

END TERM EXAMINATION

THIRD SEMESTER [B. TECH] DECEMBER 2015

Paper Code: ETEC-203 (Batch 2013 onwards) Subject: Analog Electronics-I

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five question including Q no. 1 which is compulsory.
Select one question from each unit.

- Q1 (I) Write short notes on **any five** of the following:- (2.5x5=12.5)
- (a) Power dissipation in power amplifiers
 - (b) Thermistor compensation methods for achieving transistor ckt. stability
 - (c) Multistage amplifier
 - (d) Effect of negative feedback on the signal distortion of an amplifier
 - (e) CMOS devices
 - (f) Thyristors
 - (g) Thermal stability of FETs
 - (h) Advantages of using 'h' parameters over other parameters
- (II) Compare **any five** of the following:- (2.5x5=12.5)
- (a) Hybrid π model and the 'h' parameters model for transistor analysis
 - (b) Cascade and cascode amplifiers
 - (c) TRIAC and DIAC
 - (d) Shockley Diode and SCR
 - (e) Positive and negative feedback
 - (f) MOSFET and MESFET
 - (g) Depletion and Enhancement type MOSFETs
 - (h) Emitter follower and Darlington Pair

UNIT-I

- Q2 (a) A Si transistor has a fixed bias. neglecting the leakage current I_{CBO} , if $V_{CC} = 15\text{ V}$, $R_B = 500\text{ k}\Omega$ and $R_C = 5\text{ k}\Omega$, find I_C and V_{CE} for $\beta = 50$. What will be the effect on the working of transistor if $\beta = 101$? (5)
- (b) Sketch the Gain-frequency response curve of a RC coupled amplifier, marking the cutoff frequencies and the bandwidth. Explain why the gain falls at high and low frequencies? (4)
- (c) Compare the advantages and disadvantages of various biasing configurations. (3.5)
- Q3 (a) A CE amplifier has a voltage source of internal resistance $r_s = 800\Omega$ and the load impedance $R_L = 1000\Omega$, the h parameters of the transistor are given as $h_{ie} = 1\text{ k}\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu\text{A/V}$. Compute the A_v , R_i , A_v and R_o . (5)
- (b) Draw and explain the ckt using diode compensation for the thermal changes in V_{BE} and I_{CO} ? (5)
- (c) What is a major drawback in the 'collector to base' biasing method, and how is it avoided? (2.5)

UNIT-II

- Q4 (a) A CE voltage amplifier with negative feedback produces a certain output voltage with an input of 100mV. The same output voltage can be produced with only 10mV input if feedback is not used. Find out the open loop voltage gain of amplifier if feedback factor $\beta = 0.05$. What is the output voltage? (5)
- (b) Why overall gain of a multistage amplifier is less than the product of the gain of the individual stages? (2)
- (c) Describe a two stage RC coupled amplifier with a diagram, the advantages and disadvantages of RC coupling and the differences in performance over a single stage amplifier. (5.5)

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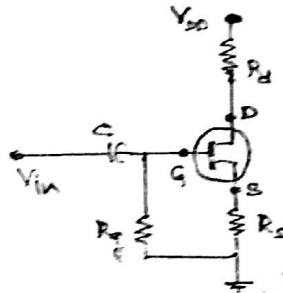
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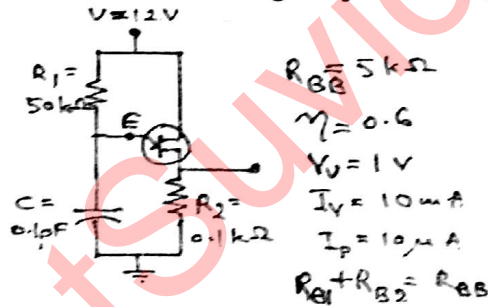
- Q5 (a) Discuss the various coupling schemes for coupling the stages of multistage amplifiers. (5)
 (b) A CE amplifier has an open loop gain equal to -500 and the input resistance 1.0 kΩ. To raise the input resistance to 5.0 kΩ what type of feedback configuration and feedback factor β should be used? (5)
 (c) What is the effect of negative feedback on the bandwidth of an amplifier? (2.5)

UNIT-III

- Q6 (a) Describe the important parameters of JFETs. (4)
 (b) Describe the working of a UJT Relaxation Oscillator. How can it be used for triggering SCR? (4)
 (c) One n-channel FET amplifier (figure) has $V_P = -2.0V$, $g_{m0} = 1.6 \text{ mA/V}$ and $i_{D0} = 1.65 \text{ mA}$. It is desired to bias the ckt at $I_D = 0.8 \text{ mA}$ using $V_{DD} = 24 \text{ V}$. Find (i) V_{GS} (ii) g_m (iii) R_S (4.5)



- Q7 (a) What are the precautions observed in handling MOSFET components? (2.5)
 (b) Given the Relaxation Oscillator in the figure, find (i) values of R_{B1} and R_{B2} at $I_E = 0 \text{ A}$, (ii) Calculate V_P , the voltage required to trigger the UJT 'ON'. (5)



- (c) Describe some important applications using SCR. (5)

UNIT-IV

- Q8 (a) Describe various classifications of Power Amps based on their biasing? (4)
 (b) What is the advantage of using a class B amplifier as compared to a class A amp? (4)
 (c) Describe a transformer-coupled class A audio amplifier. What is the advantages of transformer coupling? (4.5)
- Q9 (a) Describe with a diagram operation of a class B push pull amplifier. (5)
 (b) Describe 'cross over' distortion in amplifiers. (3.5)
 (c) Calculate the transformer turn ratio required to match a 8Ω speaker load to an amplifier so that the effective load resistance is 7.2 kΩ. (4)

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