S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
UNIT - I **SINGLE STAGE AMPLIFIERS DESIGN AND ANALYSIS**			
1	Define an Amplifier?	Remembering	1
2	Describe the single stage amplifier?	Remembering	1
3	Write the advantages of CE configuration over CB and CC configurations?	Applying	1
4	Classify the amplifiers based on different parameters?	Understanding	1
5	Distinguish among three configurations?	Understanding	1
6	Write the advantages of FET over BJT?	Applying	2
7	Arrange the hybrid equivalent model of a CE amplifier?	Remembering	1
8	Discuss a small signal JFET model of a common drain amplifier.	Understanding	2
9	Define various hybrid parameters of a Transistor?	Remembering	1

10	List out the characteristics of Common Emitter amplifier?	Remembering	7
11	Explain the small signal model for common source amplifier?	Understanding	7
12	Write the advantages of Emitter follower?	Applying	7
13	List the benefits of H- Parameters?	Remembering	1
14	Name the typical values of h-parameters for a transistor in CE, CB, CC configurations?	Remembering	1
S.NO	**QUESTION**	**BLOOMS TAXONOMY LEVEL**	**COURSE OUTCOMES**
15	Explain the typical frequency response of an RC coupled amplifier	Understanding	1
16	Justify why the common emitter amplifier provides 180° phase shift between input and output?	Evaluating	1
17	Construct the approximate h-parameter model for CE amplifier?	Creating	1
19	Define a distortion in amplifiers? Give the classification of distortion?	Remembering	1
20	Define amplitude distortion?	Remembering	1
21	Define frequency distortion?	Remembering	1
22	Define phase or Delay distortion?	Remembering	1
23	Justify the statement, Why the amplitude distortion is called as harmonic distortion?	Evaluating	1
24	Analyze the components affecting the frequency response of RC coupled amplifier at low frequencies?	Analyzing	1
25	Justify the answer, why frequency response of RC coupled amplifier decreases at high frequencies?	Evaluating	1
26	Define the concept of feedback in amplifiers?	Remembering	4
27	Discuss the types of feedback?	Understanding	4
28	Classify the feedback amplifiers based on the type of mixing and type of sampling?	Understanding	4
29	Write the advantages of negative feedback?	Applying	4
30	Distinguish the negative feedback and positive feedback?	Analyzing	4
31	Discuss how does negative feedback reduce distortion in an amplifier?	Understanding	4
32	Define sensitivity of an amplifier?	Remembering	1
33	Analyze the effect of negative feedback on bandwidth?	Analyzing	4
34	Calculate new gain, if An amplifier with stage gain 200 is provided with negative feedback of feedback ratio 0.05.	Analyzing	4
35	Write the relation between lower cut off frequencies with and without feedback.	Applying	4
37	Calculate the feedback ratio, if An amplifier has a gain of 300. When negative feedback is applied, the gain is reduced to 240.	Analyzing	4
38	Estimate the input impedance of the feedback amplifier? If An amplifier with Zi = 2KΩ has a voltage gain A = 200. If a negative feedback of β = 0.01 is applied to it.	Evaluating	4
39	Calculate the feedback factor. Express the amount of negative feedback in dB. If the gain of an amplifier is decreased to 10,000 with negative feedback from its gain of 60,000.	Analyzing	4
40	Define an oscillator?	Remembering	4

	UNIT-II **BJT AND FREQUENCY RESPONSE**		
1	**Explain** the significance of logarithmic scale?	Understanding	3
2	**Define** “bel” and “Decibel”?.	Remembering	3
3	**Discuss** the half bandwidth calculation of a transistor?	Understanding	3
4	**Define** dBs?	Remembering	3
5	**Define** half power frequencies?	Remembering	3
6	**Discuss** the effect of emitter bypass capacitor on low frequency response of BJT amplifiers.	Understanding	3
7	**Sketch** the high frequency π model of a transistor and explain in brief.	Applying	3
8	**Define** fα and fβ cut-off frequencies in Hybrid-π model.	Remembering	3

