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Total Number of Pages : 03

B.Tech
PET31101

3rd Semester Back Examination 2019-20

ANALOG ELECTRONIC CIRCUITS

BRANCH : ECE, ETC

Max Marks : 100

Time : 3 Hours

Q.CODE : HB531

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- State the different types of BJT biasing circuit.
- How thermal runaway occurs in BJT?
- In a BJT circuit RC is given to be 10KΩ and VCC is given to be 10V DC. Draw the dc load line.
- Derive the equation of a transconductance from Shockley's equation in a JFET.
- List the major difference between D-MOSFET and E-MOSFET.
- Write the difference between bias current and offset voltage of an opamp.
- Why re model is preferred in comparison to other model?
- Write the difference between AVNL, AVL and AVS
- Derive the relationship between AV and Ai in a network.
- Which type of feed back is used in Oscillator.

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Analyze, Justify, Design, Formulate, Calculate, Develop, Illustrate, Explain, Distinguish, Differences & Similarities
- What is negative feedback? Develop the generalized equation of negative feedback with the help of a block diagram?
 - In a 3-stage cascaded opamp amplifier having gain of +10, -20 and -30 having the same feed back resistor of 100KΩ. Calculate the value of other resistor in each amplifier to complete the feedback loop and calculate the output voltage if i/p voltage is 300mV.
 - Define offset voltage in opamp? Which pins are used to control the offset voltage in a 741 opamp? Define total output offset voltage in opamp.
 - Which oscillator uses both positive and negative feedback? Derive the condition of oscillation of the same.
 - Explain the significance of square wave testing of an amplifier. Why square wave is chosen as the input?

For the silicon made BJT amplifier shown in the fig:1 draw the DC equivalent ckt. and determine. V_C , V_E and V_B

(f)

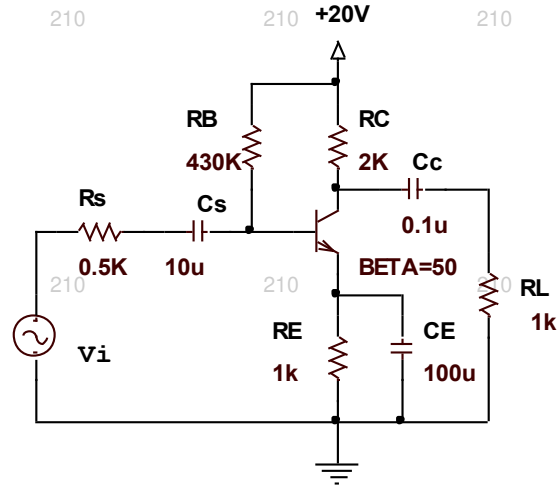
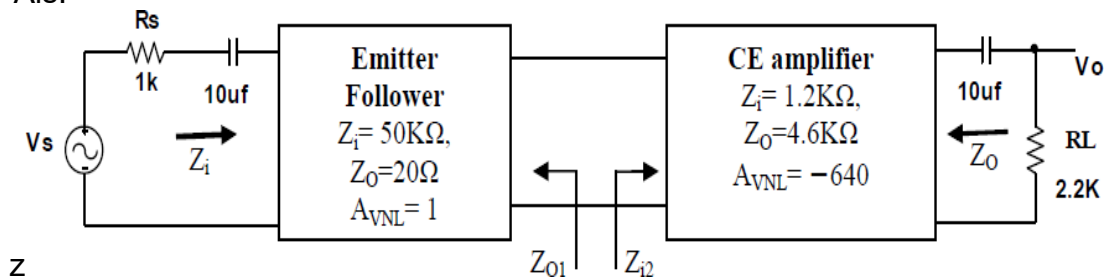


fig:1

g) For the cascaded system shown in figure determine, Loaded voltage gain of each stage, the total gain of the system A_{Vs} and A_{VL} , the current gain A_i and A_{is} .



h)

In the circuit shown in fig:2 is to be used as subtractor, for $R_1=R_2=10K$, find the value of R_3 and R_4 , so that $V_o = 2V_a - 3V_b$.

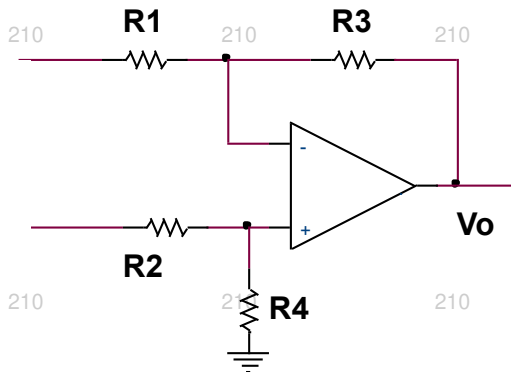


Fig:2

- What is a super beta transistor? Why it is called so. Draw the circuit and derive the DC analysis equations for a beta transistor based biasing circuit.
- Illustrate the operation and construction of a CMOS inverter?
- Differentiate the power amplifier? Why it is called large signal amplifier?
- Explain the role of the capacitors in determining the low frequency response of an amplifier.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

(16 x 2)

Discuss, Describe, Examine, Classify, Prove, Evaluate, Compare, Contrast, etc

Q3 What is instrumentation amplifier? What are the properties of a good instrumentation amplifier? Derive the output voltage equation of a standard instrumentation amplifier?

Q4 Describe the construction, operation and V-I characteristics of a Enhanced type MOSFET?

Q5 Discuss Miller's effect. How it is effective in a common emitter amplifier circuit. Explain with the help of neat circuit diagram.

Q6 Compare the emitter follower and source follower. Discuss with the help of circuit diagram and mathematical expressions of their voltage gain, input impedance, output impedance