333454(28)

B. E. (Fourth Semester) Examination, April-May 2020

(New Scheme)

(IT Branch)

ANALOG ELECTRONICS CIRCUITS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Answer all questions. Part (a) is compulsory and carries 2 marks. Answer any **two** parts from (b), (c) and (d) carries 7 marks.*
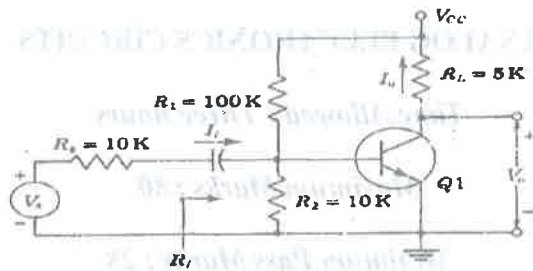
Unit - I

1. (a) What are the limitations of h-parameter model?   2

     (b) Analyse a transistor amplifier circuit using *h-*

parameters and derive the expression for A_I, R_i, R_o, A_v, A_{vs}, A_{IS}.　　7

(c)　State and prove the Miller's theorem and dual of Miller's theorem.　　7

(d)　For the circuit shown, calculate $A_i = I_0/I_i$, A_v, A_{vs}, R_i and R_o. Transistor h parameters are as follows $h_{je} = 1.1$ K, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 50$, $h_{oe} = 25$ μ A/V.　　7

Unit - II

2.　(a)　What is the criteria for validity of h-pi-parameter?　2

(b)　Derive the expression for CE short circuit current gain A_i as a function of frequency.　　7

(c)　Explain single stage CE transistor amplifier response at high frequency.　　7

(d)　Given the following transistor measurements made at $I_C = 5$ mA, $V_{CE} = 10$V, and at room temperature.　　7

$h_{fe} = 100$, $h_{ie} = 600\Omega$, $[Aie] = 10$ at 10 MHz, Cc = 3 pF. Find f_β, f_T, C_e, $r_{b'e}$, and $r_{b_b'}$.

Unit - III

3.　(a)　What do you mean by fidelity of an amplifier?　2

(b)　Draw the two stages RC coupled amplifiers and explain its response at LF and HF.　　7

(c)　Explain the effect of emitter bypass capacitor in low frequency response.　　7

(d)　Explain different types of coupling amplifier.　7

Unit - IV

4.　(a)　Define desensitivity D.　　2

(b)　Explain various topologies for negative feedback with their block diagrams.　　7

(c)　What are the advantages and disadvantages of negative feedback?　　7

(d) Explain voltage series feedback with example. 7

Unit - V

5. (a) Differentiate between positive and negative feedback. 2

   (b) Explain Barkhausen Criterion and conditions of oscillation. 7

   (c) Explain RC phase shift oscillator and also derive the expression for cutout frequency. 7

   (d) Explain Colpitt's oscillator and also derive the expression for cutout frequency. 7