

Code: AE53/AC53/AT53/AE103
Subject: ELECTRONIC DEVICES & CIRCUITS

- e. If $X_L = 100\Omega$ of an R-L circuit, it's quality factor is
 (A) 100 (B) 10
 (C) 33.3 (D) 1000
- f. In multistage amplifier _____ .
 (A) Gain increases and BW increases (B) Gain decreases and BW increases
 (C) Gain decreases and BW decreases (D) Gain increases and BW decreases
- g. For an SCR, the two transistor analogy holds good when the SCR is in _____.
 (A) Forward blocking state (B) Condition state
 (C) Both (A) & (B) (D) None of these
- h. Resistance of a wire is r ohms. The wire is stretched to double its length, then its resistance in ohms is
 (A) $4r$ (B) $r/2$
 (C) $2r$ (D) $r/4$
- i. The common collector circuit is also known as
 (A) Push-pull circuit (B) Emitter follower
 (C) Voltage gain amplifier (D) Current gain amplifier
- j. The Network Theorem used to find the equivalent circuit across an open circuited terminal is _____.
 (A) Thevenin's Theorem (B) Superposition Theorem
 (C) Reciprocity Theorem (D) None of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. Briefly discuss: (2+3+3)
 (i) Superposition theorem
 (ii) Maximum power transfer theorem
 (iii) Duality of networks
- b. An RLC circuit has $R = 25 \Omega$, $L = 0.04 \text{ H}$ and $C = 0.01 \mu\text{F}$. Calculate the resonance frequency. If 1 V source having frequency same as the resonance frequency is applied to the circuit, calculate the frequencies at which voltage across L and C are maximum. (8)
- Q.3** a. Define drift and diffusion current in PN junction diode. (4)
- b. For PN diode, the reverse saturation current at a bias of 20V is 20nA. It is $5\mu\text{A}$ at 75 volts. Calculate DC resistances at these points. (4)

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- c. Draw the circuit diagram of a full wave bridge rectifier and sketch the output waveform across the load resistance, when the input to the rectifier is a sinusoidal voltage $V_m \sin \omega t$. (8)
- Q.4** a. What are four layer devices? Explain the switching action of Silicon Controlled Rectifier (SCR). (9)
- b. Explain the construction and operation of an n-channel E-MOSFET with suitable diagram and characteristics. (7)
- Q.5** a. Explain collector to base bias or collector feedback biasing method in detail and discuss the stability of the circuit. (8)
- b. What is h-parameter model? Draw and explain a BJT h-parameter model. (8)
- Q.6** a. Draw ideal and the actual response of tuned amplifier. Compare single tuned and double tuned amplifiers. (8)
- b. With neat sketches, explain the operation of a single stage RC coupled amplifier. (8)
- Q.7** a. Calculate the peak power dissipated in each transistor of a class B push pull amplifier, if $V_{CC} = 15V$ and $R_L = 5\Omega$. (7)
- b. Compare Class A, Class B, Class AB and Class C power amplifiers. (9)
- Q.8** a. Derive the expression for the frequency of Wein Bridge Oscillators. (10)
- b. Deduce the Barkausen Criterion for the generation of sustained oscillations. How are the oscillations initiated? (6)
- Q.9** a. What do you mean by epitaxial growth in IC fabrication? Explain the steps involved in epitaxial growth. (8)
- b. Write short notes on the following:
(i) Integrated resistors
(ii) Integrated capacitors (2x4)