Answers

4) ac load (R_{AC}) = $R_c \parallel R_L$

$$= \frac{2 \times 0.5}{2 + 0.5}$$

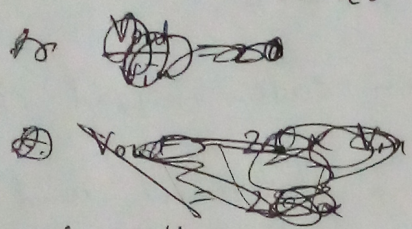
$$= \frac{1}{2.5} \text{ k}\Omega$$

Voltage gain = $\beta \times \frac{R_{AC}}{R_{in}}$

$$= 50 \times \frac{1/2.5}{1}$$

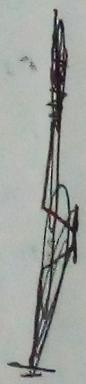
$$= \frac{50}{2.5}$$

$$= 20$$



∴ Voltage gain = 20

7)



$$I_1 = I_{EF} - 5 \text{ mA}$$

$$I = \frac{I_1}{1 + 2/\beta}$$

$$= \frac{5}{1 + \frac{2}{50}}$$

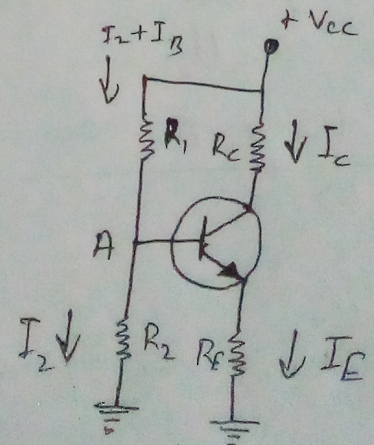
$$= 4.8 \text{ mA}$$

10) $V(B) = V_{cc} \times \frac{R_2}{R_1 + R_2}$

$$= 25 \times \frac{2.2}{(10 + 2.2)}$$

$$= 4.5 \text{ V}$$

$V(BE) = 0.7 \text{ V}$



$V(BE) = V(B) - V(E)$

$\Rightarrow 0.7 = 4.5 - V(E)$

$\Rightarrow V(E) = 3.8\ V$

18) Power gain = current gain × voltage gain

$= 132 \times 145$

$= 19140\ W$

$A_p = \frac{P_{out}}{P_{in}}$

$\Rightarrow 19140 = \frac{P_{out}}{32 \times 10^{-6}}$

$\Rightarrow P_{out} = 0.61\ W$

9) $A = 100$

$R_i = 10k\Omega$

$R_o = 20k\Omega$

$\beta = 0.1$

$R_{if} = 10 \times (1 + (0.1 \times 100))$

$= 110\ k\Omega$

$R_{of} = \frac{R_o}{1 + A\beta}$

$= \frac{20}{11} = 1.81k\Omega$

17) $S = 50$

$\Delta I_{co} = 1\mu A$

$\therefore S = \frac{I_c}{\Delta I_{co}}$

$I_c = S\Delta I_{co}$

$= 50 \times 1$

$= 50\ \mu A$

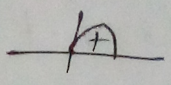
2) Gain - bandwidth product is always constant

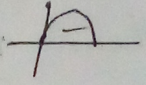
$4\ MHz = 40 \times x$

$\Rightarrow x = \frac{4 \times 10^6}{40}$

$= 10^5\ Hz$

$= 100\ kHz$

14) $V_R = 2V_p$ D_1 in conduction 

$V_R = 2V_p$ No diode in parallel 

19) A $A = 90$

$\beta = 0.005$ $A_f A = 0.45$

$A_f = \frac{A}{1 + \beta A}$

$= \frac{90}{1 + (0.005 \times 90)}$

$= 62.06$