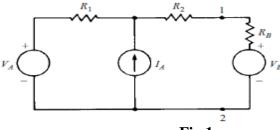
### **ELECTRONIC DEVICES & CIRCUITS** AE53/AC53/AT53

StudentBounty.com Q.2 a. In the circuit of Fig. 1,  $V_A = 2V$ ,  $I_A = 2A$ ,  $R_1 = 4\Omega$  and  $R_2 = 3\Omega$ . Find the Thevenin equivalent voltage V<sub>th</sub> and impedance Z<sub>th</sub> for the network to the left of terminals 1, 2.

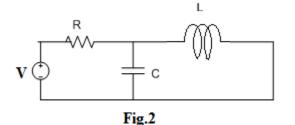




## Answer:

Q:2 9. , klith terminals 1-2 open circuited, no current froms through R2, by using KVL  $V_{12} = V_{12} = V_A + I_A R_A = 2 + (2X4) = 10V$ (2×3) · Zth - With VA replaced by a short and DA replaced by an open circuit.  $Z_{th} = R_{th} = R_1 + R_2 = 4 + 3 = 7 \mathcal{D}.$ 

b. Explain Duality. Obtain dual network for the circuit shown in fig.2.



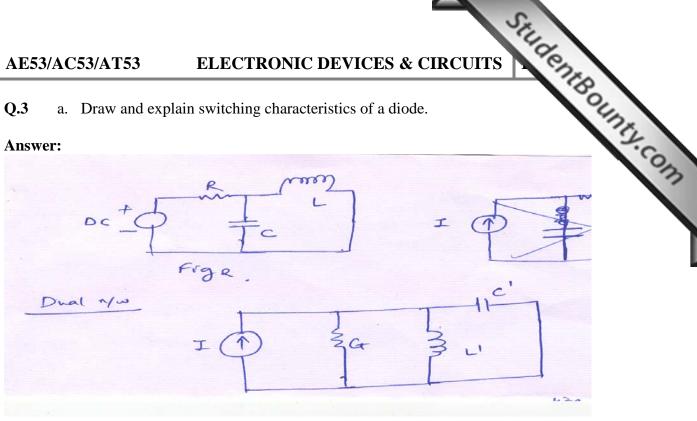
### **Answer:**

Duality :- Networks which have identical describing differential equations are known as dual of each other, and the concept is Known as DUALITY. es. dues of elements voltage source as current source, REAG LHO

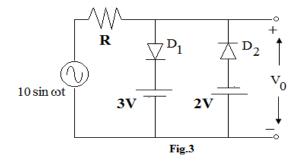
### AE53/AC53/AT53 **ELECTRONIC DEVICES & CIRCUITS**

a. Draw and explain switching characteristics of a diode. Q.3

## Answer:



b. Plot the output voltage  $V_0$ 



Answer: Topic 1.14 of Text Book 1

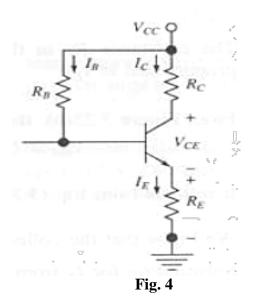
- c. Write short note on:
  - (i) Transition and Diffusion capacitance
  - (ii) Zener diode as voltage regulator

Answer: Topic 1.13 of Text Book 1

0.4 a. Explain the construction and operation of a n-channel E-MOSFET with suitable diagram and characteristics. Answer: Topic 2.3 of Text Book 1

- b. The transistor of Fig.4 is provided with the fixed and self biased emitter resistance with  $Rc = 4 \text{ k} \Omega$ ,  $R_E = 2 \text{ k}\Omega$ ,  $V_{cc} = 32 \text{ V}$  and  $I_c = 4 \text{ mA}$ .
  - (i) Calculate the value of  $R_B$  if  $\beta = 100$
  - (ii) What will be the percentage change in  $I_C$  if actual  $\beta$ =40?

# ELECTRONIC DEVICES & CIRCUITS

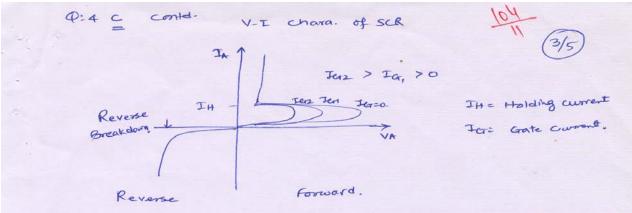


### Answer:

	Condition.	Emitter Junction	Collector j'un	ction Ragiogh of application
リ	IFR	FB	RB	Active> Amplificatio
ത	IFF	FB	FF	Saturation - Elosed switch
(m)	TIRR	RB	RB	Cut-off -> open switch.
N)	E RF	RB	FB C: Veny poor .	Diverted > Notused. transistor action).

c. Draw V-I characteristics of an SCR.

# Answer:



**Q.5** a. Draw the small-signal model of Emitter follower and obtain the expression of voltage gain, current gain, input impedance and output impedance.

