Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Supplementary Examination, January 2020

Course: Basic Electronics Engineering **Semester: II**
Program: B.Tech CSE - B.Tech CSE – BAO, CCVT, GG, IT, BT **Time : 02 hrs.**
Course Code: PHYS1003 **Max. Marks: 100**

Instructions: 1) Assume any missing data

SECTION A (40 marks)

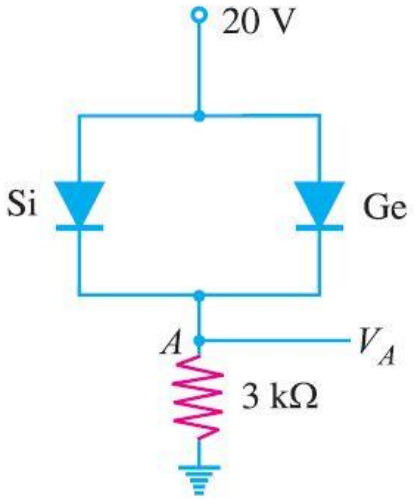
S. No.		Marks	CO
Q 1	The most commonly used semiconductor is …….. • Germanium • Silicon • Carbon • Sulphur	1	CO1
Q2	A pentavalent impurity has ……. Valence electrons • 3 • 5 • 4 • 6	1	CO1
Q3	An n-type semiconductor is …… • Positively charged • Negatively charged • Electrically neutral • None of the above	1	CO1
Q4	"Forward biasing a pn junction diode,……. the width of depletion layer." • Decreases • Increases • Remains the same • None of the above	1	CO1
Q5	A reverse bias pn junction has …… • Very narrow depletion layer • Almost no current • Very low resistance • Large current flow	1	CO1
Q6	A pn junction acts as a ……. • Controlled switch • Bidirectional switch	1	CO1

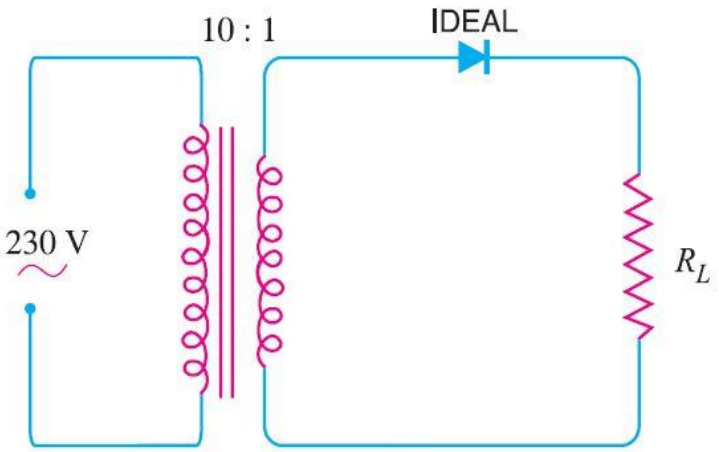
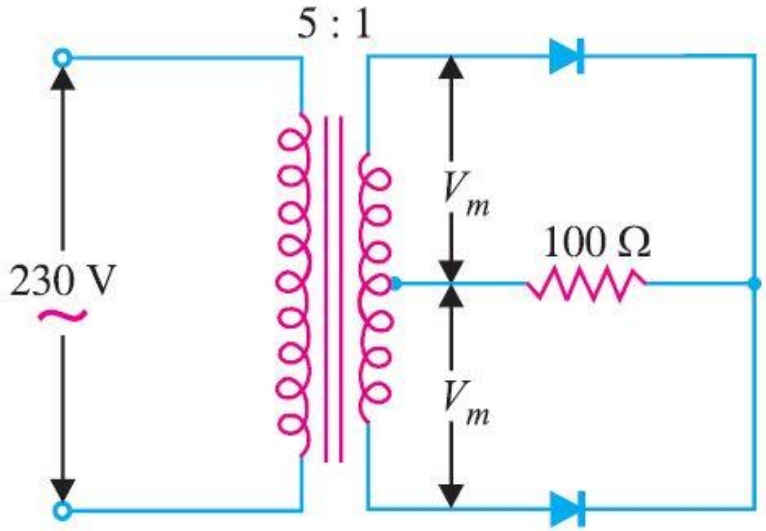
	• Unidirectional switch • None of the above		
Q7	The battery connections required to forward bias a pn junction are …… • Positive terminal to p and negative terminal to n • Negative terminal to p and positive terminal to n • Negative terminal to p and negative terminal to n • Positive terminal to p and positive terminal to n	1	CO1
Q8	Which of the following doping generates a P-type semiconductor? • Germanium and boron • Germanium and phosphorus • Germanium and antimony • Silicon and Germanium	1	CO1
Q9	In forward biasing of the p-n junction.. • the positive terminal of the battery is connected to p-side and the negative terminal of the battery is connected to n-side and depletion region becomes thin. • the positive terminal of the battery is connected to n-side and the negative terminal of the battery is connected to p-side and depletion region becomes thin. • the positive terminal of the battery is connected to n-side and the negative terminal of the battery is connected to p-side and depletion region becomes thick. • the positive terminal of the battery is connected to p-side and the negative terminal of the battery is connected to n-side and depletion region becomes thick.	1	CO1
Q10	Which of the following circuits would require the least amount of filtering? • A half-wave rectifier • A full-wave rectifier • A bridge rectifier • A full-wave rectifier and a bridge rectifier	1	CO1
Q11	Maximum efficiency of bridge full wave rectifier • 81.20% • 40.60% • 25% • 100%	1	CO1
Q12	The basic purpose of filter is to : • minimize variations in ac input signal • suppress harmonics in rectified output • stabilize dc output voltage • remove ripples from the rectified output	1	CO1
Q13	A half wave rectifier is equivalent to :	1	CO1

