Electronic Circuits (ECL-257)
B.Tech. Semester III
Assume any missing data and mention it

Maximum Marks: 30

23

Q.1:	A. Consider the Circuit below and Determine the value of R_B if β=19 and V_E=4V.	[CO 1] [3 Marks]
	B. The given silicon transistor as shown below refer to as current source biasing having β=99. Calculate its base and collector currents ? Also tell whether the BJT is in active region or Saturation mode ?	[CO 1] [4 Marks]
	C. Assume that a silicon transistor with β=50, and V_{BE}=0.6V, V_{CC}=22.5V and R_C=5.6k Ω, It is desired to establish a Q point at V_{CE} =12V and I_C =1.5mA with a stability factor of s ≤ 3. Find R_E, R_1 and R_2.	[CO 1] [5 Marks]

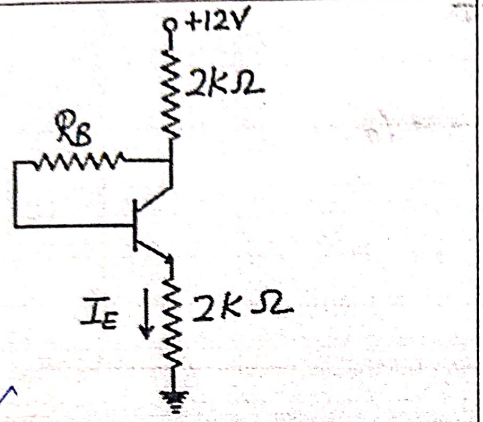

Figure for Question 1. A

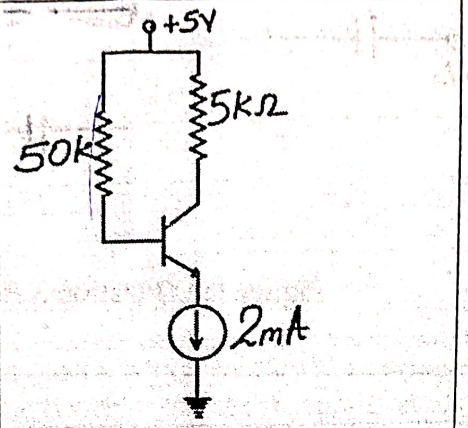

Figure for Question 1. B

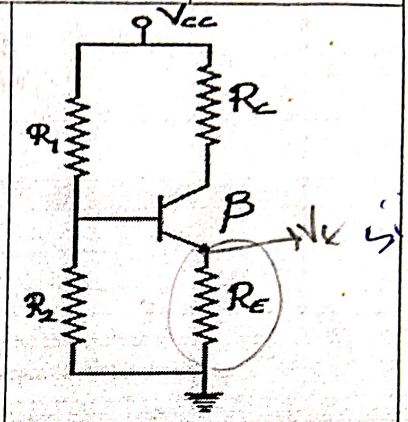

Figure for Question 1. C

Q.2:	A. Draw the AC equivalent model of BJT using Voltage Divider Bias in Common Emitter Configuration and Derive the Expression for Voltage Gain, Current Gain, Input Impedance and Output Impedance with Dynamic Emitter resistance Model.	[CO 2] [6 Marks]
	B. For common Base Amplifier given below Calculate the following parameters using hybrid equivalent model. (h_{ib} =14.41Ω, h_{rb} =0.883×10^{-4}, h_{fb}= -0.991, h_{ob}=0.18 μS a) Z_i and Z_i' b) A_i c) A_v d) Z_o and Z_o'	[CO 2] [7 Marks]

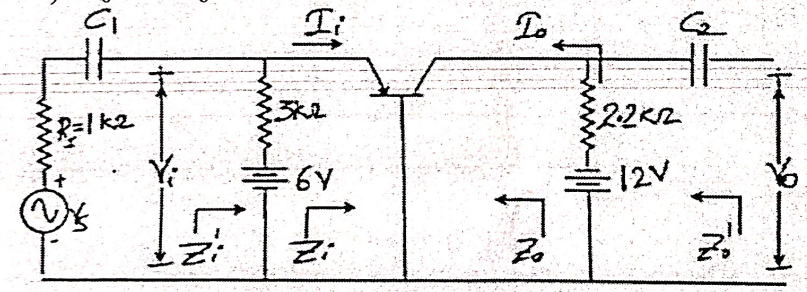

Figure for Question 2.B.

