

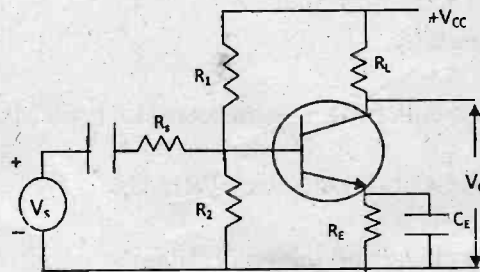
11. (a) (i) The reverse saturation current of a silicon PN junction diode is $10 \mu\text{A}$. Calculate the diode current for the forward bias voltage of 0.6 V at 25°C . (8)
- (ii) Discuss the construction and applications of Schottky diode. (8)

Or

- (b) (i) Draw the collector-to-base bias circuit for a transistor amplifier and obtain its stability factor. (8)
- (ii) Derive the transistor equation $I_C = \beta I_B + (1 + \beta)I_{CBO}$. (8)
12. (a) (i) Define the parameters trans conductance g_m drain resistance r_d , and amplification factor μ of a JFET and establish a relation between them. (8)
- (ii) Describe the construction and characteristics of n-channel D-MOSFET. (8)

Or

- (b) (i) Draw and explain the static emitter characteristics of UJT. (8)
- (ii) Explain the operation and characteristics of SCR. (8)
13. (a) (i) Draw the h-parameter model of a CE transistor and define the h-parameters. (8)
- (ii) For the CE amplifier shown in figure, calculate the mid frequency voltage gain and lower 3-dB point. The transistor has h-parameters $h_{fe} = 400$ and $h_{ie} = 10 \text{ k}\Omega$. The circuit details are $R_L = 5 \text{ k}\Omega$, $R_S = 600 \Omega$, $R_E = 1 \text{ k}\Omega$, $V_{CC} = 12 \text{ V}$, $R_1 = 15 \text{ k}\Omega$, $R_2 = 2.2 \text{ k}\Omega$, and $C_E = 50 \mu\text{F}$. (8)



Or

- (b) (i) In a class A amplifier, $V_{CE(\text{max})} = 15 \text{ V}$, $V_{CE(\text{min})} = 1 \text{ V}$. Find the overall efficiency for
- (1) series-fed load, (4)
- (2) transformer coupled load. (4)
- (ii) Derive the conversion efficiency and the relation between maximum power output and maximum power dissipation for class B push-pull power amplifier. (8)

14. (a) (i) An amplifier has a voltage gain of 400, $f_1 = 50\text{Hz}$, $f_2 = 200\text{ kHz}$ and a distortion of 10% without feedback. Determine the amplifier gain, f_{1f} , f_{2f} and D_f when a negative feedback is applied with feedback ratio of 0.01. (8)
- (ii) Draw the circuit of a CE amplifier with voltage-shunt feedback and explain. (8)

Or

- (b) (i) Derive the expression for frequency of oscillation of RC phase shift oscillator. (10)
- (ii) Draw the circuit of a crystal oscillator and explain its operation. (6)
15. (a) (i) Draw the circuit of biased positive clipper and explain with suitable waveforms. (8)
- (ii) With suitable waveforms, describe the working of a bridge rectifier. (8)

Or

- (b) (i) Classify multivibrators and mention their applications. (8)
- (ii) Discuss the design of a zener diode voltage regulator. (8)
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