BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER: III**
BRANCH: ECE **SESSION: MO/2022**

SUBJECT: EC211 ANALOG CIRCUITS

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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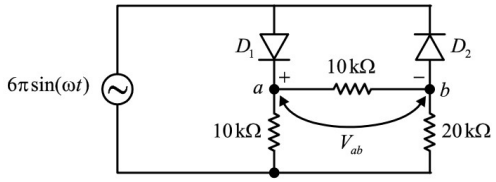
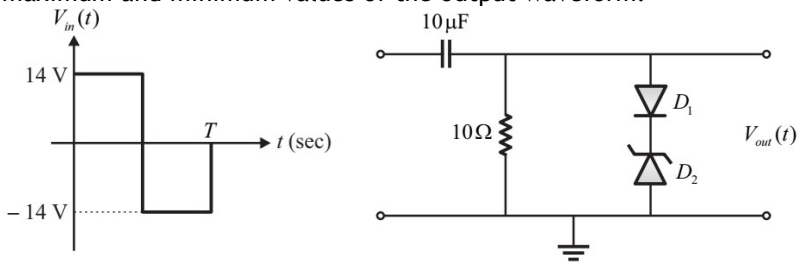
Q1 (a)	Derive and draw the time response of output of RC High Pass Circuit when pulse input is applied.	[2]	Understand the concept of active filter circuits.	Understand
Q1 (b)	Derive the expression for rise time of output generated when RC Low pass circuit is subjected to a step input.	[3]	Understand the concept of active filter circuits.	Understand
Q2 (a)	In the circuit shown, assume that the diodes D1 and D2 are ideal. Find out the average value of voltage V_{ab} (in Volts), across terminals 'a' and 'b'. 	[2]	Understand the concept of active filter circuits.	Analyze
Q2 (b)	In the figure, D1 is a real silicon p-n junction diode with a drop of 0.7 V under forward bias condition and D2 is a Zener diode with breakdown voltage of - 6.8 V. The input Vin (t) is a periodic square wave of period T, whose one period is shown in the figure. Assuming $10\tau << T$, where τ is the time constant of the circuit. What are the maximum and minimum values of the output waveform? 	[3]	Understand the concept of active filter circuits.	Evaluate
Q3 (a)	Derive the expressions for the transconductance (g_m) for BJT for hybrid π equivalent circuit.	[2]	Understand the concept of amplifiers	Analyze

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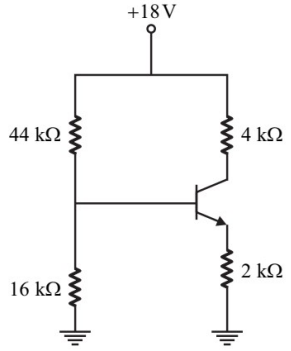
Q3 (b)	Consider the circuit shown in the figure. Assume base-to-emitter voltage V_{BE} = 0.8 V and common base current gain (α) of the transistor is unity. Find out the value of the collector-to-emitter voltage V_{CE}. 	[3]	Analyze amplifiers, at low and high frequency.	Evaluate
Q4 (a)	Draw the frequency response of an BJT amplifiers. What do you mean by -3dB frequency?	[2]	Analyze amplifiers, at low and high frequency.	Understand
Q4 (b)	Derive the gain of the CE amplifier considering only the effect of C1 capacitor in low frequency operation.	[3]	Analyze amplifiers, at low and high frequency.	Analyze
Q5 (a)	What is Darlington connection in the amplifier? Find out the expression of current gain in Darlington pair.	[2]	Understand the concept of amplifiers	Understand
Q5 (b)	Derive the expression of gain for CE amplifier in high frequency operation. Also, explain the physical significance of each capacitance.	[3]	Analyze amplifiers, at low and high frequency.	Analyze

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