S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
9	**Define** square wave testing? What is need for it?	Remembering	3
10	**Define** f_T?	Remembering	3
11	**Discuss** the effect of coupling capacitors on low frequency response of BJT amplifiers.	Understanding	3
12	**Write** short notes on miller‟s theorem.	Creating	3
13	**Evaluate** the relationship between low frequency h-parameters and high frequency parameters.	Evaluating	3
14	**Describe** how internal capacitances affect the gain of BJT amplifier.	Evaluating	3
15	**Define** Band width of an amplifier?	Remembering	3
16	**Define** gain-bandwidth product?	Remembering	3
17	**Define** unity-gain frequency?	Remembering	
18	**Define** voltage gain of the amplifier at f_T?	Remembering	3
19	**Discuss** the internal BJT capacitances and explain their effects.	Understanding	3
20	**Express** power gain in dB	Understanding	3
21	**Express** voltage gain in dB.	Understanding	3
22	**Evaluate** the mid-range voltage gain of a transistor?	Evaluating	3
23	**Sketch** a small signal JFET model of a common drain amplifier.	Applying	3
24	**Sketch** a voltage divider bias FET network.	Applying	3
25	**Write** the relationship between the hie and rbb‟.	Creating	3
	UNIT-III **MULTIVIBRATORS, CLIPPERS AND CLAMPERS**		
1	**Define** a multivibrator? How many states does it have.	Remembering	2
2	**Describe** a bistable multivibrator?	Understanding	2
3	**Classify** the multivibrators?.	Understanding	2
4	**Indicate** the other names of a bistable multivibrator?	Understanding	2
5	**Describe** the bistable multivibrator.	Understanding	2
6	**Define** an ac coupling in multivibrators?	Remembering	2
7	**Name** the applications of a bistable multivibrator?	Remembering	2
8	**Define** stable state of a binary?	Remembering	2
9	**Define** quasi-stable state?	Remembering	2

10	**Define** loading of a binary? What are its effects on the performance of a binary?	Remembering	2
11	**Discuss** the purpose of collector catching diodes in multivibrators?	Understanding	2
12	**Write** the advantage of a self biased binary over fixed biased binary?	Applying	2
13	**Define** commutating capacitors? Why are they required?	Remembering	2
14	**Indicate** the other names of commutating capacitors?	Understanding	2
15	**Define** triggering?	Remembering	2
16	**Name** the methods of triggering in multivibrators? Distinguish between them.	Remembering	2
17	**Define** unsymmetrical triggering? Where is it used?	Remembering	2
18	**Define** symmetrical triggering? Where is it used?	Remembering	2
19	**Write** the advantages and disadvantages of a direct coupled binary?	Applying	2
20	**Discuss** about a Schmitt trigger?	Understanding	2
21	**List** the applications of a Schmitt trigger?	Remembering	2
22	**Explain** how a Schmitt trigger converts a sine wave into a square wave.	Understanding	2
23	**Define** the terms i)Upper triggering point(UTP) ii) Lower triggering point(LTP)	Remembering	2
24	**Describe** a monostable multivibrator?	Understanding	2
25	**Indicate** the other names of a monostable multivibrator?	Understanding	2

S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
26	**Explain** why is monostable multivibrator also called a delay circuit?	Understanding	2
27	**List** the applications of a monostable multivibrator?	Remembering	2
28	**Indicate** the type of triggering is used in a monostable multivibrator?	Understanding	2
29	**Describe** an astble multivibrator.	Understanding	2
30	**Write** the expression for the period of oscillation of an astable multivibrator when it used as square wave generator.	Applying	2
31	**Define** clipping in Non-linear wave shaping?	Remembering	2
32	**Name** the different types of clipping circuits?	Remembering	2
33	**Indicate** the other names of clipping circuits?	Understanding	2
34	**Name** the three configurations of clipping circuits?	Remembering	2
35	**Indicate** the devices required for clipping purposes? Name the commonly used ones.	Understanding	2
36	**Define** single ended clipping?	Remembering	6
37	**Describe** about the double ended clipping?	Understanding	6
38	**List** the applications of circuits?	Remembering	6
39	**Define** a comparator?	Remembering	6
40	**Distinguish** between comparator and clipping circuits.	Analyzing	6
41	**List** the applications of voltage comparators?	Remembering	6
42	**Define** clamping? What for clamping circuits are used?	Remembering	6
43	**Indicate** the other names of a clamping circuit?	Understanding	6
44	**Define** positive clamp?	Remembering	6
45	**Define** Negative clamp?	Remembering	6

46	**Justify** why the clamping circuit is also called a dc inserter?	Evaluating	6
47	**State** clamping circuit theorem.	Remembering	6
48	**Define** biased clamping?	Remembering	6
49	**Discuss** about practical clamping circuit?	Understanding	6
50	**Distinguish** between clipping and clamping?	Analyzing	6

UNIT-IV
LARGE SIGNAL AMPLIFIERS, LINEAR WAVE SHAPING

1	**Define** a linear network?	Remembering	6
2	**Define** linear wave shaping?	Remembering	6
3	**Discuss** about a low pass circuit?	Understanding	6
4	**Define** cut-off frequency?	Remembering	6
5	**Evaluate** the relation between rise time and bandwidth of a low-pass circuit?	Evaluating	6
6	**Define** high-pass circuit?	Remembering	6
7	**Write** the condition for a high-pass circuit, which act as a differentiator?	Applying	6
8	**Define** peaking?	Remembering	6
9	**Justify** why RC circuits commonly used compared to RL circuits?	Evaluating	6
10	**Explain** why f1 is also called the 3-dB cut-off frequency of an RC high pass filter?	Understanding	6
11	**Define** the step waveform mathematically. Sketch the step waveform neatly.	Remembering	6
12	**Write** the expression for rise time t_{r} in terms of the time constant RC.	Applying	6
13	**Write** the expression for rise time t_{r} in terms of the cut-off frequency f2.	Applying	6
14	**Write** the condition for an RC low-pass filter to function as a good integrator?	Applying	6

