SASTRA
DEEMED TO BE UNIVERSITY
THANJAVUR | KUMBAKONAM | CHENNAI

School of Electrical and Electronics Engineering
CIA I Examinations April 2022
Course Code: EIE110
Name: Principles of Electronics
Duration: 90 Min Max Marks: 50

ANSWER ALL THE QUESTIONS

PART – A 10 x 2 = 20 Marks

1 How do you classify the materials, based on the number of valence electrons?

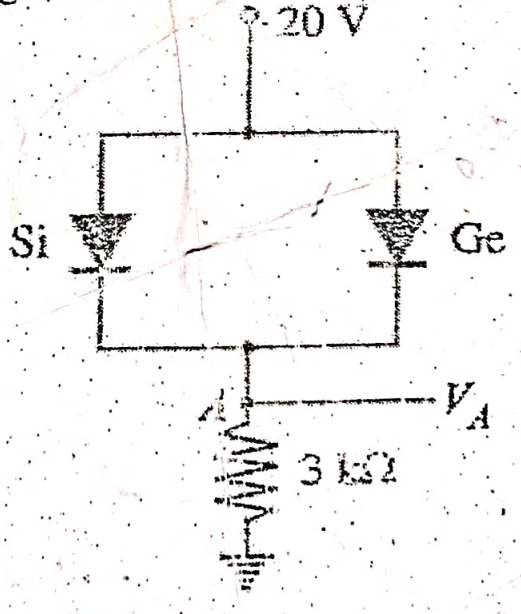
2 Draw the diagrams showing the Fermi energy levels in the p type and n type semiconductors.

3 Differentiate drift and diffusion currents in the semiconductors.

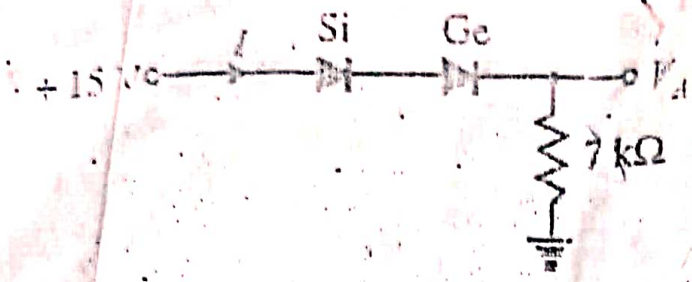
4 'P' type and 'N' type materials are joined together. Explain in detail what is happening at the junction?

5 Name the two types of breakdowns occur in diodes. Explain both briefly.

6 Determine the voltage V_A for the following circuit



7 Determine the voltage V_A and the current through the resistor for the following circuit.



8 Briefly explain the application of Zener diode.

9 With neat sketch explain briefly, the working of half wave rectifier.

10 How does the resistance of a diode change if it is connected in forward and reverse bias conditions? Explain it for both ideal and practical cases.

PART – B **3 x 10 = 30Marks**

11 After entering the Electronics lab, you have been asked to study the relationship between the current through a PN junction diode, when the voltage across the diode is introduced in the following two fashions. i) Potential at anode is more positive than cathode, ii) Potential at cathode is more positive than anode. With necessary sketches and relevant graphs, explain in detail the study of the given diode.

12 A single diode having ideal characteristics is used in the rectification circuit supplying a resistive load of 1000Ω. The input voltage is 250 V, 50 Hz AC. Determine the i) RMS value of the current, ii) Power dissipated in the load.

13 Two identical semiconductor devices are connected in a circuit to rectify both positive and negative half cycles of the input sinusoidal signal. With necessary sketches derive the expressions for, a) Average value of the current, b) RMS value of the current, c) Rectifier efficiency, d) Ripple factor.

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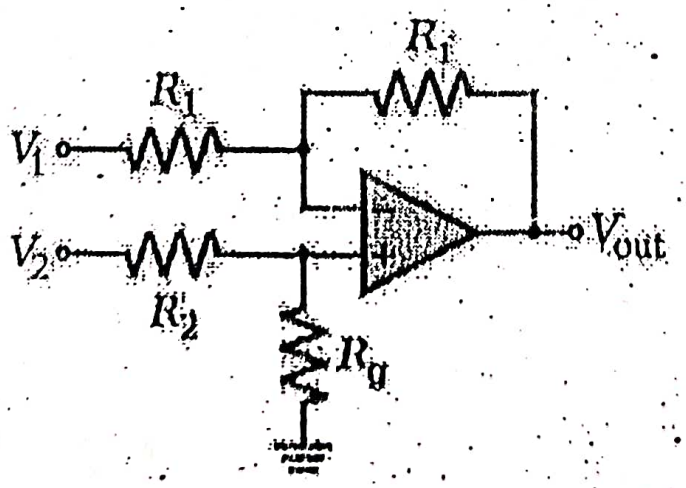
CIA II Examinations May 2022
Course Code: EIE110
Name: Principles of Electronics
Duration: 90 Min Max Marks: 50

PART – A 10 x 2 = 20 Marks

ANSWER ALL THE QUESTIONS

1 On studying the BJT, what do you understand about the area and doping of different terminals?
2 Analyze the effect of output voltage on the input characteristics of common base transistor configuration.
3 Obtain the current gain of a transistor under CE configuration in terms of current gain of CB transistor
4 What is meant by pinch off voltage?
5 List the ideal characteristics of operational amplifier.
6 Differentiate E-MOSFET with DE-MOSFET
7 Select suitable values of R_1,R_2,R_f,R_g, to get $V_{out} = 30(V_2-V_1)$



8 An inverting amplifier having a feedback resistance of 50 KΩ and an input resistance of 1 KΩ is given an input voltage of 1V. Determine the output voltage of this amplifier.
9 Draw the circuit of an integrator using Op-Amp and derive the output equation of the same.

