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Exam.Code:0928
Sub. Code: 6907

1059

B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-406: Analog Electronic Circuits

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

I. Attempt the following:-

(a) Define slew rate and discuss its significance.

(b) State the Barkhausen criterion for oscillation.

(c) Show how a potentiometer can be connected to an op amp circuit so that the output dc offset can be adjusted to its minimum value.

(d)For an op-amp differentiator with R = 100 KΩ and C = 0.1 μF, an input of 2 sin 1000 t is applied. Determine the value of V_o.

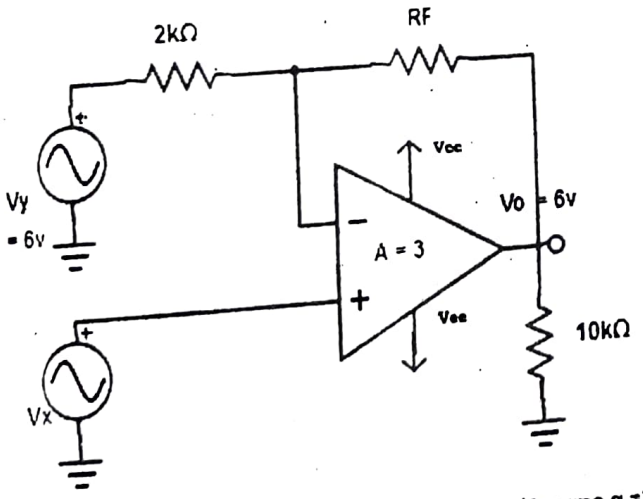
(e) Give any limitation of using Op-amp as a Comparator.

(f) What is thermal drift? How does it affect the performance of an op-amp circuit?

(g) List applications of Transconductance amplifiers.

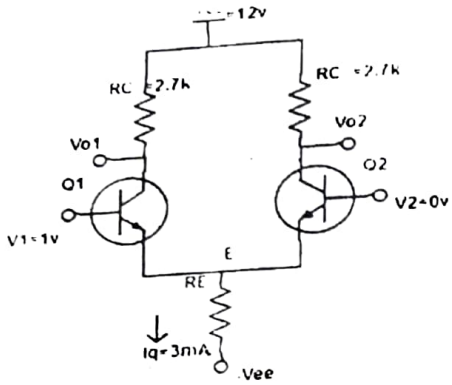
(h) Calculate the current gain of Darlington Connection.

(i) For the differential amplifier given below, Calculate V_x and R_f value.



(j) From the circuit, determine the output voltage (Assume α_f=1)

P.T.O.



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PART- A

Q2. (a) What is a cascode amplifier? List the characteristics of the cascode amplifier. Draw equivalent circuit of cascode amplifier and calculate voltage gain, current gain and input resistance. 5

(b) Design the dual-input balanced -output differential amplifier using the diode constant current bias to meet the following specifications:

(a) Supply voltage $V_+ = \pm 12$ V

(b) Emitter current I_E in each differential amplifier transistor = 1.5 mA. 5

(c) Voltage gain less than equal to 60. 5

Q3. (a) Draw and discuss the hybrid Π model for a transistor in CE configuration. 5

(b) What are the characteristics of an ideal op-amp? List three open-loop op-amp configurations. Explain why open-loop op-amp configuration is not used in linear applications. 5

Q4. (a) Briefly explain why negative feedback is desirable in amplifier applications? 3

(b) In what way is the voltage follower a special case of the non inverting amplifier. 2

(c) What is the need of Level Translator circuit?

PART- B

Q5. (a) What is a frequency response? Briefly explain the need for compensating networks in op-amps. What is the difference between compensated and noncompensated op-amps? 5

(b) Draw the high frequency equivalent circuit of an op amp. Explain in detail the major sources responsible for capacitive effect. Also evaluate the expression for output voltage gain as a function of frequency. 5

Q6. (a) Design a first order high pass filter at a cut-off frequency of 400Hz and a pass band gain of 1. 5

(b) Explain the difference between (a) inverting and differential summing amplifiers and (b) inverting and Noninverting averaging amplifiers. 5

Q7.(a) Design a narrow band pass filter so that f_c = 2KHz, Q= 20, A_f = 10. 5

(b) What is the difference between clipper and clampers? Design a negative clipper circuit with reference voltage (i) +3V (ii) -3V 5

X-X-X