S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
15	**Express** how does a capacitor behave for sudden changes in voltage?	Understanding	6
16	**Define** the terms collector dissipation and conversion efficiency of class A power amplifier	Remembering	6
17	**Define** a large signal amplifier?	Remembering	5
18	Distinguish between voltage amplifier and power amplifier?	Analyzing	5
19	**Write** the classification of power amplifiers?	Applying	5
20	**Calculate** the power that can be dissipated by a transistor at an ambient temperate of TA=500C, given Tj=2300C and θJA=1000C/W.	Analyzing	5
21	**Calculate** the junction temperature. If the thermal resistance of a transistor is 100C/W. It is operated at TA=250C and dissipates 3W of power. Calculated the junction temperature.	A	5
22	**Compare** the various classes of operation of power amplifiers based on operating cycle.	Evaluating	5
23	**Discuss** the basic reason for crossover distortion in class-B power amplifiers?	Understanding	5
24	**State** the advantages of push pull class B power amplifier over class B power amplifier	Remembering	5

25	**Define** harmonic distortion? How the output signal gets distorted due to the harmonic distortion?	Remembering	5
26	**Compare** push pull and complementary symmetry class-B power amplifiers.	Evaluating	5
27	**Define** Heat Sink. What is its function?	Remembering	5
28	**Define** conversion efficiency of power amplifier.	Remembering	5
29	**Define** thermal runaway?	Remembering	5
30	**Define** conversion efficiency of power amplifier.	Remembering	5
	UNIT-V SWITCHING CHARACTERISTICS OF DEVICES		
1	Justify how does a diode act as a switch?	Evaluating	6
2	Define dynamic and static resistance of a diode?	Remembering	6
3	Define storage time of a diode?	Remembering	6
4	Define transition time of a diode.	Remembering	6
5	Define reverse recovery time of a diode.	Remembering	6
6	Describe when does a transistor act as a) a closed switch b) an open switch	Understanding	6
7	Define a) Rise time b) storage time c) fall time	Remembering	6
8	Define turn ON time of a transistor?	Remembering	6
9	Translate the term BV_{CBO}?	Understanding	6
10	Define BVCEO?	Remembering	6
11	Define the common emitter saturation resistance R_{CE} (sat).	Remembering	6
12	Discuss the three regions of operation of a transistor?	Understanding	6
13	Define the limitations posed by the transistor breakdown voltages?	Remembering	6
14	Explain how does the temperature affect the saturation junction of a transistor?	Understanding	6
15	Define avalanche breakdown.	Remembering	6
16	Define turn-on time of a transistor.	Remembering	6
17	Define delay time of a transistor.	Remembering	6
18	Define zener breakdown.	Remembering	6
19	Define operating point?	Remembering	6
20	Define the turn ON time of a transistor.	Remembering	6

GROUP - II (LONG ANSWER QUESTIONS)

S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
	UNIT-I SINGLE STAGE AMPLIFIERS DESIGN AND ANALYSIS		
1	**Evaluate** the equations for voltage gain , current gain, input impedance and output impedance for a BJT using low frequency h-parameter model for CE configuration.	Evaluating	1
2	**Evaluate** the equations for voltage gain, current gain, input impedance and output impedance for a BJT using low frequency h-parameter model for CB configuration.	Evaluating	1

3	**Evaluate** the equations for voltage gain , current gain, input impedance and output impedance for a BJT using low frequency h-parameter model for CC configuration.	Evaluating	1
4	**Evaluate** the expression for Ri, Ai, Av and Ro for CE amplifier with un bypassed Re.	Evaluating	1
5	**Classify** the amplifier circuits based on frequency range, type of coupling, power delivered and signal handled.	Understanding	1
6	**State** millers theorems. Explain its significance in transistor circuit analysis	Remembering	1
7	**Analyze** general transistor amplifier circuit using h-parameter model. Derive the expression for Ai,Av,Ri, Ro, Ais, Avs	Analyzing	1
8	**Define** h-parameters? Why they called so? Define them and what are the benefits of h-parameters	Remembering	1
9	**Explain** voltage shunt feedback amplifiers &current series feedback amplifiers?	Understanding	1
10	**Sketch** the block diagram of a feedback amplifier and derive the expressions for gain (1) with positive feedback and (2) with negative feedback. State the advantages of negative feedback.	Applying	1
11	**Estimate** the values of open loop Gain A and feedback ratio. For the given data iii) An amplifier, with feedback, has voltage gain of 100. When the gain without feedback changes by 20%and the gain with feedback should not vary more than 2%.	Understanding	1
12	(i) **Discuss** the circuits of voltage shunt and current series feedback amplifier and derive the expressions for input impedance Rif.	Understanding	**1**
13	**Explain** the relevant information, how the negative feedback improves stability reduce noise and Increase input impedance?	Understanding	1
14	**Design** the circuit diagram of CS amplifier. With the help of small signal model, derive the expressions for input impedance, output impedance and voltage gain.	Creating	1
15	(a) **Write** short notes on miller‟s theorem. (b) **Analyze** a single stage transistor amplifier using h –parameters	Applying	1
16	**Sketch** the circuit diagram of CE amplifier with emitter resistance. Draw its approximate h-parameter model and derive the expression for AI, RI and AV.	Applying	1
17	**Show** that for voltage shunt feedback amplifier trans resistance gain, Ri and Ro are decreased by a factor (1+Aβ_) with feedback.	Applying	1