Q.3:	A. Three cascaded amplifiers has a decibel voltage gain of 15. What is the overall decibel voltage gain. What is the overall linear voltage gain?	[CO 1&2] [2 Marks]
	B. Calculate the DC bias Voltage and Current for the Darlington configuration	[CO 1&2]

mentioned below. (β_1=50, β_2=100) [3 Marks

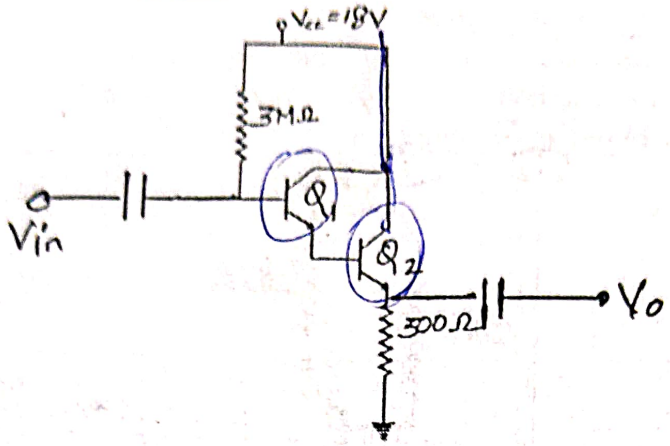

Figure for Question 3.B.

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Q. 1

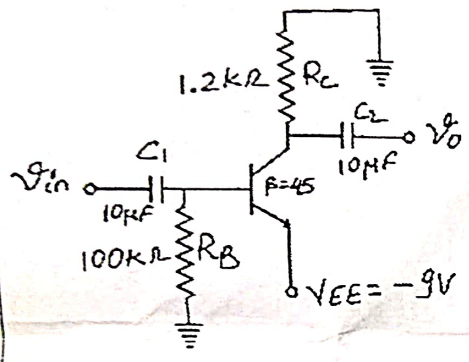
A. Determine the Potential V_C and V_B for the following Network.(β=45) **[C02 Marks 4]**

B. Determine the I_{DQ}, V_{GSQ} and V_{DS} for the network shown **[C02 Marks 4]**

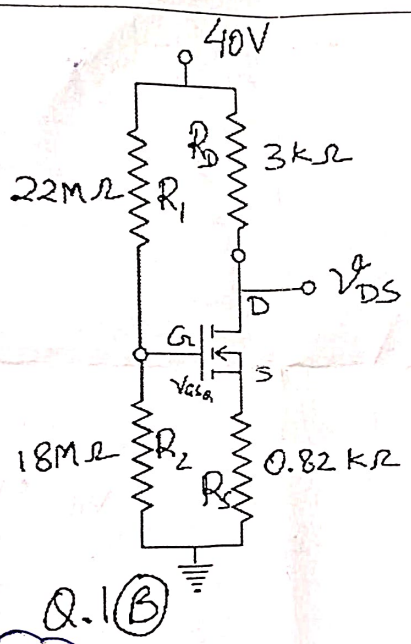
C. For the BJT amplifier Determine (a) I_i (b) Z_i (c) V_o (d) I_o **[C03 Marks 6]**
In given circuit the V_s=12mV and V_i=4mV and R_L=0.51 kΩ (using r_e model)

D. For the network Shown Determine the following parameters using the complete hybrid equivalent model. (a) Z_i and Z'_i (b) A_v (c) A_i and A'_i (d) Z_o **[C03 Marks 6]**

(h_{ie}=1.6 kΩ h_{fe}=110 h_{re}=2 X 10^{-4} h_{oe}= 20 μA/V)

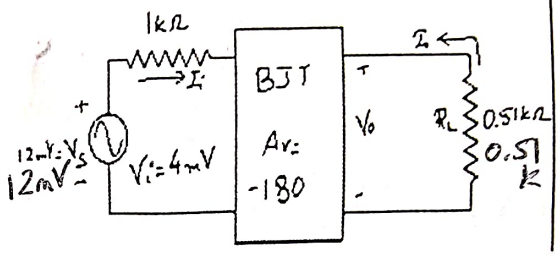


1(A)

