

This question paper contains 4 printed pages!

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S. No. of Question Paper : 949

Unique Paper Code : 251303

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Name of the Paper : Analog Electronics—I

Name of the Course : B.Tech. Electronics

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt Five questions in all, including

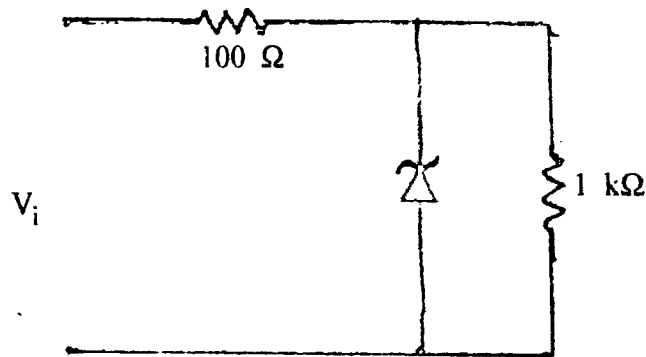
Question No. 1 which is compulsory.

Use of scientific calculator is allowed.

1. (a) What do you understand by clipping ? Explain it with a series diode clipper circuit having a supply in series with it. 3
- (b) Why collector to base bias configuration in spite of giving stable Q point is not preferred ? 3
- (c) Show that stability of amplifier increases with negative feedback. 3
- (d) A parallel LC circuit tuned to 200 kHz. with 350 μ H inductor has measured impedance of 17.6 k Ω . Calculate Q factor and bandwidth. 3
- (e) Explain why voltage amplifier cannot be used as power amplifier ? 3

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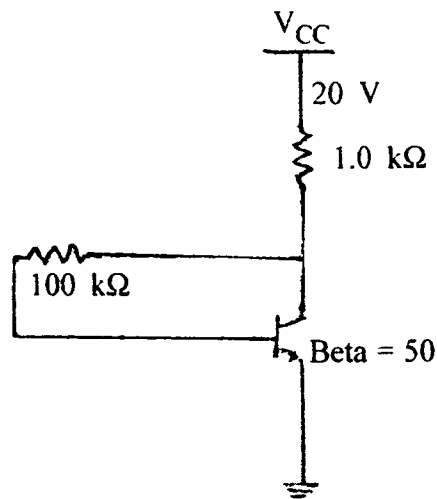
2. (a) Derive an expression for ripple factor for half wave rectifier. 5
- (b) Find the range of V_i which will maintain the Zener in ON state. Given $V_Z = 10$ V.
 $I_{ZM} = 32$ mA. 5



- (c) What is clamper ? Draw and explain both negative and positive clamper. 5
3. (a) Draw the hybrid equivalent circuit of common emitter configuration. Find its voltage gain, current gain, input impedance and output impedance. 5
- (b) Draw the circuit of self bias CE amplifier. Explain how R_E improves the stability of the amplifier. 5
- (c) Find the coordinates of the Q point and stability factor for an NPN Transistor in self bias configuration. Given $\beta = 50$, $V_{BE} = 0.7$, $R_1 = 150 \text{ k}\Omega$, $R_2 = 100 \text{ k}\Omega$, $R_E = 4.7 \text{ k}\Omega$, $R_C = 2.2 \text{ k}\Omega$ and $V_{CC} = 12$ V. 5
4. (a) Draw h parameter equivalent circuit of RC coupled amplifier in the high frequency range and calculate its cut off frequency. 7

(3)

(b) Find V_{CE} and I_B for the given circuit.



(c) Derive the expression for stability factor S' and S'' .

5. (a) Draw the block diagram of current series feedback circuit. Find the expression for gain, input impedance and output impedance.

(b) Why do we need minimum 3 RC networks in the RC phase shift oscillator ?
how Barkhausen criterion is satisfied in RC phase shift oscillator.

(c) An amplifier gives an output of 10 volt with an input of 0.5 volt in a negative feedback circuit. When feedback is removed it requires 0.25 volts input for the same output. Calculate :

(i) gain without feedback

(ii) feedback fraction.

- Draw the circuit diagram of LC Colpitt's oscillator and derive the expression of the frequency of oscillations. 8
- Obtain the maximum efficiency of class A amplifier with resistive load and how it can be increased. 4
- For a class B power amplifier providing 20 V peak signals to a 15Ω load and a power supply of $V_{CC} = 30$ V. Find the output power and efficiency. 3
- Draw the equivalent circuit of FET. Find an expression for voltage gain, input and output impedance of a common source JFET amplifier. 8
- Define various JFET parameters. Derive a relation between them. 3
- A class B amplifier has an efficiency of 60% and each transistor has a rating of 2.5 watt. Find the ac output power and dc input power. 4