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B. E. (Fourth Semester) Examination, 2020

(Old Scheme)

(EEE, Et & T, IT & Mechatronics Engg. Branch)

ANALOG ELECTRONIC CIRCUITS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) of each question is compulsory and attempt any* ***two*** *part from (b) and (c) of each questions.*

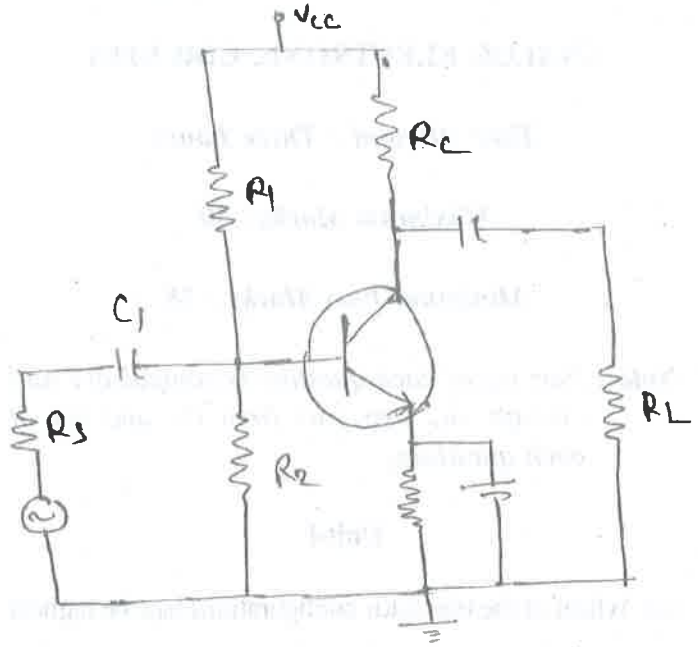
Unit-I

1. (a) Which of the transistor configurations has the highest R_i? 2

(b) Write a short note on Miller's theorem. 7

(c) Draw a typical common emitter amplifier and explain the function of each component in it. 7

(d) Consider a signal stage CE amplifire with $R_S = 1\,k\Omega, R_1 = 50\,K, R_2 = 2\,K, R_C = 1\,K,$ $R_L = 1{\cdot}2\,K,\ h_{fe} = 50,\ h_{ie} = 1{\cdot}1\,K,\ h_{oe} = 25\,\mu A/V$ and $h_{re} = 2{\cdot}5 \times 10^{-4}$ as show in fig. below



Find $A_i, R_i', A_V, A_{is}, A_{vs}$. 7

Unit-II

2. (a) At what frequency short circuit CE current gain becomes unity. 2

(b) Draw the hybrid π equivalent of a CE transistor valid for high frequency and explain significance of each parameter. 7

(c) Short circuit CE current gain of transistor is 25 at a frequency of 2 MHz if $f_P = 200$ kHz. Calculate (i) f_T (ii) h_{fe} (iii) find $|Ai|$ at frequency of 10 MHz and 100 MHz. 7

(d) Prove that $h_{fe} = g_m r_{b'e}$. 7

Unit-III

3. (a) Define rise time. 2

(b) What is effect of cascading on fequency response and Band width? 7

(c) Explain different types distortion occure in amplifiers. 7

(d) A multistage amplifier is to be constructed using four identical stage, each of which has lower cut-off frequency 15 Hz and upper cutoff frequency 30 kHz.

(i) What will be lower and upper cutoff frequency of the multistage amplifier?

(ii) If the mid-band voltage gain of each stage is 8·2, what will be approximate gain of the multi-stage amplifier at 7·5 Hz and at 300 kHz? 7

Unit-IV

4. (a) In which type topology in Negative feedback an amplifier input resistance is increases. 2

(b) Discuss the advantage and disadvantage of –ve feedback 7

(c) Give step-by-step procedure for identifying topology of feedback in amplifiers. 7

(d) An amplifier has mid-band voltage gain (Avmid) of 1000 with f_L = 50 Hz and f_H=50 kHz, if 5% feedback is applied then calculate gain, f_{LF} and f_{Hf} with feedback. 7

Unit-V

5. (a) What is the Barkhausen criterion for the feedback oscillators? 2

(b) Draw a neat circuit diagram of a phase shift oscillator using BJT and an expression for its frequency of oscillations. 7

(c) Draw the wein bridge oscillator using BJT. Show that the gain of the amplifier must be at least 3 for oscillation to occur. 7

(d) Explain the working of Colpitts oscillator and state the formula for the frequency. 7