



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:

DTEE/DEPE/DTEA/DTIE

EEE 2201: ANALOGUE ELECTRONICS II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt Choose instruction.

Do not write on the question paper.

Question ONE

- Draw a well labelled equivalent circuit of a quartz material used in a crystal oscillator circuit stating the function of each component. (4marks)
- Explain any two factors that affect the frequency stability of an oscillator and state how they can be minimized. (6marks)
- With the aid of a circuit diagram explain the operation of an R-C oscillator. (8marks)
- State any two applications of a crystal oscillators. (2marks)

Question TWO

- Explain with the aid of appropriate diagrams the following terms as applied in photocells
 - Photo emissive
 - Photo conductive
 - Photo resistive(9marks)

- b) With the aid of a circuit diagram and waveforms explain the operation of an a stable multivibrator (8marks)
- c) State any three (3) applications of photocell. (3marks)

Question THREE

- a) Explain the following terms as applied in an operational amplifier
 - i. Offset voltage
 - ii. CMRR

(4marks)
- b) Draw an non inverting circuit and derive the equation for its voltage gain (6marks)
- c) Explain the operation of an operational amplifier operating as an integrator.(6marks)
- d) Assuming that the op-amp in the circuit in figure1 is ideal. Determine the value of R_2 so that the magnitude of closed-loop gain, =4 when $R_1 = 1.5 \text{ k}\Omega$. (4marks)

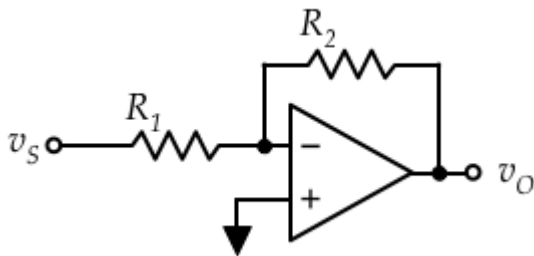


Fig. 1

Question FOUR

- a) Define the terms
 - i. Clipping
 - ii. Clamping

(4marks)
- b) With the aid of a circuit diagram and waveforms explain the operation of a clamping circuit (7marks)
- c) Explain how Zener diodes can be used to clip a sinusoidal waveform. (5marks)
- d) State any two applications of clippers and clampers (4marks)

Question FIVE

a) With the aid of a block diagram differentiate between regenerative and degenerative feedback

(4marks)

b) Draw the Block diagrams of the following types of negative feedback and explain their operation.

- i. Current-Shunt Feedback
- ii. Voltage-Shunt Feedback

(8marks)

c) Derive the output voltage equation of a series voltage negative feedback (4marks)

d) With a negative voltage feedback, an amplifier gives an output of 10 V with an input of 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate

- (i) gain without feedback
- (ii) feedback fraction

(4marks)