a Vidyalaya Institution of Engineering and Technology

BE I Year EXAMINATION Feb-March 2022

CS(A), CS(B), and all EX

ETRIC4: BASIC ELECTRONICS

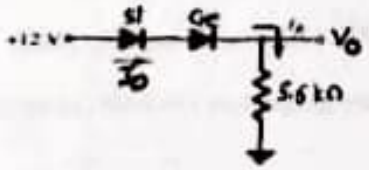
Time 3 Hours **Max. Marks: 60**

Note: Attempt any two part from each question.

Q.1 (a) Write down difference between following. (6)

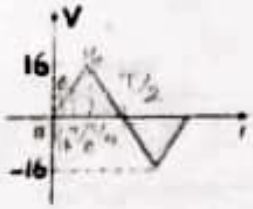
I. n-type and p-type semiconductor materials.
II. donor and acceptor impurities.
III. majority and minority carriers.

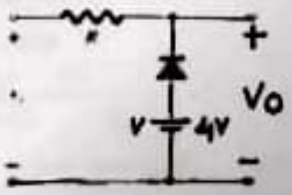
(b) Determine V_o and I_D for the given circuit. (6)



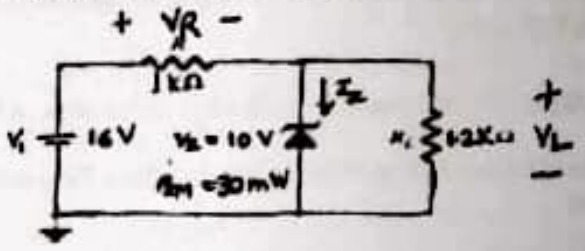
(c) Draw the V-I characteristics of Silicon diode, Zener diode, LED, Photo diode and ideal diode. (6)

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

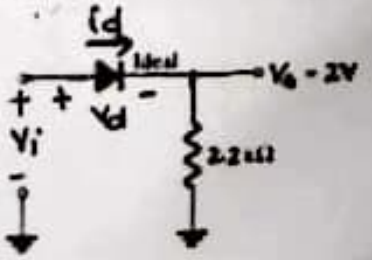




(b) Determine V_L, V_R, I_Z, and P_Z for given circuit. (6)



(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)



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

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

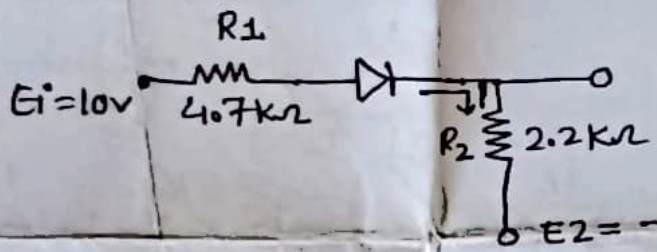
Note:- All question carry equal marks. Attempt any two part from each question

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

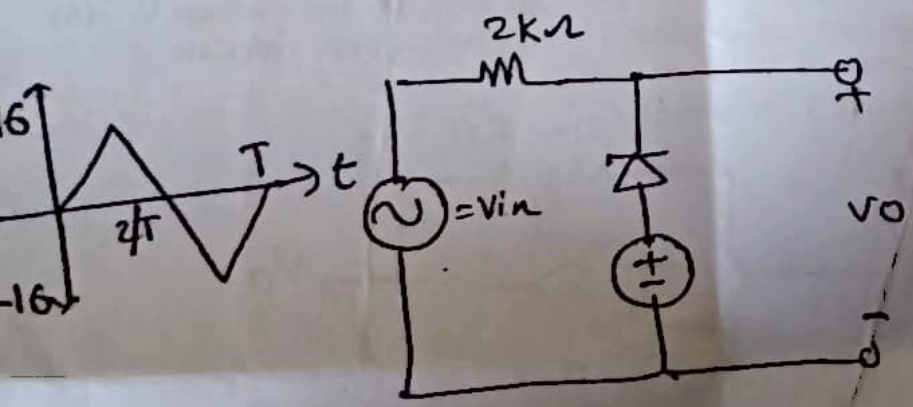
b) Consider a pn junction at equilibrium at room temperature (T=300K) for which the doping concentrations are Na = 10^{12}/cm^3 and Nd = 10^{11}/cm^3 and the cross-sectional area A=10^{-2}cm^2. Calculate p_{p0}, n_{p0}, n_{n0}, p_{n0}, V_0, W, xn, xp and Qj. Use ni=1.2x10^9/cm^3. (6)

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)

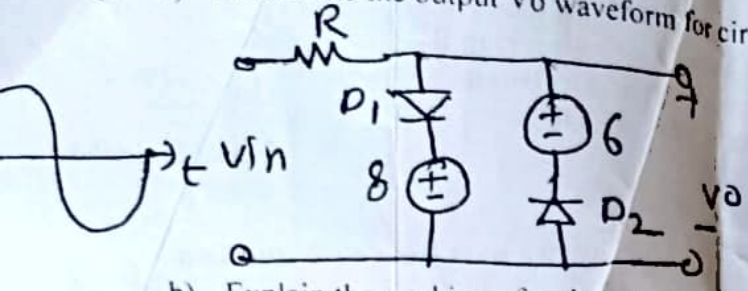


b) Determine the output vo waveform for circuit below.



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)



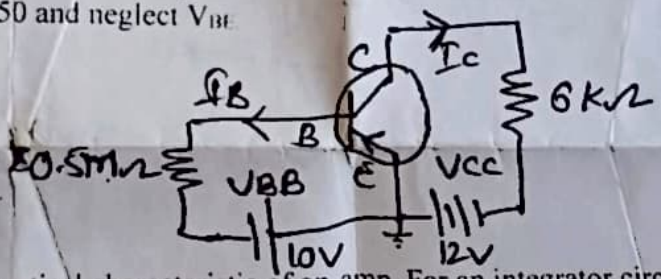
b) Explain the working of a photodiode and Zener diodes. Derive ripple factor equation for full wave rectifier. (6)

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?

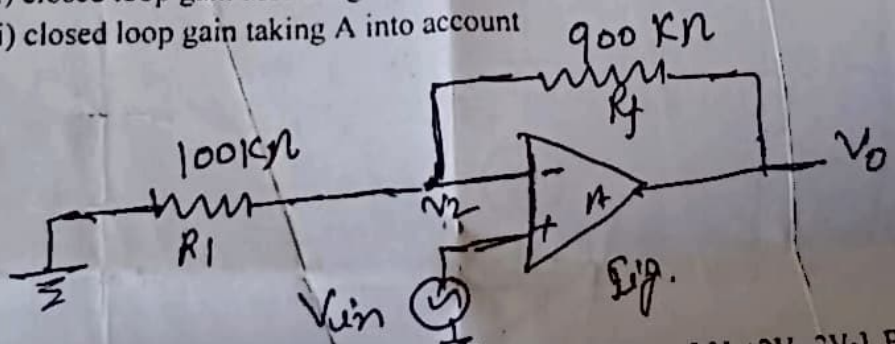
b) Define dc alpha and ac alpha. A transistor has I_B= 105μA and I_C = 2.05mA. find (1) β, (2) α, (3) I_E (6)

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)