S. No	**QUESTION**	**BLOOMS TAXONOMY LEVEL**	**COURSE OUTCOMES**
18	**Define** the following terms in connection with feedback i. Return difference, fb ii. Closed loop gain iii. Open loop gain	Remembering	1
19	**Sketch** the circuit diagram of CE amplifier with emitter resistance. Draw its approximate h-parameter model and derive the expression for AI, RI and AV.	Applying	1
20	**Explain** how h –parameters can be obtained from the static characteristics of a transistor.	Understanding	1
UNIT-II **BJT AND FREQUENCY RESPONSE**			

1	**Evaluate** the expressions for fβ and fT.	Evaluating	3
2	**Discuss** the effect of coupling capacitor (Cc) on low frequency response of CE amplifier.	Understanding	3
3	**Sketch** the low frequency small signal model of a transistor in CB and CE configurations and explain significance of each model.	Applying	3
4	**Sketch** the small-signal high-frequency circuit of a CS amplifier and derive the expression for the voltage gain.	Applying	3
5	**Show** that (i) hfe=gm rb‘‘e for a Hybrid _ model of CE amplifier.	Applying	3
6	**Explain** how does a Ce and Cc vary with | Ic | and | VCE |.	Understanding	3
7	**Explain** how does gm vary with | Ic | and | VCE |, T.	Understanding	3
8	**Evaluate** the expression for current gain with resistive load.	Evaluating	3
9	**Justify** why the gain of the amplifier decreases in the low frequency and high frequency range?	Evaluating	3
10	**Evaluate** the expression for the CE short-circuits current gain Ai as a function of frequency.	Evaluating	3

UNIT-III
MULTIVIBRATORS, CLIPPERS AND CLAMPERS

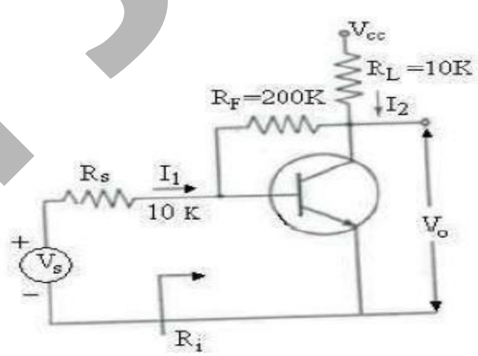
1	**Explain** the working of a fiaxed-biased binary with neat diagram.	Understanding	6
2	**Explain** the working of a non-saturated binary. What are its drawbacks?	Understanding	6
3	**Discuss** the different methods of triggering a binary with neat sketches.	Understanding	6
4	**Explain** the working of a Schmitt trigger with neat sketches.	Understanding	6
5	**Evaluate** the expressions for UTP and LTP of a Schmitt trigger.	Evaluating	6
6	**Explain** how hysteresis can be eliminated in a Schmitt trigger.	Understanding	6
7	**Explain** the working of a collector-coupled monostable multivibrator, With the help of a neat circuit diagram and waveforms,.	Understanding	6
8	**Evaluate** an expression for the gate width of a monostable multivibrator.	Evaluating	6
9	**Explain** the working of an astable mulpivibrator. With help of a neat circuit diagram and waveforms.	Understanding	6
10	**Evaluate** an expression for the frequency of oscillation of astable multivibrator.	Evaluating	6
11	**Show** that an astable multivibrator can be used as a voltage to frequency convertor.	Applying	6
12	**Construct** the circuit of the astable multivibrator and explain how it works.	Creating	6