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# AE53/AC53/AT53

# **ELECTRONIC DEVICES & CIRCUITS**

### Answer:

StudentBounty.com (D) S Griven. RC=4KE RE=EKE VCE=32V and IC= 4MA (D) Value of RB if B= 100. (ii) Actual B=40; AIC=? Q.5  $J_B = \frac{1}{B} = \frac{4}{100} = 0.04 \text{ mA}.$  3R = 550 Te + 0.7 + (Te + 4)R $\therefore \text{Te} = 0.04 \text{ mA}$ Je= IBXB = 40x0.04 VCC= IBRO + VOE+ (IB+IC)RE =1-6mA. 32 = 0.04x PB+ 0.7+ (0.04+0.04) & ATC= 4-1.6= 2.4mA = 60%. Reduction. RB = 550 KZ

b. Explain working of a Darlington pair amplifier in detail. Answer: Topic 3.9 of Text Book 1

c. Write short note on CMOS. Answer: Topic 3.2 of Text Book 1

a. Explain working of tuned amplifier. Also state its merit and application. **O.6** Answer: Topic 4.4 of Text Book 1

b. A certain BJT transistor has  $r_{\pi} = 2 \text{ k}\Omega$  and  $\beta = 50$  at 1MHz and  $\beta = 2.5$  at 20MHz. Determine  $f_T$ ,  $f_\beta$  and  $C_{\pi}$ .

Answer:

( Grinn MA = 2KR & B = 50 at IMHZ. B=25 at 20MHZ. fT = BfB = Bf.f Cx = 1 2T X 2×10 × 1×106 fT= 2.5x 20= 50 M Hz. CAES SOPF  $f_B = \frac{f_T}{B} = \frac{50}{50} = \frac{1 \text{ MHz}}{1 \text{ MHz}}$  $f_{B} = \frac{1}{2\pi c_{\pi} s_{\pi}}$   $t \times 10^{6} = \frac{\phi 01}{2\pi c_{\pi} 2 \times 10^{3}}$ 

c. Write short note on cascaded amplifiers. Answer: Topic 4.6 of Text Book 1

a. Compare Class A, Class B, Class AB and Class C power amplifiers. 0.7

### **ELECTRONIC DEVICES & CIRCUITS** AE53/AC53/AT53

## Answer: Topic 5.5 of Text Book 1

b. State performance parameters of power amplifier.

StudentBounty.com Answer: i) Collector efficiency = ac power, output / ac power input. ID Distortion iii) Power dissipation capability.

c. A transistor supplies 2W for a 5 k $\Omega$  load. The zero-signal dc collector current is 35 mA and rises to 40 mA when signal is applied. Determine the percent second- harmonic distortion.

### Answer:

B2=B0= 5mt. ( ] TE= 35mA Second harmonic distartion. TetBo= 40mA R. 1'e Bo= 20-35= 5mA.  $P_2 = \left(\frac{B_2}{B_1}\right) \left(\frac{3}{283} \times 100\right)$  $P_{1} = B_{1}^{2} \frac{R_{L}}{R}$ = 17.667. Av. - BIZ 28-3MA

**Q.8** a. Define feedback. Which type of feedback is used for oscillator circuit? Discuss feedback's effect on input and output impedance.

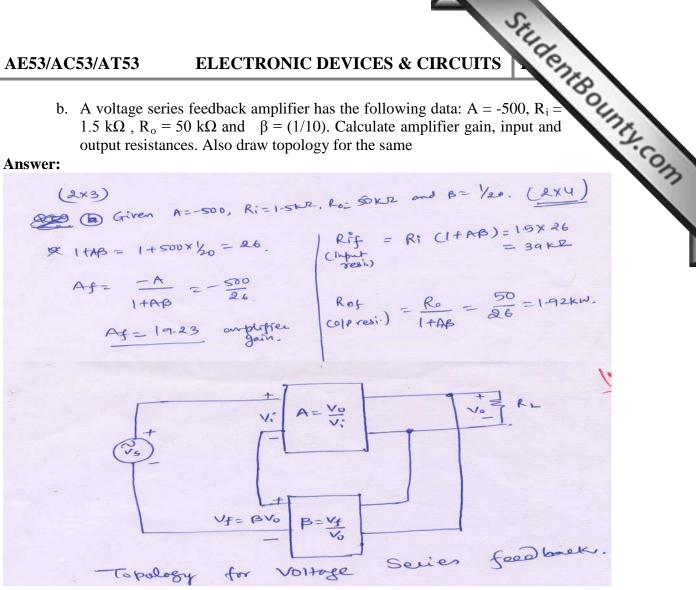
### Answer:

Feedblack: The process by which a fraction of output energy of device camplifier) is injected back to (Olmark) its input is called feedblack. Q:8 (a) Type:- Positive Freedback :- Used for Oscillator circuit. (Ormark) negative feedback :- used for amplifier. Rest Part :- Topic 6.4. Ret(F).

### **ELECTRONIC DEVICES & CIRCUITS** AE53/AC53/AT53

b. A voltage series feedback amplifier has the following data: A = -500,  $R_i = -500$ 1.5 k $\Omega$ , R<sub>0</sub> = 50 k $\Omega$  and  $\beta$  = (1/10). Calculate amplifier gain, input and output resistances. Also draw topology for the same

### Answer:



Q.9 a. Write short notes: (i) Integrated resistors (ii) Integrated capacitors Answer: Topic 9.9 & 9.10 of Text Book 1

b. State characteristics of IC components. Answer: Topic 9.12 of Text Book 1

c. State levels of integration of IC fabrication. Answer: Topic 9.14 of Text Book 1

### **TEXT BOOK**

Electronic Devices and Circuits, I. J. Nagrath, PHI (2007)