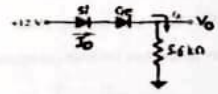
a V[illegible]wa[illegible]alaya Institution of Engineering and Technology
BE I Year EXAMINATION Feb-March 2022
CS(A), CS(B), and all EX
ETRIC4: BASIC ELECTRONICS

Time 3 Hours **Max. Marks: 60**

Note: Attempt any two part from each question.

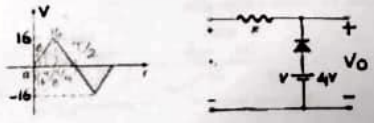
Q.1 (a) Write down difference between following. (6)
I. n-type and p-type semiconductor materials.
II. donor and acceptor impurities.
III. majority and minority carriers.

(b) Determine V_o and I_D for the given circuit. (6)

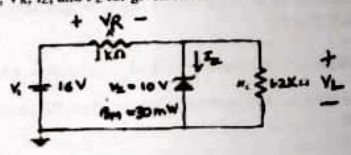


(c) Draw the V-I characteristics of Silicon diode, Zener diode, LED, Photo diode and ideal diode. (6)

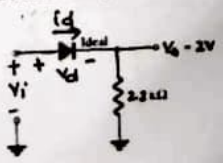
Q.2 (a) Determine Vo for the given network. (6)



(b) Determine V_L, V_R, I_Z, and P_Z for given circuit. (6)

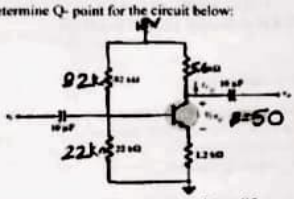


(c) Assuming an ideal diode, sketch vi, vd, and id for the half-wave rectifier of Fig. The input is a sinusoidal waveform with a frequency of 60 Hz. Repeat, Problem with a silicon diode (VT =0.7 V). (6)



Q.3 (a) I. Sketch Output characteristic of BJT in Common Base configuration. What kind of information does it reveals? (6)
II. Derive expressions for Stability Factors S, S' and S'' for BJT in Collector to Base bias configuration.

(b) I. Determine Q- point for the circuit below: (6)



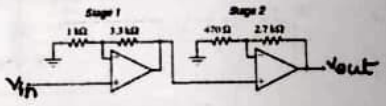
II. Classify and State different types of Amplifiers.

(c) Explain working of BJT Differential Amplifier circuit. (6)

Q.4 (a) Explain with necessary circuits how OP-AMP can be used to filter different frequency signals (6)

(b) It is require to implement the function C = 4 * (A- B) in hardware, where A and B are two voltage sources and C is the output voltage. Draw and explain the circuit to meet the same. (6)

(c) Calculate the voltage gain for each stage of this amplifier circuit, then calculate the overall voltage gain: (6)



Q.5 (a) Sketch and explain re model for BJT in CE configuration. State relation between α, β and γ. (6)

(b) Compare positive and negative feedback with the help of block diagram. (6)

(c) State the purpose of using Schmitt Trigger. Draw the circuit and Explain the same. (6)

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BE I year Computer Engineering B
Subject Name:- Basic Electronics
Subject Code:- 1ETRC4

Time: 3 hours **Max Marks:60**

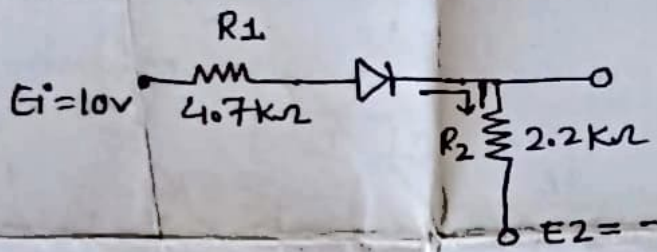
Note:- All question carry equal marks. Attempt any two part from each question

Q.1 a) Draw the ideal diode V-I characteristic and explain the working of the PN junction diode (6)

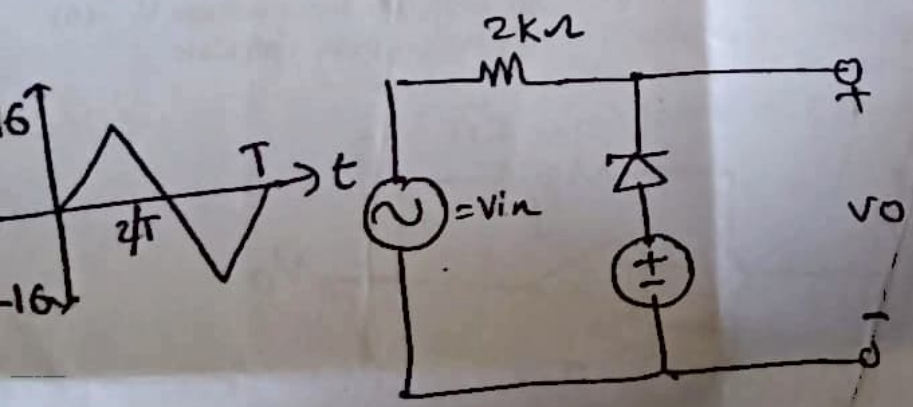
b) Consider a pn junction at equilibrium at room temperature (T=300K) for which the doping concentrations are Na = 10^{12}/cm^3 and Nd = 10^{11}/cm^3 and the cross-sectional area A=10^{-2}cm^2. Calculate p_{p0}, n_{p0}, n_{n0}, p_{n0}, V_0, W, xn, xp and Qj. Use ni=1.2x10^9/cm^3. (6)

