4E1219

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4E1219

B. Tech. IV-Sem. (Back) Exam., Oct.-Nov. - 2020

Electronic Inst. & Control Engineering

4EI4-04 Analog Circuits

EC, EI

Time: 2 Hours **Maximum Marks: 82**

 Min. Passing Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What is digital to analog conversion?

Q.2 What is clipper circuit? Describe biased clipper.

Q.3 Discuss the need for biasing in transistor.

Q.4 Why voltage series feedback is most commonly used in cascaded amplifiers?

Q.5 Find the conversion time of a successive approximation ADC which uses a 2 MHz clock and a 5 bit binary ladder containing 8V reference.

Q.6 Why a power amplifier is always preceded by a voltage amplifier?

Q.7 What is Barkhausen criterion for oscillator?

Q.8 Define offset voltage as applied to an Op – amp.

Q.9 Voltage gain of an amplifier without feedback is 60 dB. It decreases to 40 dB with feedback. Calculate feedback factor.

Q.10 What are the differential gain and common mode gain of differential amplifier?

PART – B

[4x8=32]

(Analytical/Problem solving questions)

Attempt any four questions

Q.1 Describe the circuit and working of Colpitt's oscillator using BJT?

Q.2 Define the following with respect to performance characteristics of ADC –

(a) Resolution

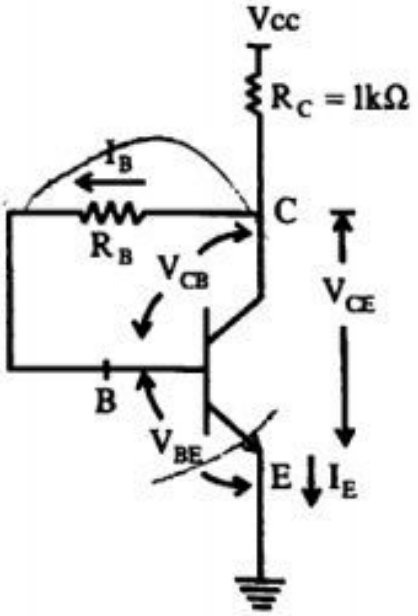
(b) Accuracy

(c) Settling time

(d) Conversion time

Q.3 Draw a circuit of an Astable Multivibrator and explain its working.

Q.4 The transistor shown in figure below has operating point at 2V, 2mA. Calculate the value of R_B. Given that $V_{BE} = 0.7V$, $\beta = 50$.



Q.5 Define the following parameters with respect to Op-amp –

(a) Input bias current

(b) Slew rate

(c) CMRR

(d) Output offset voltage

Q.6 Describe the concept of stability & gain margin.

Q.7 Explain Schmitt trigger and its application.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[2×15=30]**

Attempt any two questions

Q.1 What are the different analog to digital conversion techniques? Explain any one of them in detail.

Q.2 (a) Describe inverting and non-inverting Op-amp.

(b) A 5 mV, 1 kHz sinusoidal signal is applied to the input of an Op-amp integrator for which $R_1 = 100\ k\Omega$ and $C = 1\mu F$. Find the output voltage.

Q.3 Classify amplifiers based on operating point selection. Compare various configurations in terms of efficiency and distortion.

Q.4 Explain active filters with low pass, high pass, band pass and band stop.

Q.5 The circuit shown below has following parameters, $R_C = 4\ k\Omega$, $R' = 50\ k\Omega$, $R_S = 6k\Omega$, $h_{ie} = 1.1\ k\Omega$, $h_{fe} = 60$ and $h_{oe} = h_{re} = 0$.

Find :

(a) A_{vf}

(b) R_{if}

(c) R_{of}