



FIRST SEMESTER (PROPER/REPEAT)

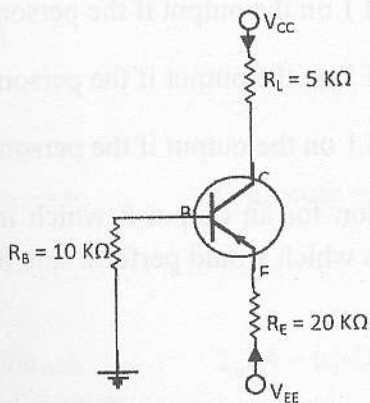
(DECEMBER 2008)

PH 301 ELECTRONICS II

Time: 01 hour.

Answer ALL Questions

- Describe the function of a bipolar junction transistor. Sketch and explain the input and output characteristics curves of a transistor.



In the above common emitter *npn* transistor circuit, $R_B=10\text{ K}\Omega$, $R_L=05\text{ K}\Omega$, $R_E=20\text{ K}\Omega$, $V_{CC}=30\text{ V}$, $V_{EE}= -30\text{V}$ and common-emitter forward transfer ratio $\beta = 200$. Neglect the voltage drop between base and emitter terminals and find:

- Emitter current
- Base current
- Collector current
- Voltage drop between collector and emitter terminals.

2. Using the Boolean Algebra, show that

$$(a) A\bar{B}\bar{C} + A\bar{B}C + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + C = \bar{B} + C$$

$$(b) C(\bar{A} + \bar{C}) + C(\bar{A} + \bar{B}) + A\bar{B}C + ABC = \bar{A}\bar{C} + C$$

$$(c) A + \bar{A}B = A + B$$

$$(d) A\bar{B}\bar{C} + A\bar{B}C + \bar{A}BC + ABC + A\bar{B}C = A + BC$$

$$(e) AB + \bar{A}\bar{C} + A\bar{B}C(AB + C) = 1$$

Establish Truth- Tables for NOR, NAND and NOT logics.

A person is entitled to apply for a certain job if he/she is;

(a) a woman over the age of 40

(b) a married man

Three switches are provided to test the entitlement;

Switch A puts logical 1 on the output if the person over 40.

Switch B puts logical 1 on the output if the person is male.

Switch C puts logical 1 on the output if the person is married.

Write down a logical equation for an output F which indicates entitlement and draw suitable arrangement of gates which would perform this function.