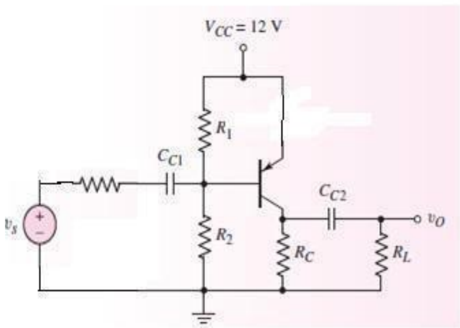
S. No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
13	**Explain** the working of a transistor clipper. With the help of a neat circuit diagram and waveforms.	Understanding	6
14	**Explain** the working of a two level diode clipping. With the help of a neat circuit diagram.	Understanding	6
15	**Explain** how a sine wave may be converted into square wave using a clipping circuit.	Understanding	6
16	**Explain** the working of a simple diode comparator. Draw the output wave form for a ramp input.	Understanding	6
17	**Explain** the working of a positive clamping circuit. With necessary waveforms.	Understanding	6

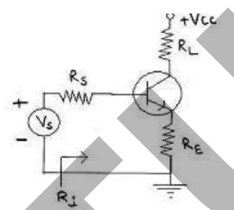
18	**Explain** the working of a Negative clamping circuit. With necessary waveforms.	Understanding	6
19	**State** and prove the clamping circuit theorem?	Remembering	6
20	**Explain** the principle of clamping. What is the need for a shunting resistor R in parallel with the diode in the basic clamping circuit?	Understanding	6
	UNIT-IV **LARGE SIGNAL AMPLIFIERS, LINEAR WAVE SHAPING**		
1	**Evaluate** the expression for maximum conversion efficiency for a simple series fed Class A power amplifier. What are the drawbacks of transformer coupled power amplifiers?	Evaluating	5
2	**Explain** the method of determination of total harmonic distortion in push pull power amplifiers using five point method.	Understanding	5
3	**Define** thermal resistance? Explain the thermal electrical analogy related to a transistor with heat sink.	Remembering	5
4	**Explain** and analyze a transformer coupled class A power amplifier and also define the total harmonic distortion with three point method.	Understanding	5
5	**Design** the circuit of a series fed class A power amplifier and analyzes it for its efficiency and power dissipation and proves that maximum efficiency is 25%.	Creating	5
6	**Sketch** the schematic of class B push-pull amplifier with complementary symmetry configuration and explain the working of it.	Applying	5
7	**Show** that maximum efficiency of Class B amplifier is 78.5%.	Applying	5
8	**Show** that maximum efficiency of Transformer coupled Class A amplifier is 50%.	Applying	5
9	With a neat diagram **explain** the principle of operation of class B pushpull amplifier.	Understanding	5
10	**Sketch** the schematic of class B push-pull amplifier with complementary symmetry configuration and explain the working of it.	Applying	5
11	**Explain** the operation of low pass RC circuit, and also derive an expression for the output to an exponential input?	Understanding	5
12	**Evaluate** an expression for the percentage Tilt of the output of a highpass circuit with large time constant excited by a symmetrical square wave with Zero average value.	Evaluating	6
13	**Evaluate** an expression for the rise time of the output of a low pass circuit excited by a step input.	Evaluating	6
14	**Discuss** about a low pass RC circuit? Derive an expression of output voltage for square wave input and draw input-output characteristics of this circuit.	Understanding	6
S.No	**QUESTION**	**BLOOMS TAXONOMY LEVEL**	**COURSEOU TCOMES**
15	**Sketc**h the high- pass R-C circuit. Derive for step- voltage response of this circuit and show the input- output characteristics of this circuit.	Applying	6
16	**Sketch** the response of an RC high-pass for square wave input	Applying	6
17	**Explain** the response of an RC high-pass filter to behave as a good differentiator.	Understanding	6
18	**Evaluate** the expression for power output and conversion efficiency of a class A series fed amplifier.	Evaluating	6

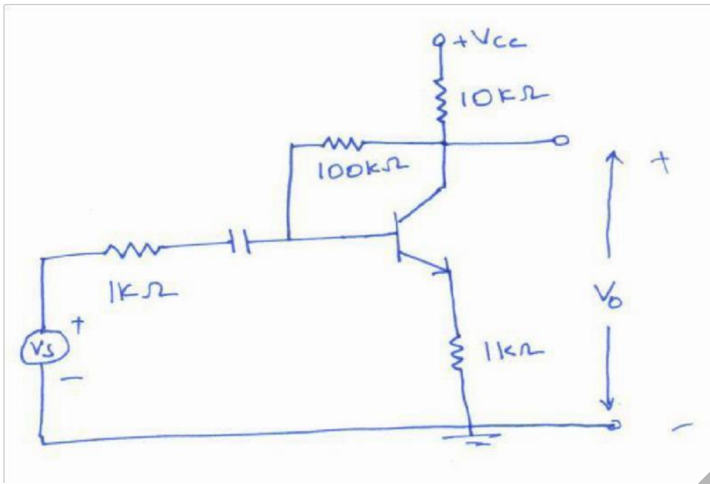
	UNIT-V SWITCHING CHARACTERISTICS OF DEVICES		
1	Explain the phenomenon of "latching" in a transistor switch.	Understanding	6
2	Explain the behavior of a BJT as a switch in electronic circuits. Give an example.	Understanding	6
3	Write a short note on the switching times of transistor.	Applying	6
4	Explain the behavior of a BJT as a switch. Give Applications.	Understanding	6
5	Explain the terms pertaining to transistor switching characteristics. i. Rise time. ii. Delay time.iii. Turn-on time. iv. Storage time v. Fall time. vi. Turn-off time.	Understanding	6
6	Write Short notes on: (a) Diode switching times (b) Switching characteristics of transistors (c) FET as a switch.	Applying	6
7	Explain piecewise linear diode characteristics.	Understanding	6
8	Explain how transistor can be used as a switch in the circuit, under what condition a transistor is said to be „OFF" and „ON" respectively.	Understanding	7
9	Discuss how does the temperature affect the saturation junction voltages of a transistor?	Understanding	6
10	Explain how does avalanche multiplication take place in a semiconductor diode?	Understanding	7

