Total No. of printed pages = 5

CAI-506/EC&D-II/5th Sem/2017/M

ELECTRONIC CIRCUITS AND DEVICES-II

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What is the importance of differential amplifier ? Draw the circuit diagram of basic BJT differential amplifier. 2+2=4

   (b) Write different configuration of differential amplifier circuit. 4

   (c) What is CMRR ? Show that in a differential amplifier using Op-Amp the output voltage. 2+4=6

$$V_{out} = A_d V_d \left(1 + \frac{1}{CMRR} \cdot \frac{V_{cm}}{V_d}\right)$$

[Turn over

2. (a) For AC analysis of dual input balanced output differential amplifier, derive the expression for differential voltage gain. 8

(b) An emitter biased dual input, balanced output differential amplifier has the following specifications : 6

$V_{CC} = 15V$, $R_{C_1} = R_{C_2} = 3\,K\Omega$, $R_E = 3{\cdot}6\,K\Omega$, $\beta_{dc} = 97$, $V_{BE} = 0{\cdot}7V$

Calculate :

(i) Operating point

(ii) Voltage gain.

3. (a) What is adjustable voltage regulator ? Derive the expression for the output voltage for LM 317 adjustable voltage regulator. 2+6=8

(b) Differentiate between shunt and series regulators. 2

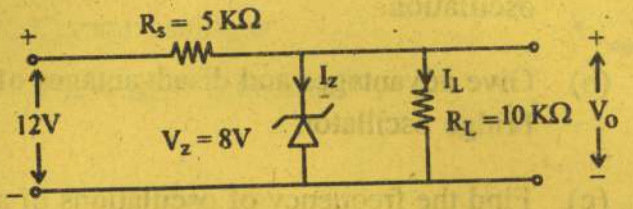
(c) A Zener circuit is shown in figure.

Find :

(i) Output voltage

(ii) Voltage across R_s

(iii) Current through Zener diode 3



(d) The 7912 regulator IC provides _____ voltage. 1

4. (a) What is tuned amplifier ? Give the classification of tuned amplifiers. Draw and explain the circuit diagram of single tuned amplifiers and its frequency response. 2+2+6=10

(b) A single tuned amplifier with capacitive coupling consists of tuned circuit having $R = 12\Omega$, $L = 25$ mH and $C = 0{\cdot}07$ μF. Determine 4

(i) Resonant frequency

(ii) Bandwidth of the amplifier.

5. (a) Explain the working of Wein bridge oscillator with appropriate circuit diagram and derive the expression for the frequency of oscillation. 8

(b) Give advantages and disadvantages of Wein bridge oscillator. 3

(c) Find the frequency of oscillations of a Wein bridge oscillator with $R = 20\,K\Omega$ and $C = 1000$ pF. 3

6. (a) Draw the block diagram of feedback amplifier in the following configuration : 4

(i) Voltage series feedback

(ii) Current shunt feedback.

(b) What is negative feedback amplifier ? How does negative feedback help in increasing stability ? 5

(c) Define feedback factor (β). 2

(d) A single stage transistor amplifier has a voltage gain of 600 without feedback and 50 with feedback. Calculate the percentage of output which is feedback to the input. 3

7. Write short notes on any *two* : 7×2=14

(a) SCR

(b) Active filter

(c) Crystal oscillator

(d) Phase shift oscillator.