c) Derive the diode current equation and what parameters it depends on. (6)

Q.2 a) Determine I_D, I_{R1},I_{R2},V_0,V_{R1} and V_{R2} use practical diode model. (6)

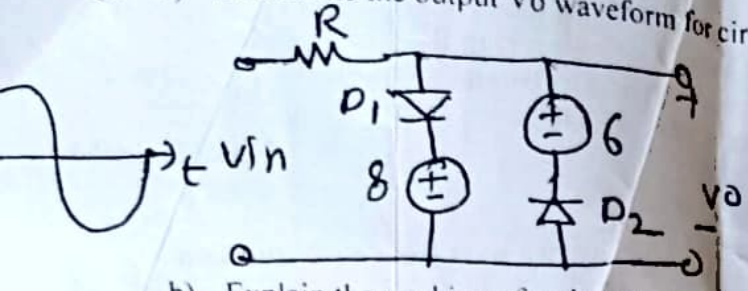


b) Determine the output vo waveform for circuit below.



c) Explain the working of a full wave bridge rectifier with the help of a circuit diagram. Also, draw output waveform

Q.3 a) Determine the output Vo waveform for circuit below. (6)



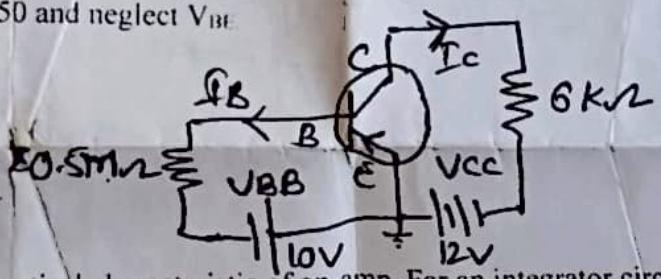
b) Explain the working of a photodiode and Zener diodes. Derive ripple factor equation for full wave rectifier. (6)

c) Explain the working of Photodiode and Zener with the help of V-I characteristic (6)

Q.4 a) . Draw the different configurations of the PNP transistor. Explain the following: (6)
(1) Why is the collector wider than the emitter and base.?
2) why is a transistor low-powered device?

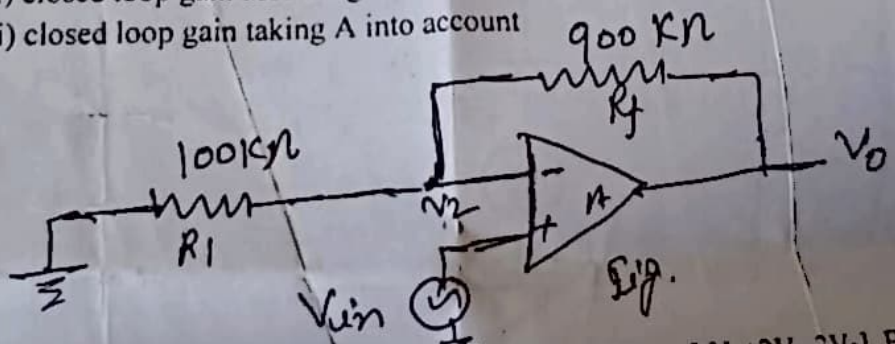
b) Define dc alpha and ac alpha. A transistor has I_B= 105μA and I_C = 2.05mA. find (1) β, (2) α, (3) I_E (6)

c) For the circuit shown in fig. draw the dc load line and locate the dc working point. Assume β=50 and neglect V_{BE} (6)



Q.5 a) Write the practical characteristic of op-amp. For an integrator circuit V1(t) = 1sin ωt. If R1 =4KΩ and C=2μF. find V0 at ωt = π /2, if V0(0) and ω = 1MHz. (6)

b) A non-inverting amplifier is shown in fig.. the loop gain A=50,000. Input voltage V_i =0.5V average d.c with a.c sine wave component of 0.3V peak to peak. Calculate (6)
(i) closed loop gain assuming A= Infinite and
(ii) closed loop gain taking A into account



c) Sketch the circuit of summer using OP-AMP to get $V_O = -[-V_1+2V_2-3V_3]$. Explain the virtual ground concept in an OP-AMP. (6)