GROUP - III (PROBLEMS)

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
	UNIT-I SINGLE STAGE AMPLIFIERS DESIGN AND ANALYSIS		
1	**Compute** current gain, voltage gain, input and output impedance of the CB amplifier if it is driven by a voltage source of internal resistance Rs=1k.The load impedance is RL=1K. The transistor parameters are hib= 22, hfb= -0.98, hrb=2.9×10−4, hob= 0.5µA/V.	Applying	1
2	**Calculate** AI , AV , RI , R0.of a transistor with hie=1.1K, hfe=50, hre=205X10−4 , hoe=25µA/V is connected in CE configuration as shown in fig. 	Analyzing	1
3	An Amplifier has a voltage gain of 400, f1=50Hz, f2=200KHz and a distortion of 10% without feedback. **Estimate** the voltage gain, f1f , f2f and Df when a negative feedback is applied with feedback ratio of 0.001.	Understanding	

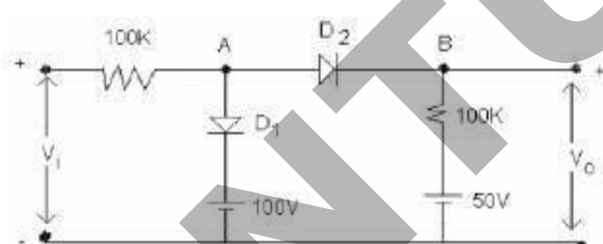
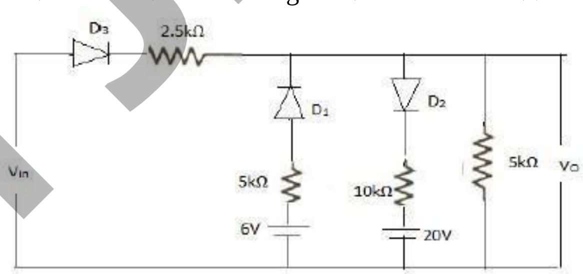
4	**Calculate** the gain, input impedance, output impedance of voltage series feedback amplifier having A=300, Ri=1.5K,RO=50K Andβ=1/2.	Analyzing	1
5	 **Calculate** Ai ,Ri ,Av , Ro, Avs, Ais, Ap. For circuit shown in below the transistor parameters are hic = 1.2KΩ hoc=25 µA/V hrc= 1 ,hfc= -101.	Analyzing	1

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
6	**Evaluate** the expression for Ri For the given circuit, shown in the Figure}  b) If R_L=R_E= 1KΩ and using typical values of h – parameters h_{ie}=1.1KΩ, h_{fe}=50, h_{re}=50, h_{re}=2.5×10^{-4}, h_{oe}=25µA/V. What is the values of R_i.	Evaluating	1
7	**Calculate** the voltage gain for the common source FET amplifier if , rd=100k ohm, gm=300µ, RL=10k ohm.	Analyzing	1
8	We have an amplifier of 60dB gain. It has an output impedance Z0 = 10KΩ. It is required to modify its output impedance to 500Ω by applying negative feedback factor. **Calculate** the value of the feedback factor. Also find the percentage change in the overall gain, for 10% change in the gain of the amplifier without feedback.	Analyzing	1
9	An amplifier with open loop voltage gain AV = 1000±100 is available. It is necessary to have an amplifier whose voltage gain varies by no more than ±0.1 percent. i. **Estimate** the reverse transmission factor β of the feedback network used. ii. Estimate the gain with feedback.	Analyzing	1

