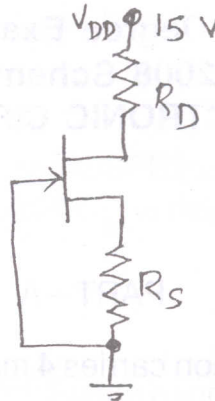




7. Design the circuit shown in fig. (2). Given $V_D = 6V$, $V_p = -4V$, $I_{DSS} = 16\text{ mA}$ and $I_D = 4\text{ mA}$.



fig(2)

8. Draw the high frequency hybrid π model of a BJT and explain.
 9. Explain short circuit current gain of a BJT.
 10. Why heat sink is used in power amplifiers ?

PART - B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module - I

11. Draw the circuit of an RC integrator and explain show that the output of the integrator is the integral of the input. Under what conditions does an RC circuit acts as an integrator ?
12. A full wave rectifier uses a double diode with each element having a constant forward resistance of 500Ω . The transformer rms secondary voltage from the centre tap to each plate is 300 V and the load has a resistance of $2.5\text{ K}\Omega$. Determine (i) dc output power (ii) ac input power (iii) the rectification efficiency and (iv) voltage regulation from no-load to full-load.
13. Draw the circuit of a series voltage regulator and explain its working. How fold back protection is provided in the circuit ?



Module - II

14. Determine the operating point for the circuit shown in fig. (3). Given $V_p = -4\text{ V}$ and $I_{DSS} = 10\text{ mA}$.

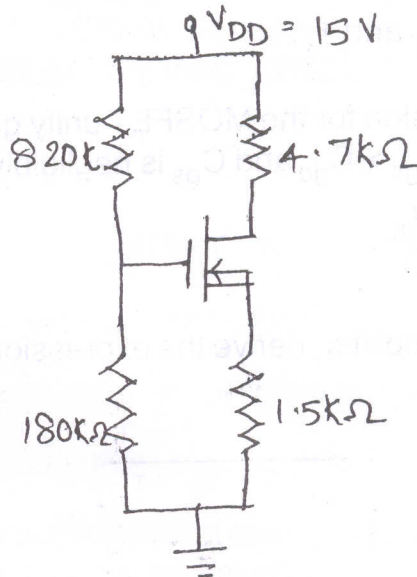


fig (3)

15. Analyze a common gate amplifier and derive the expression for voltage gain, input impedance and output impedance.
16. For the common emitter amplifier with emitter bypass capacitor (fig 4), calculate A_v , R_i and R_o .

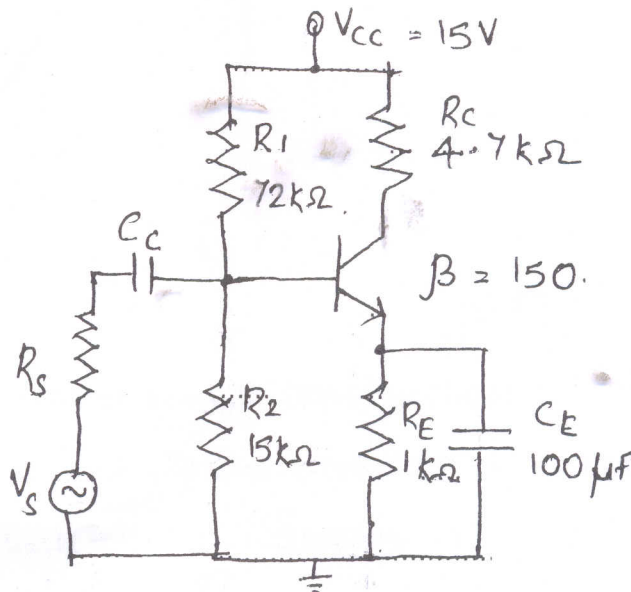
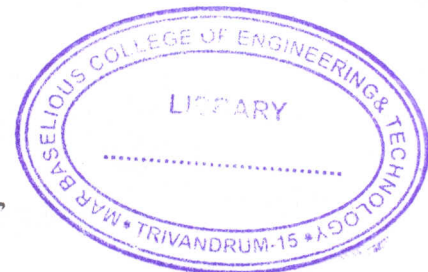


fig (4)



**Module – III**

17. A particular BJT operating at $I_C = 2 \text{ mA}$ has $C_\mu = 1 \text{ pF}$, $C_\pi = 10 \text{ pF}$ and $\beta = 150$. Calculate the values of f_T and f_β .
18. Starting from the expression for the MOSFET unity gain frequency and making the approximation that $C_{gs} \geq C_{gd}$ and C_{gs} is negligibly small, show that for an n channel device $f_T = \frac{3\mu_n V_{ov}}{4\pi L^2}$.
19. For a class B push pull amplifier, derive the expression for conversion efficiency and figure of merit.
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