



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

CERTIFICATE IN TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING (CEEE2)

EEE 1101

ANALOGUE ELECTRONICS

END OF SEMESTER EXAMINATIONS

SERIES: APRIL 2016

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- 1) You should have the following for this examination;
 - Answer booklet
 - Non-programmable calculator
- 2) Answer any **THREE** Questions

QUESTION ONE

- a) 1 State four factors that affect the stability of a transistor amplifier
2 Two possible effects of excessive shift of the Q-point of a Transistor amplifier. 6 Marks
- b) Sketch a labeled output Characteristics curves of a common emitter and show the cut off and Saturation regions 7 Marks
- c) A transistor amplifier operating in Class A mode has the following characteristics $\Delta I_c = 1\text{mA}$, $R_e = 6\text{K}\Omega$, $\Delta I_b = 100\text{mA}$, $V_{ce} = 5\text{V}$, and $V_{cc} = 12\text{Volts}$. Calculate the current Gain 'B' and the value of the Emitter Current (I_e) 7 Marks

QUESTION TWO

- a) 1 Define the following as applied to Semi conductor theory
1. Doping
2. Extrinsic Semi conductor 3 Marks
- b) With the aid of diagrams, describe how a P-N Junction is formed. 6 Marks
- c) A crystal diode having internal resistance of 200Ω , is used for half wave rectification. If the applied Voltage is $V = 50\sin\omega t$, and the Load resistance is $R_L = 800\Omega$, Find
1. I_m, I_{dc}, I_{rms}
2. Ac power input and dc power output
3. Dc output Voltage
4. Efficiency of rectification 11 Marks

QUESTION THREE

- a) Using sketches explain the operation of the following classes of Amplifiers
Classes A, B, C. 9 Marks
- b) State any three comparisons between BJT and FET. 3 Marks
- c) With the aid of diagrams, describe the construction and operation of an enhancement mode MOSFET. 8 Marks

QUESTION FOUR

- a) With the aid of diagrams describe the construction and operation of a Cathode Ray tube employing magnetic focussing and deflection system. 11 Marks
- b) 1 Explain the function of the Time base in a CRO.
2 Explain how time base can be used to display an alternating waveform on an Oscilloscope. 9 Marks

QUESTION FIVE

- a) Draw a diagram of a full wave bridge rectifier and describe its operation. 10 Marks
- b) Explain the Principle of the following types of Filters
1 Shunt Capacitor
2 π - Filter 10 Marks

QUESTION ONE

- a) State the conditions for maintaining Oscillations in feedback Amplifiers. 4 Marks
- b) Explain any three factors which influence frequency Stability of an Oscillator 6 Marks
- c) State remedies for the factors in b above 10 Marks

QUESTION TWO

- a) Define the following as applied to Semiconductor theory
 - 1 Doping
 - 2 Extrinsic Semi-conductor 4 Marks
- b) With the aid of diagrams, describe how a P-N Junction is formed. 6 Marks
- c) 1 With the aid of diagrams, describe the Construction of paper dielectric capacitor 5 Marks
- 11 Give ONE advantage of Silvered Mica Capacitor over Stacked Mica capacitors 5 Marks

QUESTION THREE

- 3 Using sketches explain the operation of the following classes of Amplifiers
 - Classes A, B, C. 9 Marks
- 4 State any three comparisons between BJT and FET. 3 Marks
- 5 With the aid of diagrams, describe the construction and operation of an enhancement mode MOSFET. 8 Marks

QUESTION FOUR

- c) With the aid of diagrams describe the construction and operation of a Cathode Ray tube employing Electric focussing and deflection system. 11 Marks
- d) 1 Explain the function of the Time base in a CRO.
- 2 Explain how time base can be used to display an alternating waveform on an Oscilloscope. 9 Marks

QUESTION FIVE

- c) Draw a diagram of a full wave bridge rectifier and describe its operation. 10 Marks
- d) Explain the Principle of the following types of Filters
 - 1 Shunt Capacitor
 - 2 π - Filter 10 Marks