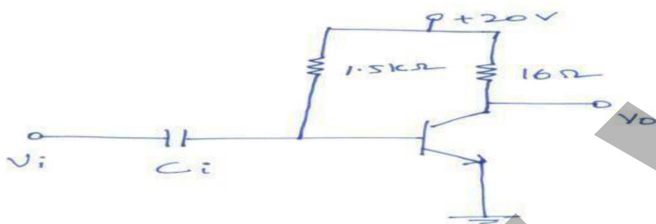
10	For the transistor feedback amplifier stage shown hfe=100, hie=1K, while hre and hoe are negligible, **Estimate** the following: Av =Vo/Vi , A Vs = Vo/Vs, Rif, Rof. 	Analyzing	1

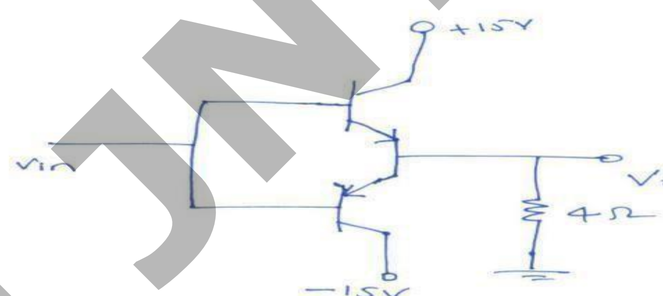
S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
UNIT –II (BJT AND FREQUENCY RESPONSE			
1	**Estimate** the gain of an amplifier at frequency = 100kHz ,if an Amplifier 3 dB gain is 200 and higher cut-off frequency is 20kHz.	Understanding	3
2	For an amplifier, midband gain is 100 and lower cut-off frequency is 1kHz. **Estimate** the gain of an amplifier at frequency = 20Hz.	Understanding	3
3	**Calculate** gm, rb‟e, cb‟e and Wβ , At Ic = 1mA and Vce = 10V, a certain transistor data shows Cc= Cb‟c=3pf, hfe = 200 and W_T = -500 Mrad/sec.	Analyzing	3
4	**Estimate** the overall upper 3dB frequency fH..If four identical amplifiers are cascaded each having fH = 100kHz .Assuming non interacting stages.	Understanding	3
5	A transistor has hie = 6kΩ and hfe = 224 at Ic = 1mA with fT = 80 MHz and cb‟c = 12 pf. **Estimate** gm, rb‟e , rbb‟ and cb‟e at room temperature.	Understanding	
A UNIT-III (MULTIVIBRATORS, CLIPPERS AND CLAMPERS			
1	The fixed-bias bistable multivibrator uses npn transistors with hfe=20.The circuit parameters are Vcc = 12V, VB B= 3V, RC=1KΩ, R1= 5 KΩ, R2 =10 KΩ, VCE(sat) = 0.4V, and VBE (sat) = 0.8V. (a)Estimate the stable state voltages and currents. (b) What is the maximum load the multivibrator can drive, still maintaining one transistor in saturation and the other in cut-off?what is the maximum reverse saturation current ICBO tolerated so that neither of the transistor is at cut-off? If the initial value of ICBO is 10mA at room temperature, what is the maximum temperature at which one device remains off?	Evaluating	6
2	Design fixed bias bistable multivibrator to provide an output with a swing of 10V? b) Design collector coupled fixed-bias Bistable Multivibrator to operate from ±6Vsupply.Given IC (sat) = 1mA, hFE =35. Assume Sitransistor?	Creating	6
3	Design a Schmitt trigger circuit to have VCC =12v, UTP = 6V, LTP = 3V, using two silicon npn transistors with hfe(min) = 60.	Creating	6

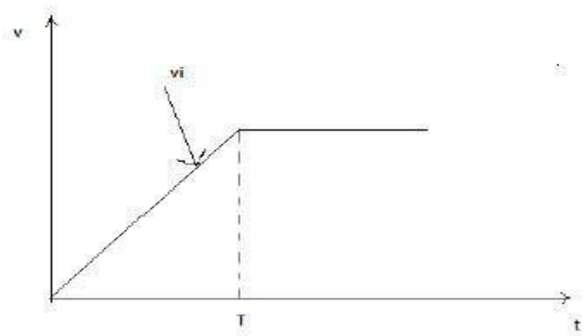
4	Estimate the period of output and the frequency of oscillation of an astable multivibrator with R1 = R2 = 25 KΩ and C1 = C2 = 0.2μF.	Evaluating	6
5	Calculate the input pulse width of mono-stable multivibrator for the design values of RC=2k Ω, RB=10k Ω;C =0.1 μ F , VCC =10 V , VBE(sat)=0.8V.	Analyzing	6
6	In an astable multivibrator circuit shown in the figure 7.4 R1=R2=5kΩ, R3=R4=0.4kΩ and C1=C2=0.02μF. Estimate the time period and frequency of oscillators.	Evaluating	6
7	Design a Schmitt trigger circuit using NPN transistors having hFE(min) =60 . VBE(Cutoff) = 0V, VCE(Sat) = 0.2V and VBE(sat) = 0.7V. Given VCC =8V and o/p swing = 6V, UTP = 3.5V, LTP = 1.5V, R1 = 10K and R2 = 2K. Determine RC1, RC2 and Re.	Creating	6
8	Design an astable multivibrator to generate a 5kHz square wave with a dutycycle of 60% and amplitude 12v. Use NPN silicon transistors having hFE(min) = 70 VCE(Sat) b= 0.3v, VBE(Sat) = 0.7v, VBE(Cutoff) = 0v and RC = 2K. Draw the waveforms seen at both collectors and bases.	Creating	6

