



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND TERM EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

ANALOGUE ELECTRONICS II

DATE: 10/6/2021

TIME: 8.30-11.30 AM

INSTRUCTIONS

1. *All Questions compulsory*
2. *Neat work required*

QUESTION ONE

- a) Briefly explain feedback in amplifiers (5 marks)
- b) Give an expression for negative feedback in electronic circuits (3 marks)
- c) Explain any **THREE** types of negative feedback (12 marks)

QUESTION TWO

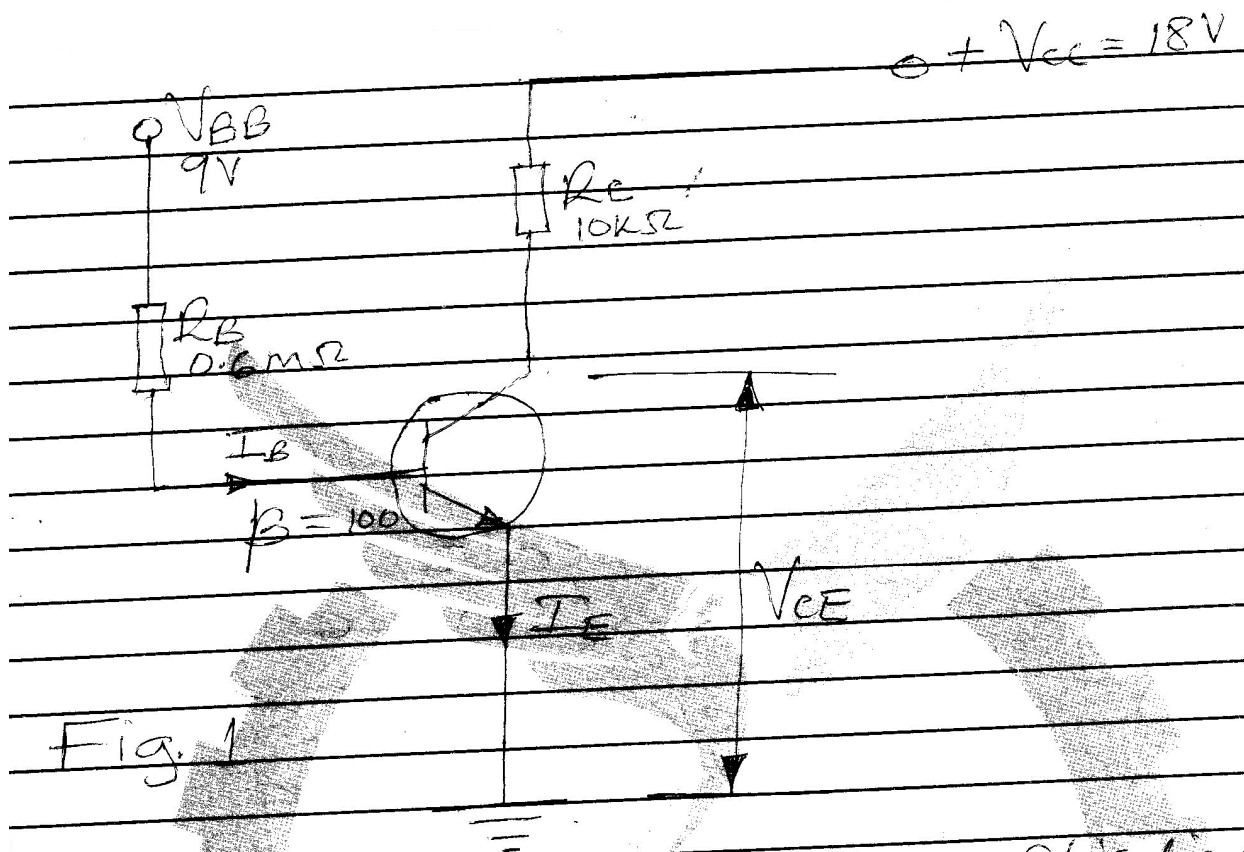
- a) In a current - series feedback circuit, the feedback resistor and load resistor are 10Ω and 5Ω respectively. Find the feedback factor (β) (5 marks)
- b) An inverting amplifier has a gain without feedback of 500. If R_1 and R_2 are the output resistors with values $220k\Omega$ and $3.3k\Omega$ respectively.
 - i. Draw the circuit diagram
 - ii. Calculate the voltage gain with feedback (10 marks)
- c) Describe a push - pull amplifier (5 marks)

QUESTION THREE

- a) Explain the operation of uni-junction Transistor (3 marks)
- b) A transistor is operated in common emitter mode. If the transistor is operated with $I_B 30 \mu A$, load resistor $1.2 k\Omega$ and supply voltage of 18v. Determine
- The quiescent values of collector voltage and current respectively
 - The peak to peak voltage, that would be produced by an input signal of $40 \mu A$
- (12 marks)
- c) Show how a photo cell is applied as a street lighting sensor (5 marks)

QUESTION FOUR

- a) Define an oscillator (2 marks)
- b) State **FOUR** parameters of an Amplifier affected by negative feedback (4 marks)
- c) Figure 1 shows a transistor circuit. Using the values given calculate:-
- Base current I_B
 - Current I_C
 - Emitter current I_E
 - Collector emitter voltage V_{CE}
- (12 marks)



d)

State any TWO applications of amplifiers

(2 marks)

QUESTION FIVE

- Differentiate between low pass filters and high pass filters (1 mark)
- State one application of filters (1 mark)
- State THREE photo detector characteristics (6 marks)
- Explain the principal operation of photo detectors (6 marks)
- With aid of a diagram describe the operation of a dynamic microphone (6 marks)