

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
(END SEMESTER EXAMINATION)

CLASS: B.TECH  
BRANCH: ECE

SEMESTER : III  
SESSION : MO/2022

SUBJECT: EC211 ANALOG CIRCUITS

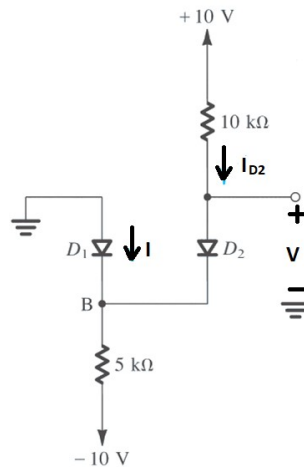
TIME: 3:00 Hours

FULL MARKS: 50

**INSTRUCTIONS:**

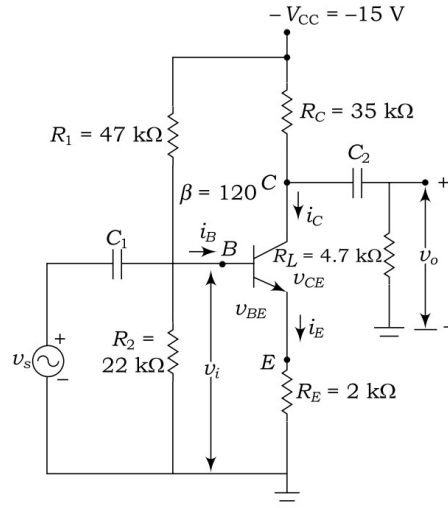
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a) Assuming the diodes to be ideal, find the values of  $I$  and  $V$  in the following circuits. [2]



Q.1(b) Draw and explain the voltage transfer characteristics (VTC) for the BJT voltage amplifier. [3]

Q.1(c) Figure shows transistor amplifier. Determine the input resistance  $R_i$  and  $V_{CE}$ . [5]



Q.2(a) Find the magnitude gain corresponding to a voltage gain of 100dB. [2]

Q.2(b) Explain the Miller Theorem with appropriate equations. [3]

Q.2(c) Derive the expression for the gain of an BJT CE amplifier considering only the output coupling capacitor ( $C_2$ ) for low frequency applications. [5]

Q.3(a) An amplifier has gain of -1000 and feedback of = -0.1. If it had a gain change of 10% due to temperature, what will be the change in gain of the feedback amplifier? [2]

Q.3(b) Derive the expression for the input impedance for the voltage-series (Voltage-voltage) feedback. [3]

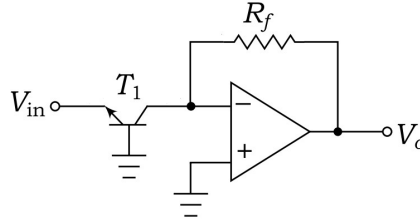
Q.3(c) Derive the expression of frequency of oscillation for RC phase shift oscillator. [5]

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- Q.4(a) Draw and explain the Emitter-coupled differential amplifier with proper equation. [2]  
 Q.4(b) When a step voltage input is applied to an integrator circuit from 0 to 0.5 ms as shown in figure, [3]  
 find out the output voltage at  $t = 0.5$  millisecond.



- Q.4(c) Derive the output voltage for the op-amp circuit shown in the figure. [5]



- Q.5(a) Explain the idealized input characteristic of the UJT. [2]  
 Q.5(b) Discuss the operation of collector coupled monostable multivibrator with its output waveforms. [3]  
 Q.5(c) Write short notes on: [5]  
 (a) Diode switching times and Transistor switching times.  
 (b) Tunnel Diode and its current-voltage characteristics