Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Fourth Semester B. Tech.

(Electronics and Telecommunication)

Class Test-II

Sub Code: ETU 402 (Analog Circuit)

Marks: 15 **Time: 1 hour**

Solve Any 3

Q.1 Derive the relationship between sweep speed error, transmission error, displacement error for any exponential sweep circuit, using proper circuit diagram. **(05)**

Q.2 Draw a UJT sweep circuit having the following parameters, V_{BB}=20V, V_{DD}=50V, R=5kΩ, R_{B1}=R_{B2}=0Ω, C=0.01μF, also calculate (a) Amplitude of sweep signal.(b)Slope and displacement error (c) Duration of sweep (d) Recovery time.

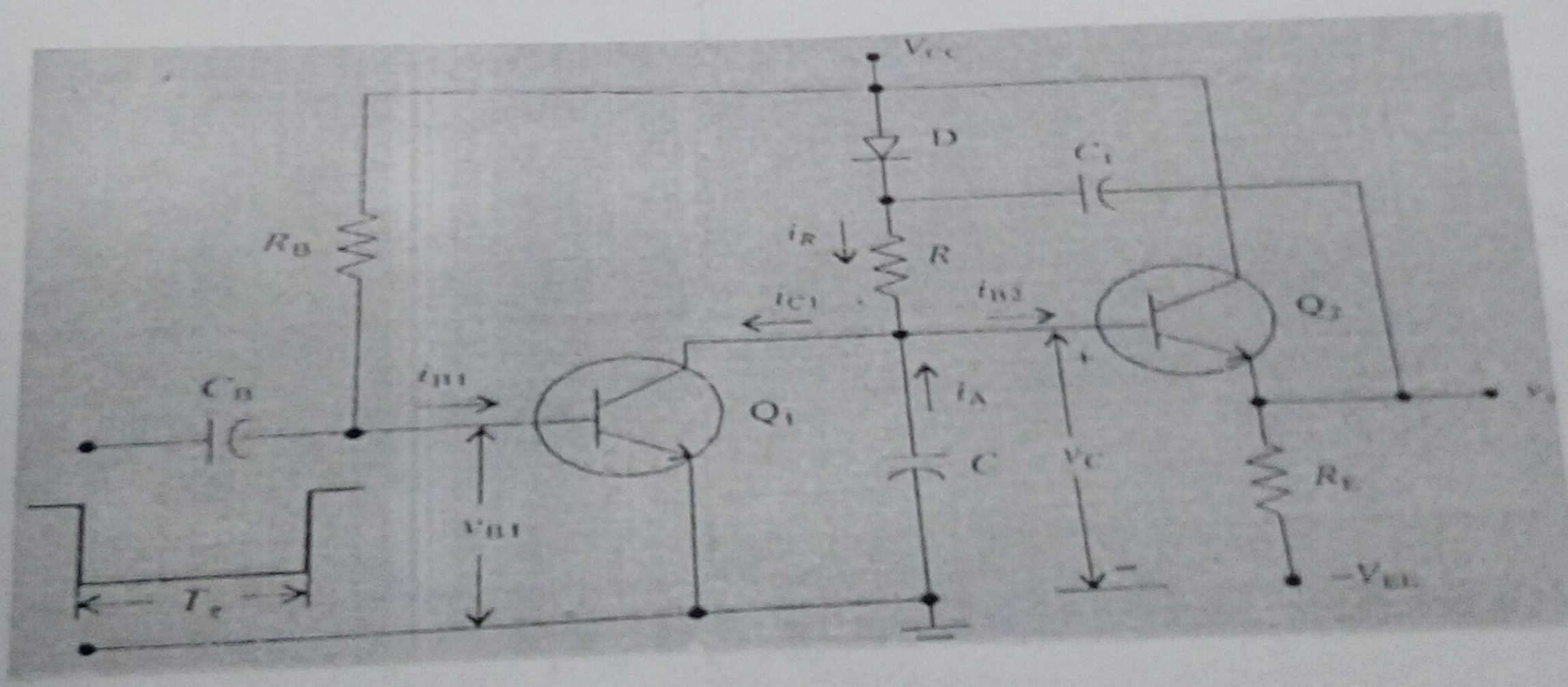
(05)

Q.3 The following specifications are given for the dual input, balanced-output differential amplifier having R_C = 2.2 kΩ, R_{S1} = R_{S2} = 50Ω, $+V_{CC}$ = 10V, $-V_{EE}$ = -10 V, β_{dc} =100 and V_{BE1} = V_{BE2}=0.715V.Determine the operating points (ICQ and VCEQ) of the two transistors.

(05)

Q.4 In the transistor bootstrap circuit as shown in figure below have V_{CC}=25V, V_{EE}=-15V, R=10kΩ, R_E=15kΩ, R_B=150kΩ, C=0.05 μF and C_1=100 μF. The gating waveform has a duration, Tg=300 μs. The transistor parameters are h_{ie}=1.1 kΩ, h_{re}=0.25Ω, h_{fe}=50, h_{oe}=1/40. (a) Draw the waveform of ic1 and V0,labeling all current and voltage levels. (b) What is the slope error of the sweep? (c) What is the sweep speed and the maximum value of the speed and maximum value of the sweep voltage? (d)What is the retrace time Tr, for C to discharge completely? € Calculate the recovery time T_1 for C_1 to recharge completely.

(05)



Government College of Engineering Amravati

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Electronics and Telecommunication Department

Class Test: 2
Subject: ETU 402
Solve any three

Max. Marks: 15
Date: 13/03/2015
All questions carry equal marks

1) Draw and explain in detail each component of the high frequency hybrid-π model for BJT. Also derive the expression for r_π and g_m and give the relation between r_π , g_m and β.

2) For a single stage RC-coupled amplifier, derive the expression for Miller Capacitance and explain it's effect on the high frequency response of the amplifier.

3) For a CE-amplifier with the following parameters R_1= 51.2 kΩ, R_2= 9.6 kΩ, R_C= 2kΩ, R_E= 0.4 kΩ, R_S= 0.1 kΩ, C_{in}= 1μF, C_E= 0, C_{out}= 0 and V_{CC}= 10 V. The transistor parameters are $V_{BE(on)}$=0.7 V, β=100 and V_A= ∞. Calculate the lower cut-off frequency due to C_{in} and the maximum gain.

4) For a CE-amplifier with C_{in}, C_{out} and C_E, R_1= 200 kΩ, R_2= 220 kΩ, R_C= 2.2 kΩ, R_L= 4.7 kΩ, R_E= 1 kΩ, R_S= 100 kΩ and V_{CC}= 5 V. The transistor parameters are β_0= 100, $V_{BE(on)}$= 0.7 V, V_A= ∞, C_π= 10 pF and C_μ= 2 pF. Calculate (a) The Miller Capacitance, and (b) the 3dB frequency.

5) (a) Derive the expression for $\beta(f)$ and give the expression for f_β.
(b) Calculate f_β and f_T if, β_0= 150, C_π= 4pF, C_μ= 0.5 pF and $I_{C(dc)}$= 1 mA.