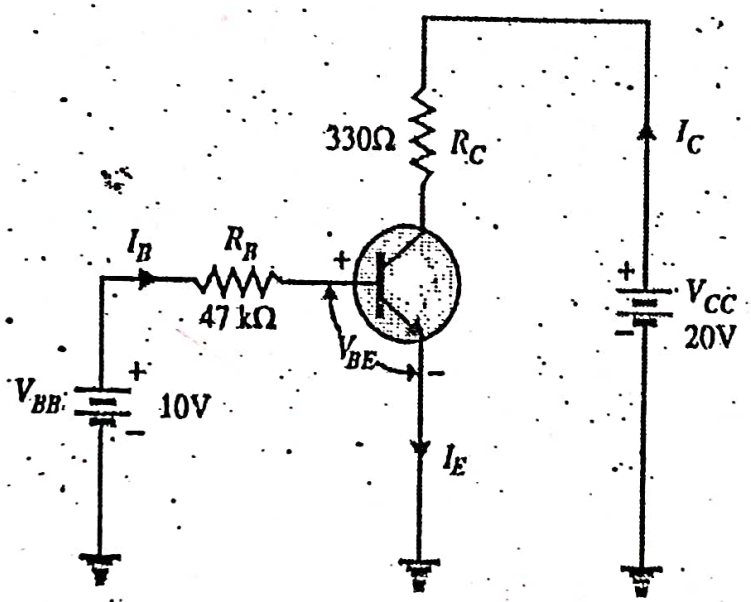
10 Draw the circuit diagram of a subtractor that gives the output voltage of V_1-V_2, where V_1 and V_2 are the voltages given at noninverting and inverting input terminals respectively.

PART – B 3 x 10 = 30Marks

ANSWER ANY THREE QUESTIONS

11 A bipolar junction transistor is used for an amplification purpose. This transistor is configured in such a way that the current gain is more than 50. Before using this transistor for the application, study its different characteristics by properly biasing. Draw the necessary circuit and relevant graphs.

12 For the following transistor circuit, determine the collector current and collector emitter voltage if the current gain of the transistor is 200. The transistor is made of silicon material. Draw the DC load line also.



13 A transistor having a metal oxide layer in it, possesses a N channel (before biasing) for the flow of electrons. Identify this transistor. Study different characteristics of the same. Draw necessary circuit diagrams and relevant graphs.

14 Draw a circuit diagram that gives the output voltage of $-(V_1+V_2+V_3)$, if the input voltages are V_1, V_2, V_3. Also derive this output for the drawn circuit, with necessary expressions. Arrive the condition under which the same circuit gives $-10(V_1+V_2+V_3)$.

SASTRA
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School of Electrical and Electronics Engineering
CIA III Examinations June 2022
Course Code: EIE110
Name: Principles of Electronics
Duration: 90 Min Max Marks: 50

PART – A 5 x 2 = 10 Marks

ANSWER ALL THE QUESTIONS

1 Compare Avalanche and Zener breakdowns in the PN junction diode.

2 Derive the input and output loop equations for the fixed bias transistor circuit.

3 State DeMorgan's first and second theorem applied to Boolean algebra.

4 What is the application of voltage follower using Op Amp? Draw its circuit.

5 Design half subtractor circuit with necessary truth table and logic diagram.

PART – B 3 x 10 = 30Marks

ANSWER ANY THREE QUESTIONS.

6 Draw the circuit of voltage divider bias applied to the BJT. With necessary expressions, explain in detail the input and output loops for the same.

7 With necessary circuit diagrams and waveforms explain the working of inverting and non-inverting comparators using operational amplifiers

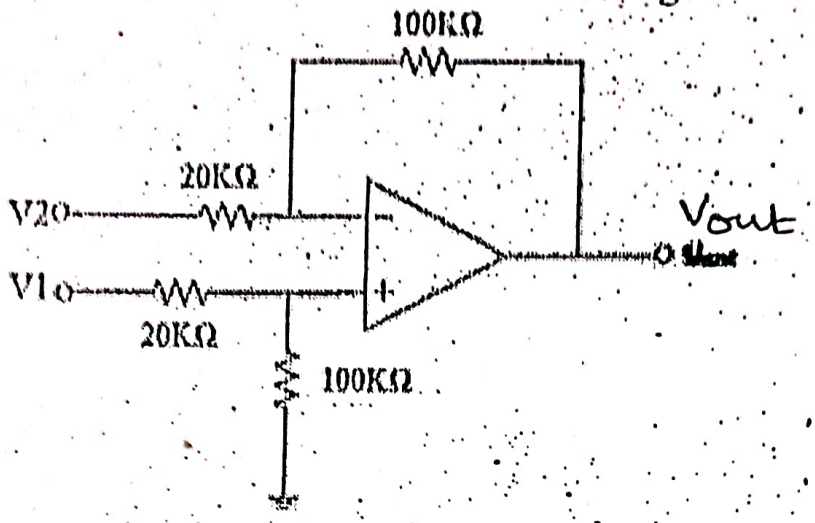
8 Design a full adder circuit that sums three binary inputs and gives two outputs (ie., sum and carry). Realize the Boolean expression obtained from the design using logic gates

9 Simplify the Boolean function given by $F(A,B,C,D)=\sum(0,1,2,4,5,6,8,9,12,13,14)$ using K map.

PART – C 1x 10 = 10 Marks

10

a. Determine Vout for the following circuit



b. Design and implement 4 to 1 line multiplexer using logic gates.