4E4120

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4E4120

B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Electronics Instrumentation & Control Engg.
4EI1A Analog Electronics
Common with EE, EX, EC & EI

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. _____ 2. _____

UNIT-I

Q.1. (a) Discuss with the help of a circuit example, the purpose of providing (i) negative feedback (ii) positive feedback in amplifiers. [8]

(b) A negative feedback of $\beta = 0.002$ is applied to our amplifier of gain 1000. Calmlate the change in overall gain of the feedback amplifier if the internal amplifier is subjected to a gain reduction of 15%. [8]

OR

Q.1. (a) Show that the negative feedback in amplifiers increases the bandwidth and improves signal to noise ratio. [8]

(b) Draw and explain the current shunt feedback. [8]

UNIT-II

Q.2. (a) State the Barkhausen conditions for an electronic system to oscillate with feedback. [8]

(b) Draw the circuit diagram of a colpitts oscillator and explain its working. [8]

OR

Q.2. (a) Draw the circuit diagram of an R-C phase shift oscillator and obtain an expression for its frequency of oscillation. [8]

(b) Differentiate between the monostable and bistable multivibrator. [8]

UNIT-III

Q.3. (a) Explain how would you arrive at the hybrid - π equivalent circuit model in CE configuration at high frequencies. Explain the different parameters involved in the circuit. [8]

(b) A CE – connected amplifier has $C_{cb} = 5pF$, $C_{be} = 12pF$, $h_{fe} = 100$, $h_{ie} = 1.5\ k\Omega$. Determine input capacitance to the circuit for a circuit collector resistance of 12Ω. [8]

OR

Q.3. (a) Draw the circuit of emitter follower at high frequencies and explain its working.[8]

(b) A transistor with alpha cut-off frequency = 5 MHz and h_{fe} or $\beta = 50$ is used in a CE configuration. When connected to an amplifier, it has stray capacitance of 80 pF at the output terminals. Determine the upper 3dB frequency when

(i) $R_L = 10k\Omega$ and (ii) $R_L = 100k\Omega$ [8]

UNIT-IV

Q.4. (a) What is parallel resonances? What are its features? How is it different from series resonances? [8]

(b) Explain the reasons for potential instability in tuned amplifiers. [8]

OR

Q.4. (a) Draw the circuit diagram of a collector tuned amplifier and derive expressions for the voltage gain at the tuned frequency and bandwidth. [8]

(b) Explain in brief the advantage of using double – tuned circuit over a single tuned circuit. Draw the circuit diagram of double tuned amplifier and its frequency response. [8]

UNIT-V

Q.5. (a) What is a power amplifier? In what respects does it differ from a voltage amplifier? Why heat sink are needed. [8]

(b) Explain collector efficiency, distortion and power dissipation. [8]

OR

Q.5. (a) Prove that for class B push-pull power amplifier the theoretical conversion efficiency is 78.5% and power dissipation capability of each transistor used shall be at least 0-2 times the maximum power output of the amplifier. [8]

(b) Draw the circuit of class D and class E amplifier and their application. [8]

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