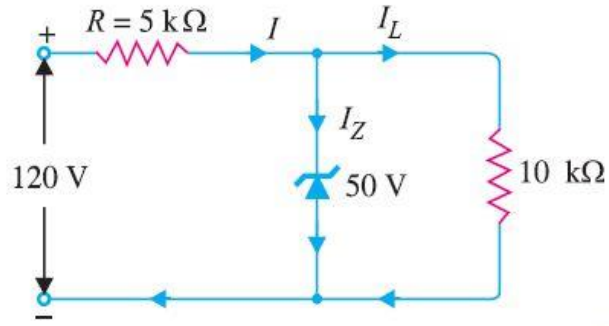
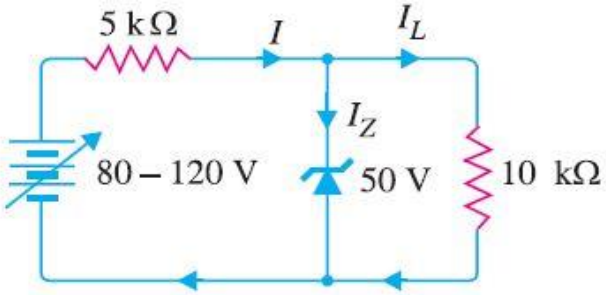
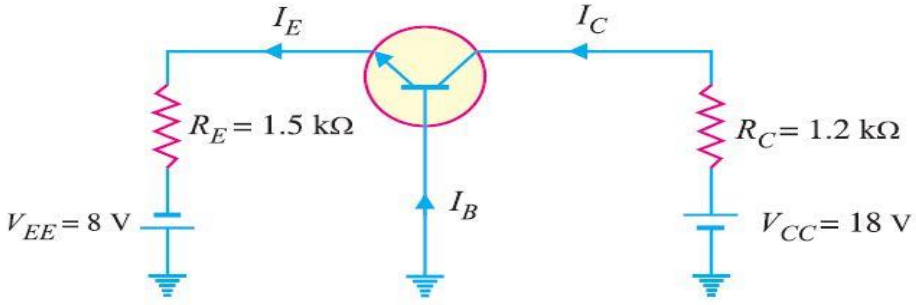
	• clamper circuit • a clamper circuit with negative bias • Clipper • a clamper circuit with positive bias		
Q14	"If the doping level in a diode is increased, the width of depletion layer" • remains the same • is increased • is decreased • none of the above	1	CO1
Q15	The number of depletion layers in a transistor is • four • three • two • one	1	CO2
Q16	Which rectifier requires four diodes? • Full-wave bridge circuit • Half-wave voltage doublers • Full-wave voltage doublers • None of the above	1	CO2
Q17	The main job of a voltage regulator is to provide a nearly …….. output voltage. • constant • fluctuating • sinusoidal • smooth	1	CO2
Q18	The base of a transistor is ...…… doped • Heavily • moderate • lightly • all of the above	1	CO2
Q19	In a PNP transistor the current carriers are …….. • acceptor ions • donor ions • free electrons • holes	1	CO2
Q20	A transistor is a ……. Controlled device • current • voltage • both current and voltage • None of the above	1	CO2
Q21	In a transistor base current is …… of emitter current	1	CO2

