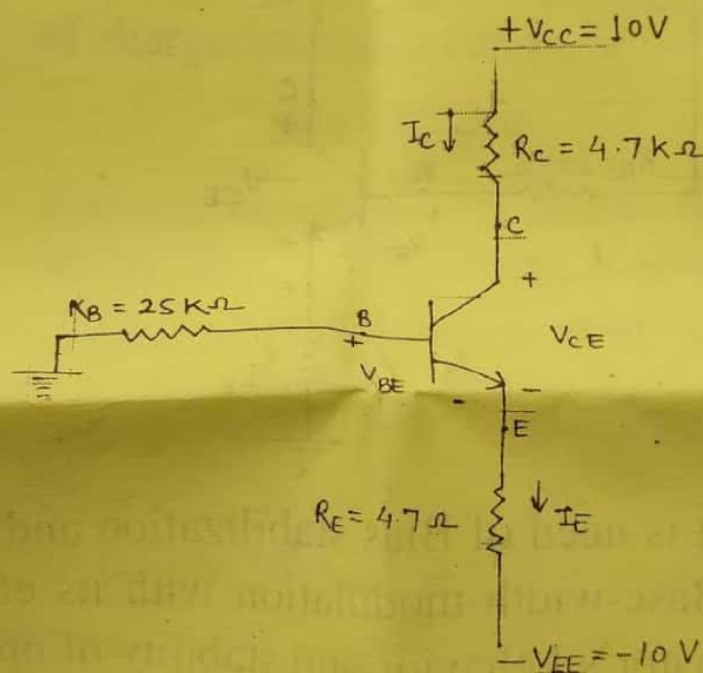b) How transistor work as an Inverter and Switch. 4

8. a) Derive the general equation of oscillator circuit and find out the frequency of oscillation for colpitt oscillator.   6

b) The emitter-bias circuit of an NPN transistor is depicted in fig4. Explain how the Q-point changes when the value of P changes from 60 to 100. Assume $V_{BE}=0.7V$ 6

9. a) Write short notes on (Any three)   9

i) RC phase shift oscillator

ii) Wein Bridge Oscillator

iii) Construction & VI characteristic of E-MOSFET

iv) Voltage Divider Biasing

b) How oscillator circuits are categorized? Find out necessary condition for sustained oscillation and positive feedback in oscillator circuits.   3

b) Figure 3 shows the fixed bias with emitter feedback circuit. Determine the base current, collector current, collector-to-emitter voltage and stability factor of a biasing circuit as shown in Fig 3. Assume V_{BE}=0.7V and p=50. 4
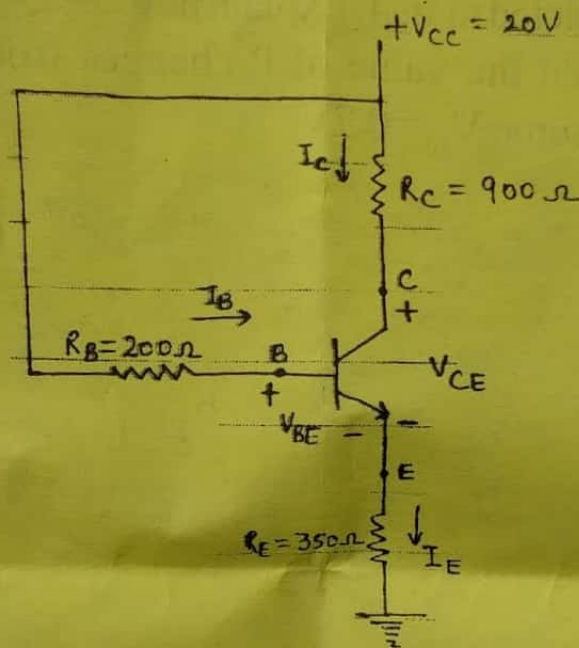
6. a) What is need of Bias stabilization and discuss the Base-width modulation with its effect on transistor's behavior and stability of operating point in detail. 6

b) A CB transistor amplifier has voltage source with R_s=750 Ω and load resistance R_L=1.5 Ω. The h-parameters are h_{ib}=25 Ω, h_{rb}=4x10^{-4}, h_{fb}=-0.98 and h_{ob}=0.2 μ A/V. Compute A_i, R_i, A_v, A_{vs}, A_{IS}, R_0, A_p 6

SECTION-C

7. a) Explain different types of coupling techniques for amplifier circuits. Discuss transfer coupled amplifier with its advantages over RC coupled amplifier. 8

3. a) A sample of pure Si semiconductor at 300K having a resistivity of 14.5×10^4 ohm-cm is doped with 3.5×10^{10} donor impurity atoms/cm³ and 1.25×10^{10} acceptor impurity atoms/cm³. When an electric field of 1000mV/cm is applied, determine the total conduction current density. Assume mobility of electron is 2500cm²/v-s and mobility of hole is 4500cm²/V-s. 6

b) Draw & Explin the generation & recombination of charge carriers in detail. 6

SECTION-B

4. a) Explain the Esaki Diode and discuss its V-I characteristic using energy band diagram. 5

b) Discuss the Miller theorem & its Dual in detail. 4

c) Determine the output waveform for the square waveform. 3
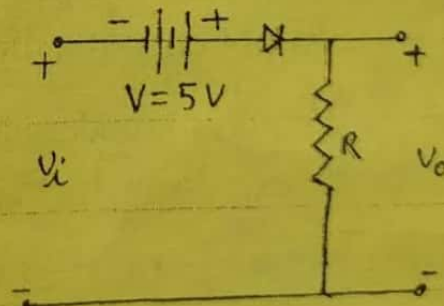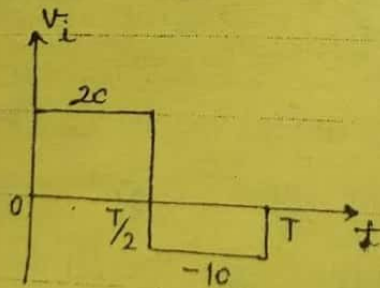
and find the output Voltage.

5. a) Draw and explain the H-model of CE configuration. Analyze the darlington transistor using h-parameter and also find out current gain, input impedence, output admittance and voltage gain. 8

B.Tech. (III Sem.)

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Engg 202

B.TECH. (THIRD SEMESTER)
EXAMINATION, DECEMBER - 2019

ENGG 202- Basic Electronics

Time Allowed : 3 HOURS

Maximum Marks : 60

Attempt five questions in all, selecting not more than two questions from each Section. All questions carry equal marks.

SECTION-A

1. a) Write any four differences between Active & passive electronic components. Write the construction of Electrolytic capacitor with applications & limitations.   6

   b) Draw and explain the different current components of a diode in detail.   6

2. a) What do you understand by diode capacitance. Derive the expression for transition capacitance.   6

   b) Determine ID_2 & voltage V_0 in the following circuit assuming each diode as Si. :   6