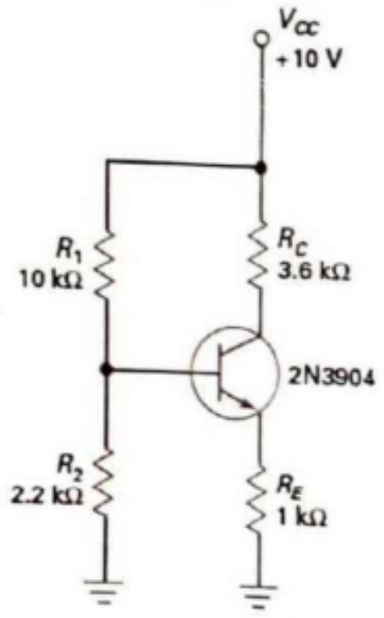
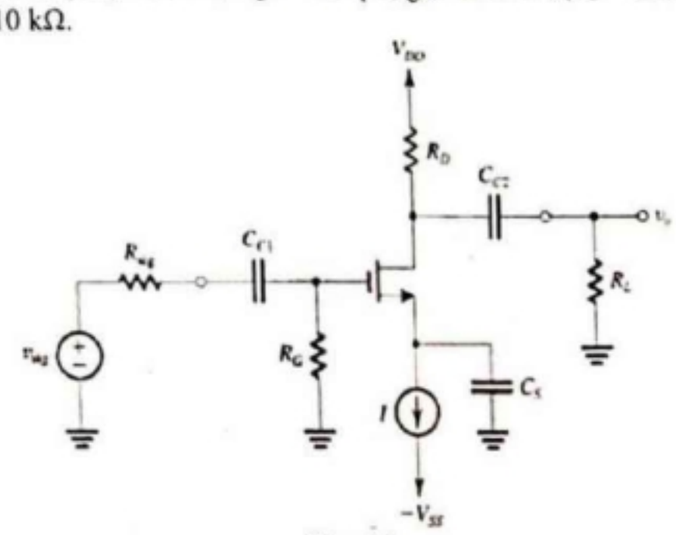
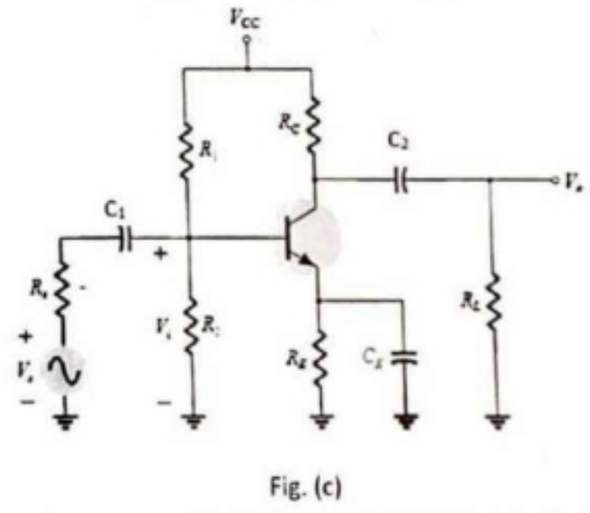
Answer all Questions

S.No.	Question	Marks	CO	BL
1	Determine the operating point and draw the load line for the circuit in Fig. (a). Assume $\beta = 150$ and $V_{BE} = 0.7$ V.  Fig. (a)	10	1	L3
2	Design the values for the coupling capacitors (C_1, C_2) and the bypass capacitor (C_s) for a common source amplifier for which $R_G = 10$ MΩ, $R_D = R_L = 12$ kΩ, $R_{sig} = 100$ kΩ, and $g_m = 1.5$ mA/V. It is required to have lower cut-off frequency at 500 Hz and that the nearest break frequency be at least a decade lower.	10	1	L3
3	a) Analyze the Common Source amplifier circuit given in the Fig. (b) and derive the expression for the mid-band voltage gain A_M. b) Calculate the mid-band voltage gain (A_M) using given specifications: $R_{sig} = 100$ kΩ, $R_G = 5$ MΩ, Cgs = 0.5 pF, $g_m = 2$ mA/V, $r_o = 100$ kΩ, $R_D = R_L = 10$ kΩ.  Fig. (b)	10	1	L3
4	Derive the expression for the upper 3-dB frequency (f_H) of the Common Emitter amplifier shown in Fig. (c). Calculate the numerical value of f_H for the given case: $I_C = 3.2mA, f_T = 10MHz, \beta = 150, R_S = 5k\Omega, R_1 = 10k\Omega, R_2 = 10k\Omega, R_C = 27k\Omega, R_E = 220\Omega, R_L = 5k\Omega, C_1 = 10\mu F, C_2 = 10\mu F, C_E = 47\mu F, C_\mu = 1nF, r_x = 47\Omega, r_o = 222k\Omega$.  Fig. (c)	10	1	L3
5	Design a class B power amplifier to deliver an average power of 20 W to an 8 Ω load. V_{CC} is selected to be 5V greater than the peak output voltage. Determine the supply voltage required, peak current drawn from each supply, total supply power, power conversion efficiency. Also determine the maximum power that each transistor must be able to dissipate safely.	10	2	L3