

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
THE ORGANISATION OF THE ISLAMIC COOPERATION (OIC)

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DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

Mid Semester Examination

Summer Semester, A.Y. 2022-2023

Course No.: EEE 4203

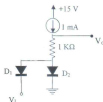
Time: 90 Minutes

Course Title: Electronics I

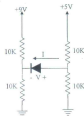
Full Marks: 75

Answer all questions. Assume reasonable value for any missing data. Programmable calculators are not allowed. Figures in the margin indicate marks of the part questions. Do not write on this question paper. COs and POs are given in the margin.

- 1(a) (i) Find V_o and I for the circuit shown in in the following figure, V_i is a 1 kHz, 10-V peak sine wave, sketch the wave form resulting at V_o . Mention its positive and negative peak values. Diodes are ideal.

6+6
[CO1
PO1]

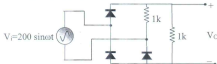
- (ii) Find V and I for the following circuit.



- (b) Design a battery charger circuit using any rectifier to supply a dc load voltage of 6 volt and dc load current of 0.5 A. The available source is the 230 Volt (rms), 50 Hz supply. (Find turn ratio of the transformer, PIV and ac current rating of each diode). Use ideal diodes in your design.

13
[CO2
PO1,PO2]

2. (a) Following circuit can be used to have dc power supply. Sketch the wave shape of the output voltage V_o of the following rectifier circuit and find the average value of the output voltage to get a primitive power supply.

06
[CO2
PO1,PO2]

(b) Sketch the output wave shapes for the following

06

[CO2

PO1,PO2]

(i) Clipper



(ii) Clamper



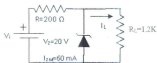
06

[CO2,PO1]

(c) Determine the range V_i that will maintain the Zener diode of the circuit shown in the following figure in the "on" state.

07

[CO1 ,PO2]



3.(a) Write down at least five major differences between the Bipolar junction transistor (BJT) and Field effect transistor (FET).

05

[CO1,PO1]

(b) Sketch the transfer characteristics for an n-channel depletion-type MOSFET with $I_{DSS} = 10 \text{ mA}$ and $V_P = -4 \text{ V}$.

08

[CO2,PO1)]

(c) Illustrate the basic construction of a p-channel JFET. For $V_{GS} = 0V$, briefly describe the working principle of p-channel JFET. Apply the proper biasing between drain and source and sketch the drain characteristics curve for different values of V_{GS}

12

[CO2,PO1)]