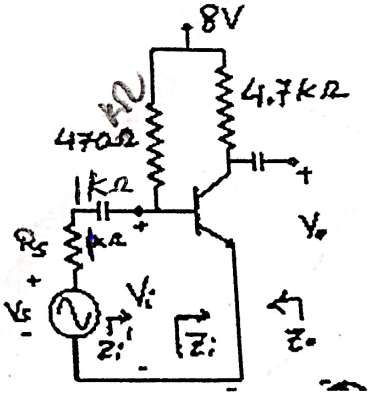


Q.1(B)

1(B)



1(C)



1(D)

Q. 2.

A. Calculate the Voltage Gain of each stage and the overall ac voltage gain for the BJT cascade amplifier circuit shown below **[C03 Marks 6]**

B. Calculate the operating frequency of a BJT phase shift oscillator for R= 6kΩ ,C=1500pF, and Rc= 18kΩ. What should be gain of amplifier to satisfy condition AB≥1 ? Also draw circuit for ocsillator. **[CO4 Marks 4]**

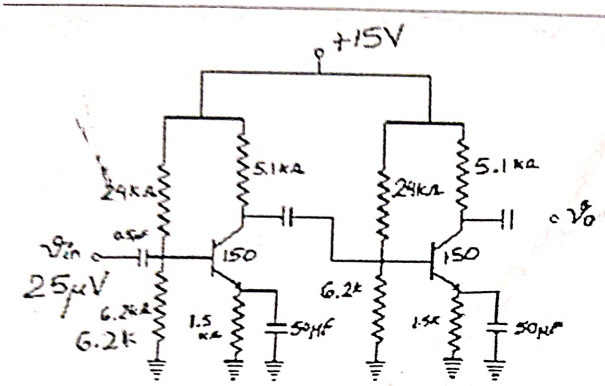
C. For the circuit shown below, if C_2 is open, **[C04 Marks 3]**

i. DC emitter voltage will change/ not change

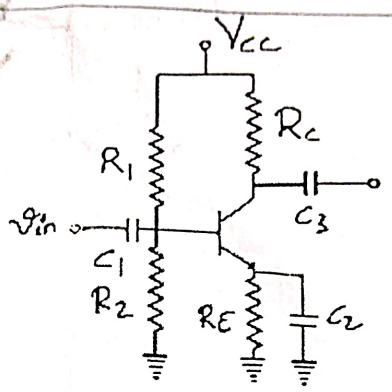
ii. Voltage gain will decrease/increase

iii. If RE increases by some amount from previous value, what will happen to dc collector voltage? (increase/decrease)

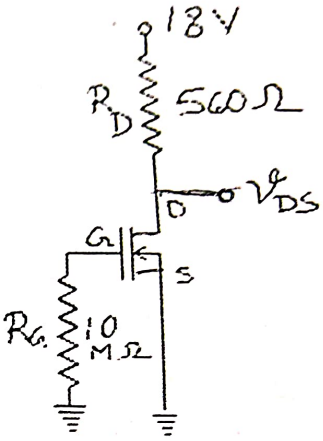
Justify your answers.



2(A)



2(C)



3(B)

Q. 3.

A. For an n channel E- MOSFET, with $V_{GS(Th)}$= 2 V, V_{GS} must be in excess of what value in order for MOSFET to conduct? **[C04 Marks 2]**

B. For the MOSFET shown, I_{DSS}= 12 mA, Determine V_{DS}. **[C04 Marks 3]**

C. Draw and Discuss the Depletion type MOSFET Characteristics **[C04 Marks 3]**

Q. 4.

A. For emitter follower circuit, which type of feedback exists? Calculate gain, i/p impedance, o/p impedance for a voltage series feedback amplifier having A= -300, Ri= 1.5 kΩ, Ro= 50 kΩ, β= -1/15 **[C05 Marks 4]**

B. For Class B Power Amplifier providing a 22-V peak signal to an 8Ω Load with power supply of Vcc =25 V. Determine **[C05 Marks 5]**

i. Input Power
ii. Output Power
iii. Efficiency of the Amplifier