED IN THE EXAMINATION HALL

1. (a) Briefly describe the following types of transmission lines:

- (i) Parallel wire transmission line. (1.5 marks)
- (ii) Parallel plate transmission line. (1.5 marks)
- (iii) Coaxial transmission line. (1.5 marks)
- (iv) Rectangular waveguide. (1.5 marks)

(b) Explain the appropriateness of each of the transmission lines in the propagation of microwave frequencies from VHF to ku-band frequencies.

(4 marks)

(c) Draw a schematic of rectangular waveguide and discuss its use at microwave frequencies. (5 marks)

2. (a) In matching impedances at microwave frequencies, discuss the realization of stub matching technique for rectangular waveguide. (4 marks)

(b) With the arrangement in Figure 1, could Z_L be matched to the network? Discuss. (6 marks)

(c) Stub and quarter wave lines are the two prominent matching techniques. How are they applied in matching techniques. (5 marks)

3. (a) Draw a schematic of a resonant cavity and write the resonant frequency as a function of the dimensions of the cavity. Define all symbols used. (4 marks)

(b) A rectangular cavity has the dimensions in the x, y and z directions as 15 cm, 14 cm and 7.5 cm respectively. Calculate its lowest resonant frequency. (6 marks)

(c) List the next 3 (three) lowest frequencies in ascending order. (5 marks)

4. (a) Describe a Klystron tube. (5 marks)

(b) Why are Klystron and magnetron tubes not usually employed in communication satellites? (4 marks)

(c) Compare the bandwidths of Klystron and magnetron tubes to that of travelling wave tubes. What is responsible for Klystron and magnetron low bandwidths? (6 marks)

5. (a) List the layers of the ionosphere during the day and then during the night. What accounts for this difference, if any? (4 marks)

(b) Compare and contrast the troposphere and the ionosphere. (5 marks)

(c) The troposphere and the ionosphere reflect certain bands of frequencies. Explain why the ionosphere is used for international broadcasting whereas the troposphere cannot be used for international broadcasting. (6 marks)

6. (a) Why is there time lag between the time a signal is transmitted to a satellite and the time the signal is received? (5 marks)
- (b) State the reasons why geostationary orbit is not the only orbit for satellite communications. (5 marks)
- (c) Derive the range of geostationary orbit. (5 marks)
7. (a) What is a radar system? (2 marks)
- (b) Using appropriate diagram, describe a pulse radar system. (6 marks)
- (c) Derive the radar range equation. Describe all the symbols used. (7 marks)