(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS

FOR DIPLOMA
IN
ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE CODE: DEE 073

COURSE TITLE: ELECTRONICS II

DATE: Wednesday 20th April, 2022   **TIME:** ~~12.00 p.m – 2.00 p.m~~ 8.00AM – 10.00AM

INSTRUCTIONS TO CANDIDATES

ANSWER ALL QUESTIONS IN SECTION A AND TWO QUESTIONS IN SECTION B.
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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MASINDE MULIRO UNIVERSITY OF SCIENCE & TECHNOLOGY

DEE 073: Electronics II

SECTION A (30 MARKS): Answer ALL questions

1. With reference to an amplifier, define the following terms:
   i)   Amplification   (1 mk)
   ii) Gain   (1 mk)
   iii) Bandwidth   (1 mk)

2. An amplifier is rated at 12V, 50Hz with an input power of 20W. The output power and voltage is 16000W and 236V respectively. Calculate:
   a) Power gain in dB   (2 mks)
   b) Voltage gain in dB   (2 mks)
   c) Current gain in dB   (2 mks)

3. Define an operational amplifier.   (2 mks)

4. Define the following terms with respect to op-amps:
   i) Slew rate   (2 mks)
   ii) Common mode rejection ratio (CMRR)   (2 mks)

5. Explain the concept of virtual ground in op-amps.   (4 mks)

6. State FIVE characteristics of an ideal op-amp.   (5 mks)

7. a) The figure below shows the symbol of a semiconductor device. Explain its operation.
                                                                              (4 mks)
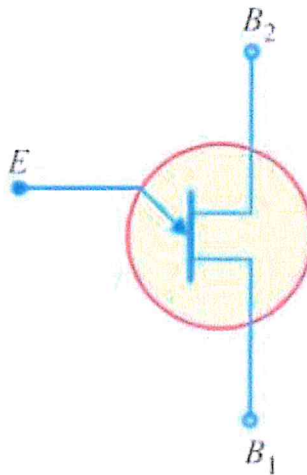
b) The intrinsic stand-off ratio for a UJT is 0.6 and the inter-base resistance is 10kΩ. Determine the values of r_{B1} and r_{B2}.   (2 mks)

SECTION B: Answer any TWO questions

8. a) With the aid of an appropriate circuit diagram, explain how a transistor can be used to amplify a signal. (10 mks)

   b) Derive the h-parameter current gain equation for a transistor amplifier. (10 mks)

9. a) Define a tuned amplifier. (1 mk)

   b)A parallel resonant circuit has a capacitor of 250pF in one branch and inductance of 1.25mH plus a resistance of 10Ω in the parallel branch.
   Find:
   i)   resonant frequency (3 mks)
   ii) impedance of the circuit at resonance (3 mks)
   iii) Q-factor of the circuit. (3 mks)

   c) Explain why tuned circuits are not used for low frequency amplification. (4 mks)

   d) Draw the circuit of a double tuned amplifier and hence its frequency response curve. (6 mks)

10. a)Define a multivibrator. (1 mk)

    b) Using an appropriate diagram, explain the operation of a transistor monostable multivibrator. (10 mks)

    c) In a differentiating circuit, R = 10 kΩ and C = 2.2 μF. If the input voltage goes from 0 V to 10 V at a constant rate in 0.4 s, determine the output voltage. (4 mks)

    d)Using a relevant circuit diagram and waveforms, explain the operation of a positive clipper. (5 mks)