

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

CLASS: BTECH
BRANCH: ECE

SEMESTER : III/ADD
SESSION : MO/2024

SUBJECT: EC211ANALOG CIRCUITS

TIME: 3 Hours

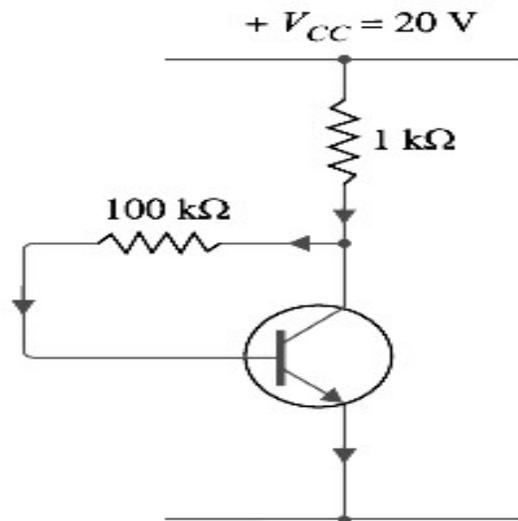
FULL MARKS: 50

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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|---|-------------------|------------------|
| <p>Q.1(a) What is the basic difference between a clipper and clamper ? [5]</p> <p>Draw the circuit diagram and output waveform only for the following .(Input sinusoidal wave with $+V_m$ to $-V_m$)</p> <ol style="list-style-type: none"> i) Combination of biased positive and negative clipper. ii) Shunt negative clipper with positive bias voltage . iii) Positive clamper with positive reference voltage . iv) Negative clamper with positive biasing. | <p>CO
1,4</p> | <p>BL
I</p> |
| <p>Q.1(b) Why we need transistor biasing circuit? [5]</p> | <p>2,4</p> | <p>III
V</p> |

Fig. shows a silicon transistor biasing circuit. Mention the type of biasing used in the circuit given below.. Determine the operating point. Given that $\beta = 100$.



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|--|--------------|-------------------|
| <p>Q.2(a) What are h parameters? Explain the high frequency response and hybrid model parameters of CE amplifier? [5]</p> | <p>3,4,5</p> | <p>III
IV</p> |
| <p>Q.2(b) i) A transistor used in CE arrangement has the following set of h parameters when the d.c. operating point is $V_{CE} = 10$ volts and $I_C = 1$ mA: $h_{ie} = 2000\ \Omega$; $h_{oe} = 10^{-4}$ mho; $h_{re} = 10^{-3}$; $h_{fe} = 50$ Determine (i) input impedance (ii) current gain and (iii) voltage gain. The a.c. load seen by the transistor is r_L.
ii) Draw the circuit diagram of RC coupled amplifier. What is the significance of gain band width product in amplifier. [3+2]</p> | <p>3,4</p> | <p>V</p> |

PTO

Q.3(a)	i) Draw the block diagram of current shunt feedback. ii) The voltage gain without negative feedback is 40 dB. What is the new voltage gain if 3% negative feedback is introduced? iii) What is the effect on input and output impedance of an amplifier if it employs voltage series negative feedback? iv) Define phase and gain margin .	[1+1+1+2]	4,5	II III IV V
Q.3(b)	State the Barkhausen criterion for an oscillator. Explain RC phase shift oscillator with neat circuit diagram. Derive its frequency of oscillation. Give the amplifier gain and feedback network gain to sustain oscillator operation.	[5]	3,4,5	II III IV
Q.4(a)	Draw the circuit of Emitter coupled differential Amplifier and explain its transfer characteristics .	[5]	4,5	II III V
Q.4(b)	What is the basic difference between linear and nonlinear application of an OPAMP. Draw the circuit diagram of the following circuit(using OPAMP) and explain the function of each .(Draw wave form also) (Any Two) i) Schmitt Trigger and zero crossing detector ii) Logarithmic amplifier iii) Active band pass filter iv) Precision rectifier	[5]	4,5	II III IV V
Q.5(a)	What is the difference between voltage controlled and current controlled negative resistance circuits/devices? With the help of suitable diagram explain the working principle of current controlled negative device. Mention one of its applications also.	[1+4]	3,4,5	III IV V
Q.5(b)	Write down the name of five different methods used for sweep linearity improvement. Explain the basic concept of Miller sweep and Bootstrap sweep Time base generator circuit.	[5]	3,4,5	II III

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