C C1121 Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B. TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EE203

Course Name: ANALOG ELECTRONIC CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries5 marks. Marks

1 Design a clamper circuit using diode to obtain sine wave output with its negative peak clamped to +2.6V. (Assume diode drop as 0.6V). (5)

2 Why does the gain of a transistor amplifier vary with frequency? Sketch the frequency response of CE amplifier. (5)

3 Why negative feedback is utilised in amplifiers? How various parameters of an amplifier gets modified by negative feedback? (5)

4 The gain bandwidth product of an op-amp is given as 10MHz.Determine the bandwidth of a non inverting amplifier using op amp for a gain of 60dB.Also find the closed loop gain of the amplifier if the required bandwidth is 100kHz. (5)

5 Draw the circuit diagram of an ideal differentiator using op-amp with corresponding input and output waveform. Why the circuit can not be recommended for practical use? (5)

6 Design a comparator using Op Amp that compares a sinusoidal signal of 3V peak with a fixed dc voltage of 1.5V.Draw corresponding waveforms. (5)

7 Design a Wein bridge oscillator with frequency of oscillation of 1kHz using op-amp. (5)

8 Draw a monostable multivibrator circuit for a time period of 1msec with an amplitude of 10V using 555 timer. (5)

PART B

Answer any twofull questions, each carries10 marks.

9 a) Explain the construction and operation of Enhancement type MOSFET with neat diagrams. (5)

b) Design a zener voltage regulator to provide regulated output voltage of 5.6 V for a variable load resistance that varies from 300Ω to 6kΩ. Zener diode parameters are I_{Zmin}= 0.25 mA and P_Z= 280mW .The input voltage is considered as constant at 15V. (5)

10 a) The data sheet of N channel JFET gives the following details. I_{DSS}=10mA and pinch off voltage of -4.8V.Determine (i) V_{GS} corresponding to drain current of 3.5 mA. (ii)Determine transconductance g_m at this drain current. (5)

b) Draw the small signal AC equivalent circuit of a Common Drain FET amplifier. Derive the expression for voltage gain, input impedance and output impedance. (5)

11 a) Determine the following parameters for the fixed bias configuration of transistor amplifier. (i) I_B and I_C (ii)V_{CE} and (iii)V_B and V_C . Assume V_{BE}=0.7V. (4)

Given β=100,V_{cc}=16V,R_c=2.2kΩ and R_B=240 kΩ.

b) Design a voltage divider bias circuit to obtain the following specifications and determine the stability factor. Assume the ratio of base current to the current through R_{B2} is 1:10. Given V_{CC}=22V, β=100, V_{CE}=50% of V_{CC},V_{RE} =10% of V_{CC}, I_C=0.8mA and V_{BE}=0.7V. (6)

PART C

Answer any two full questions, each carries10 marks.

12 a) Specify different schemes of coupling in multistage amplifiers. Compare their merits and demerits (5)

b) Why class AB power amplifiers are preferred over Class B operations? (5)

13 a) Derive the expression for frequency of oscillation for RC phase shift oscillator using BJT. (5)

b) The datasheet of Op Amp gives the following values. (5)
Open loop Gain= 175,000, common-mode gain =0.18 and slew rate= 0.5V/µs. Determine the CMRR in decibels. How long does it take the output voltage of an op-amp to go from -10V to +10V?

14 a) Derive the expression for output power and conversion efficiency of class B push pull power amplifier. (5)

b) How do the open-loop voltage gain and closed-loop voltage gain of an op-amp differ? What is the limiting value of output voltage of Op Amp Circuit? Justify with proper characteristics. (5)

PART D

Answer any twofull questions, each carries 10 marks.

15 a) Design an Op Amp circuit to get the output according to the given expression. (5)
V_O=-[0.3V_1+3V_2+V_3] where V_1,V_2 and V_3 are the inputs to op-amp.

b) Analyze the circuit diagram of an Instrumentation amplifier using op-amp. Derive the expression for output voltage. (5)

16 a) Draw and explain the operation of a triangular wave generator using op-amp. (5)

b) Design an astable multi vibrator using 555 timer for an output wave of 60% duty ratio at 2kHz frequency. (5)

17 a) Draw the circuit diagram of a Precision rectifier using op-amp. What is the main advantage over a normal rectifier? (5)

b) Design an RC phase shift oscillator using op-amp for an output frequency of 1kHz (5)

****