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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EE203

Course Name: ANALOG ELECTRONICS CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries5 marks. Marks

1 Draw the circuit of a simple zener voltage regulator and design thevalue ofseries resistor R_S for a load voltage of 12V. Given R_L= 500 Ω, I_{zmax}= 80 mA, I_{zmin} = 10 mA,V_{inmin}= 15V, V_{inmax} =18 V. (5)

2 Draw the frequency response characteristics of RC coupled amplifier and explain the reasons behind its shape. (5)

3 List out the merits and demerits of negative feedback on amplifier performance (5)

4 Compare the characteristics of ideal Op-Amps and practical Op-Amps. (5)

5 Draw the circuit of an inverting amplifier and obtain the expression for its closed loop gain. (5)

6 Draw the Schmitt trigger circuit and determine the threshold voltages V_{UT} and V_{LT}in a circuit with two resistors 18kΩ and 1kΩ,V_{ref} = 4V, and saturation voltage = ±15V (5)

7 With necessary diagrams explain the operation of OP-Amp square wave generator. (5)

8 Explain the operation of Op-Amp crystal oscillator. (5)

PART B

Answer any two full questions, each carries 10 marks.

9 a) Draw and explain the h parameter small signal low frequency model for BJT. (4)

b) Derive the expressions for current gain, input impedance, voltage gain and output impedance using h parameters of BJT. (6)

10 a) Draw and explain small signal model of FET. (4)

b) Obtain the operating point set by the voltage divider bias circuit for an NPN CE transistor with β = 50 and V_{BE} = 0.7 V. Given V_{CC} = 18 V, R_1 = 82kΩ, R_2 = 22kΩ, R_C = 5.6kΩ and R_E = 1.2kΩ. (6)

11 Explain the construction, biasing, operation and characteristics of JFET. (10)

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PART C

Answer any twofull questions, each carries10 marks.

12 a) With necessary diagrams explain the working of class A transformer coupled amplifier and obtain the maximum overall efficiency. (8)

b) What are its advantages and disadvantages (2)

13 a) Compare different types of multistage amplifiers. (5)

b) With a neat circuit diagram explain the operation of Colpitt's oscillator using BJT. (5)

14 a) Define the following terms (8)

i) CMRR ii) Slew rate iii) Input bias current (iv) Input offset voltage

b) Give the typical values of above parameters for 741 IC (2)

PART D

Answer any twofull questions, each carries 10 marks.

15 a) Explain the operation of Op-Amp integrator and differentiator circuits. (6)

b) Explain the working and design of a triangular wave generator circuit with necessary diagrams. (4)

16 a) What are the features of instrumentation amplifier? Derive the expression for output voltage of an instrumentation amplifier. (6)

b) Design the feedback circuit of a Wein Bridge oscillator with 2MHz output frequency. (4)

17 With the help of internal circuit diagram of IC555 explain the operation of astable multivibrator.Derive the expression for frequency of oscillation. (10)

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