



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:
DIPLOMA IN ELECTRICAL ENGINEERING
EEE2206: ANALOGUE SIGNAL PROCESSING
END OF SEMESTER EXAMINATION

SERIES: AUGUST 2019

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt ANY THREE.

Do not write on the question paper.

Question ONE

- State any two advantages and one disadvantage of a single sideband over double sideband AM (3marks)
- Explain the function of the modulator in an AM transmission circuit (2marks)
- Use appropriate diagrams to explain the operation of a ring modulator. (8marks)
- Why is it essential to transmit the suppressed carrier (2marks)
- For the circuit in fig.1, show that the outputs contain the modulating frequency, the upper and lower sideband. (5marks)

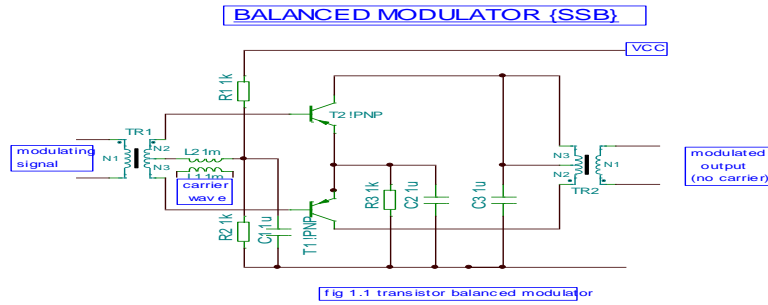


Fig. 1

Question TWO

- a) Distinguish between direct and indirect frequency modulation (4marks)
- b) With the aid of a circuit diagram and waveforms explain the operation of a Forster Seeley discriminator. (8marks)
- c) Explain how the limiting action is achieved in the ratio detector. (4marks)
- d) State any three advantages and one disadvantage of using PLL over other types of FM detectors. (4marks)

Question THREE

- a) State any two requirements of any radio transmitter. (2marks)
- b) Use appropriate diagrams to differentiate between low-level and high-level AM transmitters. (6marks)
- c) With the aid of a block diagram explain the operation of an FM transmitter employing a varactor modulator. (6marks)
- d) An Armstrong FM transmitter consist of a carrier of frequency 400 KHz and deviation of 15 HZ. The Transmitter has the following set of multipliers 1st set of multiplier are four triplers and the 2nd set consist of 6 doublers .The local oscillator in the mixer produces 34 MHz, Determine the carrier frequency and deviation at the antenna (6marks)

Question FOUR

- a) Define the following terms as related to AM receivers.
 - i. Tracking
 - ii. Sensitivity. (2marks)
- b) Describe the following types of interferences in AM receivers

- i. Adjacent Channel interference
 - ii. Co-channel interference (4marks)
- c) Draw a well labeled block diagram of an FM super heterodyne receiver and explain the functions of each blocks. (8marks)
- d) The oscillator used in an AM receiver has the IF = 465Hz with a tunable signal of $f_s = 525 \text{ KHz}$ to 1605 KHz Determine the tunable capacitor ranges for the oscillator. (6marks)

Question FIVE

- a) State any three contrasts between monochrome and coloured TV receivers. (3marks)
- b) Draw a simplified block diagram of a monochrome TV transmitter and explain its operation. (9marks)
- c) Describe the following terms
- i. Degaussing coil
 - ii. Colour fringes (4marks)
- d) A 26 cm coloured TV having an aspect ratio of 4:3 is used in telecommunication lab for display purposes determine the width and the height of the screen. (4marks)