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324451 (25)

BE (4th Semester)

Examination, Nov.-Dec., 2021

Branch : Elect.

ANALOG ELECTRONICS (NEW)

Time Allowed : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : (i) Part (a) of each question is compulsory.

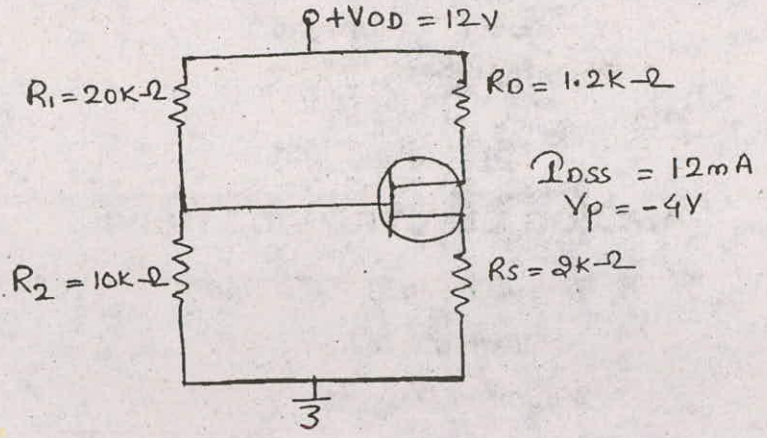
(ii) Attempt any two parts from (b), (c) and (d).

Unit-I

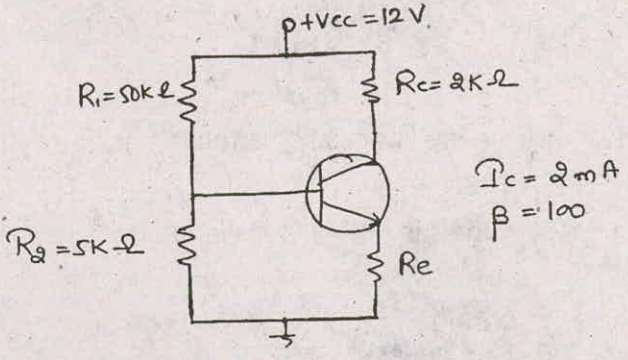
Q. 1. (a) Define stabilization factors S, S" and S' ? **2**

(b) What is Bias Compensation ? Explain the various compensation techniques ? **7**

(c) For circuit shown below, calculate I_D, V_{GS}, V_G, V_{DS} and V_S ? 7



(d) Calculate R_e, V_{ce} and S for circuit shown below : 7

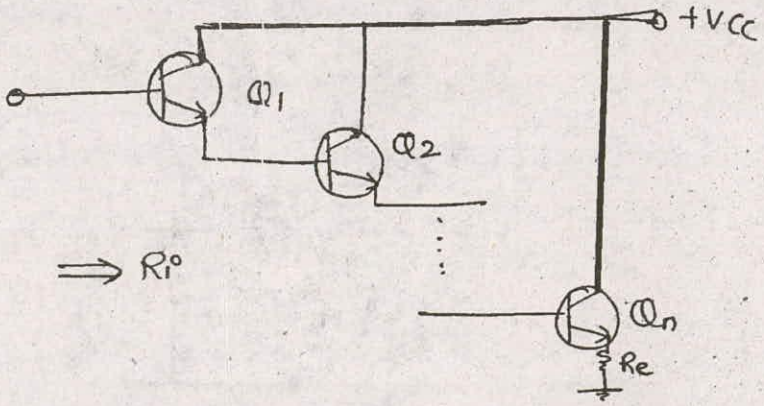


Unit-II

Q. 2. (a) State Miller's theorem ? **2**

(b) Explain Bootstrapping in Darlington pair amplifier ? **7**

(c) The cascade configuration is shown in figure. Find input resistance if hie = hre = hoe = 0 and hfe is same for each transistor from Q_1 to Q_n ? **7**

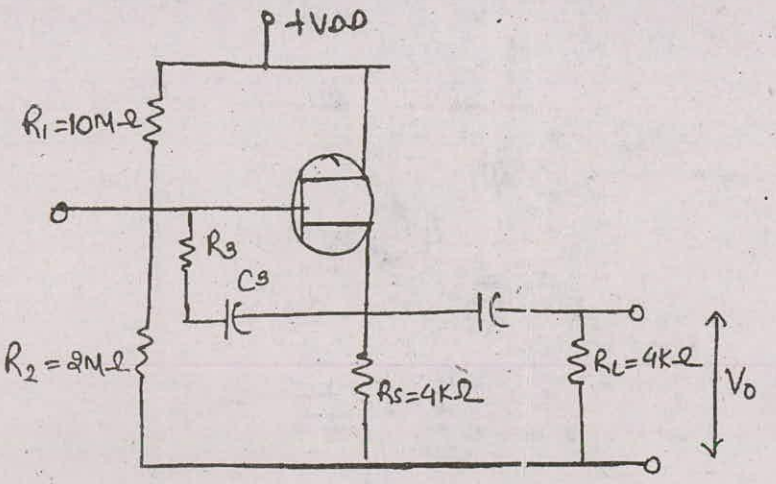


(d) The FET used in Bootstrapped CD amplifier shown in figure has :

gm = 2 mA/V, rd = 20 K. Assume that all the capacitors have large value and gate current of FET is negligible calculate : 7

(i) Voltage gain Av = V_0 / V_i

(ii) R_i ?



Unit-III

Q. 3. (a) Define base spreading resistance & write its expression ? **2**

(b) Define Diffusion Capacitance ? Also, derive an expression for it ? **7**

(c) A BJT has following parameters measured at room temperature I_C = 1 mA, hie = 3 kΩ, hfe = 100, f_T = 4 MHz, C_c = 2 pf, C_e = 18 pf. Find rb'e, rbb', gm and f_H for R_L = 1 kΩ ? **7**

(d) Prove that for an CE amplifier

$$f_T = h_{fe} * f_\beta$$

Also define f_T and f_β ? **7**

Unit-IV

Q. 4. (a) Define harmonic distortion in an amplifier ? **2**

(b) Describe low frequency response of an amplifier and also find expression for percentage tilt ? **7**

(c) The transfer function V_0/V_s of an amplifier has n poles S_1, S_2 ..... S_n and k zero's S_{z1}, S_{z2} ..... S_{zk} is as follows :

$$T.F = \frac{V_0}{V_s} = \frac{K(S-S_{z1})(S-S_{z2}).....(S-S_{zk})}{(S-S_1)(S-S_2).....(S-S_n)}$$

If zeros are of much higher frequency then poles then show that : approximate

expression for high 3dB frequency f_{H^*} is given as : 7

$$\frac{1}{f_{H^*}} = \sqrt{\frac{1}{f_{1^2}} + \frac{1}{f_{2^2}} \ldots\ldots \frac{1}{f_{n^2}}}$$

(d) Explain types of distortions in an amplifier ? 7

Unit-V

Q. 5. (a) Define feedback ? 2

(b) What are the different topologies for feedback amplifiers ? 7

(c) What are advantages of negative feedback & what are general characteristics of negative feedback ? 7

(d) Derive following for voltage shunt feedback amplifier : 7

(i) $R_i f$

(ii) $R_o f$