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
9	**Sketch** the output voltage V0 to the same scale as the input voltage? If the input voltage Vi to the two-level clipper shown in figure given below varies linearly from 0 to 200V.  	Applying	**6**
10	**Indicate** all slopes and voltage levels .Also indicate for each region, the diodes which conduct. For the clipping circuit shown in figure below, make a plot of Vo versus Vi for the range of Vi from 0 to 50V.  	Understanding	**6**
11	A 100V peak square wave with an average value of 0V and a period of 20 **Sketch** the circuit diagram necessary for this purpose. Also, draw the in	Applying put and output wave for	**6** ms?

UNIT-IV
(LARGE SIGNAL AMPLIFIERS, LINEAR WAVE SHAPING

1	**Calculate** the following for the given data. i. Power dissipation of each transistor ii. Efficiency A complementary push pull amplifier has capacitive coupled load RL=8Ω, supply voltage of.12V	Analyzing	**6**
2	**Estimate** the value of thermal resistance? If the junction temperature of a transistor is 1250C. The total dissipation at a 250C case temperature is 0.5W and at a 250C ambient temperature, the total dissipation is 0.2W	Evaluating	**5**
3	A series fed class A power amplifier operates from a DC source and is applied with a sinusoidal input signal which generates I_{Bm}=9mA. **Calculate** (i) ICQ (ii) VCEQ (iii) PDC (iv) Pac (v) Efficiency. 	Analyzing	**5**

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
4	**Calculate** i. Maximum ac power at the load. ii. Pd at maximum ac power iii. Efficiency iv. Maximum Pd at each transistor. For a class B complementary audio frequency power pilfer is as shown in fig. 	Analyzing	**B**
5	**Calculate** the ac power delivered to the load of RL = 2KΩ. For a single transistor operates as an ideal class B power amplifier. If dc current drawn from the supply is 25mA.	Analyzing	5
6	**Calculate** i) Maximum output power ii) Power rating of transistors iii) DC output power .For a complementary symmetry push pull amplifier is operated using Vcc = ±10V and delivers power to a load RL = 5Ω.	Analyzing	5
7	A 10HZ symmetrical square wave whose peak-to-peak amplitude is 2V is applied to a High pass RC circuit whose lower 3-db frequency is 5HZ. **Calculate** and sketch the output waveform?	Analyzing	5

8	**Sketch** the output wave forms for the cases (a) T = 0.2RC, (b) T = 0.2RC (c) T = 5RC. For the limited ramp shown in figure below is applied to an RC differentiator. 	Applying	5

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	COURSE OUTCOMES
9	A class B push pull amplifier supplies power to a resistive load of 12Ω. The output transformer has a turns ratio of 3 : 1 and efficiency of 78.5%. **Calculate** : i) Maximum power output ii) Maximum power dissipation in each transistor iii) Maximum base and collector current for each transistor. Assume hfe =25 and VCC = 20V.	Analyzing	5
UNIT-V **(SWITCHING CHARACTERISTICS OF DEVICES**			
1	A transistor has fT = 50 MHz, 4FE=40, Cb0c=3PF and operates with Vcc=12V and Rc=500W. The transistor is operating initially in the neighborhood of the cut-in point. **Calculate** the base current that must be applied to drive the transistor to saturation in 1µ sec?	Analyzing	6
2	**Design** a high speed CE transistor switch operating with two power supplies Vcc=15v and –Vbb = -15V. The transistor is operating at Ic=6mA, Ib = 0.5mA. the static current gain hfe of the transistor is 25. Vbe(sat) =0V and R2 = 4R1. Determine the values of the three resistors Rc, R1 and R2	Creating	6
3	**Calculate** the minimum value of Ib to keep the transistor in saturation when it is in its ON state? Consider a transistor switch in CE configuration operating with Vcc=18V and _Vbb= 0v and Vce(sat) = 0V.the static current gain hfe of the transistor is 50.	Analyzing	6
4	A silicon transistor is operated at room temperature in the CE configuration. The supply voltage is 6 V, the collector-circuit Resistance is 400Ω and the base current is 20 percent higher than the minimum value required driving the transistor into saturation.a Assume the following transistor parameters: Ico=-5µA, IEO=-2µA, hFE=100, and r bb_ =250. **Calculate** V BE (Sat) and V CE (Sat).	Analyzing	6