CC-9 PRACTICAL-2021

Full marks-30   **Time-2hrs.**

Answer **any one question** from the following questions.

1.

(a) Draw the circuit diagram of a lead-lag network used in a Wien Bridge Oscillator. Draw (i) The phase shift vs. Frequency curve (ii) V_{out} /V_{in} vs. Frequency curve for the lead-lag network
Explain the nature of variation of the above curves.

(b) Draw the circuit diagram and design a Wien Bridge Oscillator for frequency = 7.2 KHz
Explain the importance of lead-lag network in the Wien Bridge Oscillator.
Comment on the values of resistances used in the circuits other than lead-lag network.
How does the output voltage vary with variation of Resistance R_3 of the Wien Bridge circuit? Explain the utility of R_3.

                                        (3+3+3+6) + (5+3+2+2+2+1)

2.

(a) Draw the circuit diagram of a series regulated power supply from a given unregulated power supply using two transistors and a zener diode.   (10)

(b) Using the following data determine the values of the resistances used in the above circuit for output regulated voltage = 12 Volt for current range (0 – 100 mA).
Output voltage of unregulated power supply $V_{in(min)}$ = 10 Volt to $V_{in(max)}$ = 15 Volt
β for pass transistor = 200
β for error amplifier = 100
Breakdown voltage of Zener diode = 5.6 Volt at I_z =10 mA   (10)

(c) Using the following data for line regulation, draw the line regulation curve for the above circuit for load current I_L = 10 mA in a mm division graph paper.

V_{in} (Volt)	V_{out} (Volt)
10	9.3
11	10.5
12	11.0
13	11.6
14	11.8
15	11.9

Calculate % regulation of the curve

                                                            (7 + 3)

H

3.

(a) What is the difference between simple p-n diode and Zenner diode? What is Avalanch breakdown?   2+2

(b) What is the function of R_s and how it is calculated?   2+2

© What are load regulation and line regulation?   2+2

(d) Draw circuit diagrams of forward biased and reverse biased Zenner diodes. Also draw graphs showing forward reverse characteristics.
              2+2+1+1

(e) From the reverse characteristic curve, explain r_{ac} and r_{dc}. 2+2

(f) Draw both line and load regulation curves and explain percentage regulation of load and input regulation factor with suitable tables.

                              2+2+2+2

4.

(a) What is an Op Amp? What are its characteristics? What is virtual ground?
                          1+2+2

(b) What is "offset null"? Draw a circuit for "offset null" arrangement.
                      1+3

(c) Draw circuit diagrams of an adder, differential and subtractor using OP AMP.
                          3+3+1

(d) Write down the theory of OP AMP integrator and differentiator with circuit diagrams.
                          3+1+3+1

(e) Draw a circuit diagram for Schmidtt trigger and state the relevant theory. State what is hysteresis in this connection. 3+2+1

5.

(a) What do you mean by STATIC CHARACTERISTICS of a transistor?

(b) Draw the circuit diagram for measuring the static characteristics of a n-p-n transistor in CE mode.

(c)State the functions of the various components drawn in the above circuit.

(d) State the steps of the experiment briefly.

(e) Draw the relevant table necessary for the experimental data for the above experiment.

(f) Draw the nature of the curve obtained in the above experiment for at least three base currents.

(g)State two precautions for the above experiment. 2+5+8+5+3+5+2

6.

(a)What is a transistor amplifier?

(b) What is the aim of the experiment that you are doing with the amplifier.

(c) Draw the relevant circuit of an amplifier which you want to design.

(d) Write down the theory necessary for the above experiment.

(e) State the functions of each component of the circuit that you have drawn above.

(f) What is Q point? How is it chosen for an amplifier with a transistor.

<div align="center">3+2+5+6+8+6</div>