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Total Number of Pages:02

B.TECH  
PEL31102

3<sup>rd</sup> Semester Back Examination 2019-20  
ANALOG ELECTRONICS CIRCUIT

BRANCH : EEE

Max Marks: 100

Time : 3 Hours

Q.Code : HB530

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) (02x10)

Suggested Words: How, Why, Determine, Derive, State, Write, Create, etc

- With the help of mathematical equation show how the load line is varying with  $R_c$ .
- With the help of neat sketch show the prohibited regions of Q-point?
- What is the need for biasing?
- Define the pinch off voltage in JFET.
- Derive the relationship of  $g_m$  and  $g_{m0}$  using Shockley's equation.
- Two BJTs with  $\beta_1=80$  &  $\beta_2=120$  form a Darlington pair. What is the overall  $\beta$  of the Darlington pair?
- Write the major two differences between BJT and JFET.
- Write the significance of the current Mirror in practical application?
- State the two application of emitter follower circuit.
- Which configuration is used as a current Buffer? Justify.

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (06x08)

Analyze, Justify, Design, Formulate, Calculate, Develop, Illustrate, Explain, Distinguish, Differences & Similarities

In square wave testing of an audio amplifier a 5kHz square wave signal was applied at the input of the amplifier. The output wave form seen on the screen of

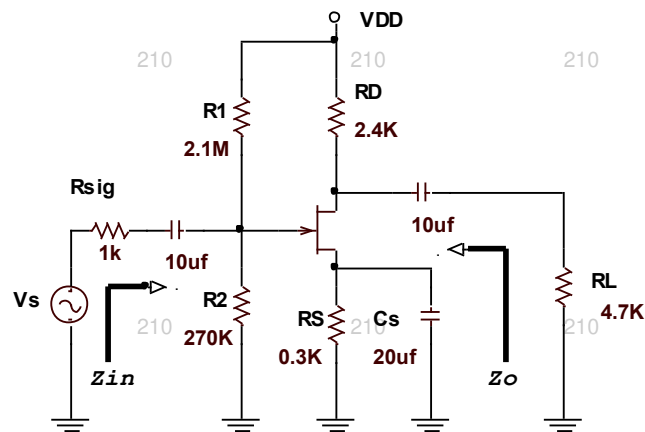
- oscilloscope records 10% rise of amplitude in 20microsec and 90% rise in 80microsec. Determine the bandwidth of the amplifier?
- Explain with the help of neat sketches how h-parameters can be determined graphically from the i/p & o/p characteristics of BJT

For the JFET network given that  $g_m= 2.2mS$ .

Sketch the two port model by calculating

$AV_{NL}$ ,  $Z_i$ ,  $Z_o$ , and calculate  $A_v$  and  $A_{vs}$

c)



- Explain various advantages of negative feedback? Draw the block diagrams of different feedback topologies?

- e) What is the concept of virtual ground? Using this concept derive the expressions for the closed loop gain of inverting and non inverting amplifier using op-amp.
- f) Derive the condition of oscillation and expression for the output frequency for a Wien bridge oscillator using op-amp.
- g) Formulate the relationship of upper cut off frequency with that of the rise time of an amplifier.
- h) Analyse the impact of physical capacitor on the low frequency response of an amplifier.
- i) Differentiate between casecade and cascode amplifier with neat circuit diagram.
- j) Illustrate the operation and construction of a CMOS inverter?
- k) Differentiate the power amplifier? Why it is called large signal amplifier?  
The input power to a device is 10000W at a voltage of 1000V. The output power is 500W, while the output impedance is  $20\Omega$ . Find the power gain and voltage gain in decibel.

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four) (02X16)

**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 n-channel JFET?
- Q5 What are the characteristics of an ideal opamp. Discuss various important parameters.
- Q6 Compare the CE amplifier with bypassed and unbypassed emitter capacitor. Analyse with the help of circuit diagram and mathematical expressions of their voltage gain and input impedance,