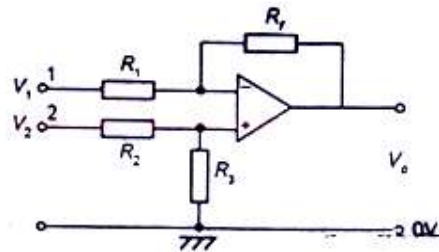


(4)

- (ii) $V_1 = 0$ and $V_2 = 5$ mV
(iii) $V_1 = 50$ mV and $V_2 = 25$ mV
(iv) $V_1 = 25$ mV and $V_2 = 50$ mV



6. (a) Prove the following Boolean identities and verify these with the help of truth tables.

- (i) $A \oplus (A + B) = \bar{A}.B$
(ii) $A \oplus (\bar{A} + B) = \bar{A}.B$

OR

- (b) With the help of PN junction diode and transistor obtain the following gates :

- (i) OR
(ii) NOT
(iii) NAND
(iv) NOR

M.Sc.-Phy.-IIS-(CEC 302)

2016

ELECTRONICS

Time : Three Hours] [Maximum Marks : 80

Answer from both the Sections as directed. The figures in the right-hand margin indicate marks.

SECTION-A

1. Answer any four of the following : 4×4
- (a) Explain, how will you get undamped oscillations from a tank circuit.
(b) What do you mean by CMRR ?
(c) What is a unity gain buffer ?
(d) How will you obtain NOT gate from NAND gate?
(e) A two-stage amplifier has first-stage voltage gain of 20 and second stage voltage gain of 400. Find the total decibel gain.
(f) Differentiate between amplifier and oscillator.

OR

(2)

2. Answer all questions from the following : 2×8
- (a) Explain direct coupled transistor amplifier.
 - (b) What is a feedback circuit? Explain, how it provides feedback in amplifiers.
 - (c) What is an Oscillator?
 - (d) Discuss the circuit operation of tuned collector oscillator.
 - (e) Write a short note on analog and digital signals.
 - (f) Derive an expression for the voltage gain of an inverting amplifier.
 - (g) What is binary number system?
 - (h) Give the block diagram of an operational amplifier.

SECTION-B

Answer all questions of the following : 16×4

3. (a) Draw the circuit diagram of RC coupled amplifier. With the help of its equivalent circuit discuss its working in mid frequency region and high frequency region. Also, obtain an expression for its voltage gain.

OR

(3)

- (b) Write brief notes on the following :
- (i) Feedback amplifier
 - (ii) MOSFET
4. (a) Draw the circuit diagram of RC oscillator and explain its working. Obtain the necessary condition for maintained oscillations.
- OR**
- (b) Draw the circuit diagram of crystal oscillator. What type of crystal can be used? Give properties of crystal used in oscillator. A quartz crystal has following constants : $L = 0.06 \text{ H}$, $C_1 = 0.01 \text{ pF}$, $C_2 = 10 \text{ pF}$ and $R = 500\Omega$. Calculate the series and parallel resonant frequency.
5. (a) What is meant by a differential amplifier? Draw the circuit diagram of emitter coupled differential amplifier and give the analysis for differential and common mode inputs.

OR

- (b) In the differential amplifier shown in Figure, $R_1 = 10 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$, $R_3 = 100 \text{ k}\Omega$ and $R_f = 100\text{k}\Omega$. Determine the output voltage V_0 if :
- (i) $V_1 = 5 \text{ mV}$ and $V_2 = 0$