# 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.  What do you mean by balanced and unbalanced differential amplifier ? Derive the equation of output voltage of a dual input unbalanced differential amplifier.

    In a differential amplifier $V_{CC}$=15V, $V_{EE}$=–15V, $R_E$ = 50 k$\Omega$, $R_B$ = 10 k$\Omega$, $R_C$ = 15 k$\Omega$. Determine the output voltage of $Q_1$ and $Q_2$ are identical with $\beta_{dc}$ = 50                   1+10+3=14
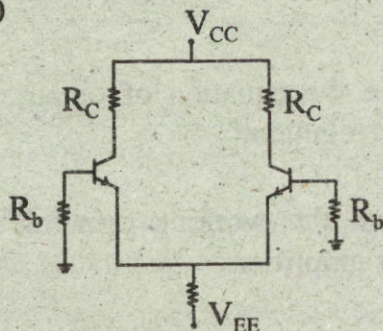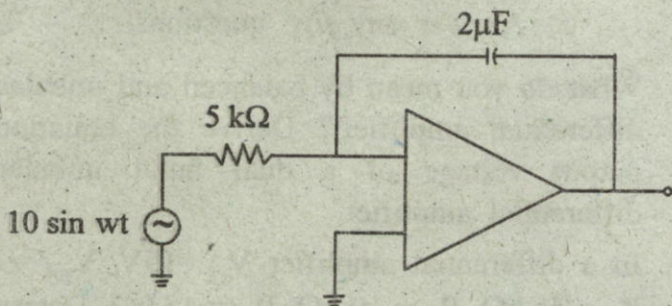
2. (a) Define the following terms : 9

   (i) CMRR

   (ii) input offset voltage

   (iii) output offset voltage

   (iv) input bias current

   (v) buffer amplifier, and

   (vi) slew rate

   (b) Determine the output voltage of the following OPAMP at 10 sec. 5



3. (a) Describe how a single OPAMP regulator works.

   (b) Derive the equation of output voltage of a boost regulator. 6+8=14

4. (a) Explain the working principle of a single tuned amplifier.

(b) What do you mean by piezoelectric effect ?

(c) Describe the operation of a parallely connected crystal as an oscillator. $5+2+7=14$

5. (a) With the help of circuit diagram derive the equation of feedback current of voltage shunt feedback amplifier. 5

(b) Discuss the effect on input impedance of voltage shunt feedback amplifier. 4

(c) Determine the frequency of oscillation from the following circuit. 5
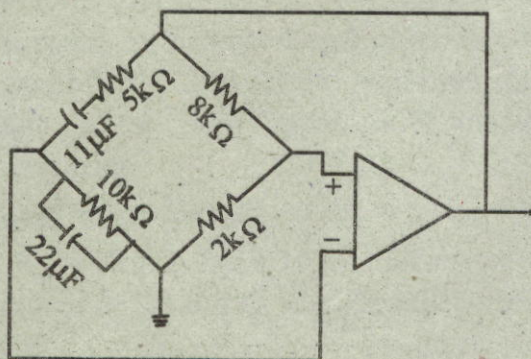


6. (a) Differentiate TRIAC from DIAC. Explain any two triggering method of SCR.

(b) Explain the monostable mode of operation of IC 555 timer. $1+6+7=14$

7. Write short notes on any *four* of the following :

$3\frac{1}{2}\times4=14$

(i) Capacitive filter power supply

(ii) LM 317 IC as voltage regulator

(iii) Current series feedback amplifier

(iv) FET amplifier

(v) Phase shift oscillator.