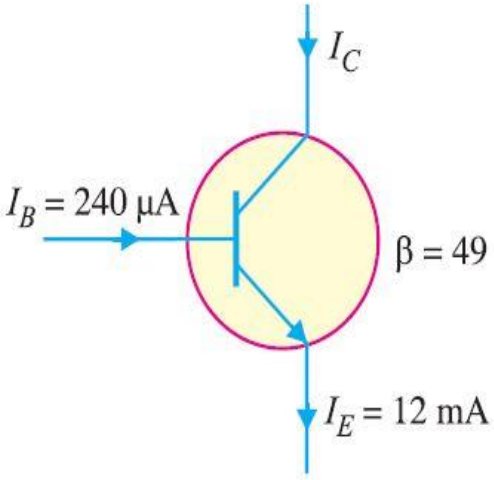
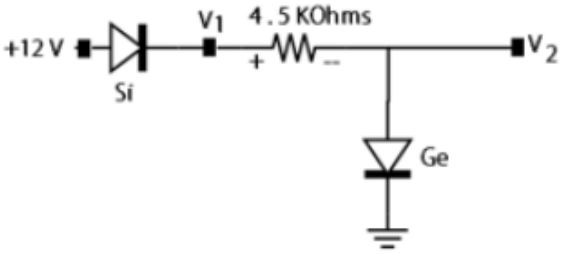
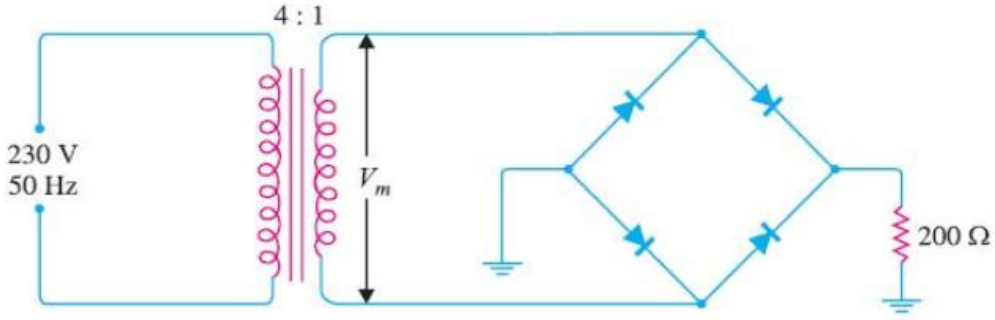
	• 5% • 25% • 75% • 99%		
Q22	The input impedance of a transistor is…… • high • low • very high • zero	1	CO2
Q23	Which of the following holds true for a transistor • IC = IE + IB • IB = IE + IC • IE = IC - IB • IE = IB + IC	1	CO2
Q24	The value of α in a transistor is…… • more than 1 • equal to 1 • less than 1 • all of the above	1	CO2
Q25	"In a transistor, IC = 100 mA and IE = 100.2 mA. The value of β is ……." • 100 • 50 • 0.2 • 200	1	CO2
Q26	The voltage gain in a transistor connected in …….. arrangement is the highest • common base • common collector • common emitter • None of the above	1	CO2
Q27	The arrow in the symbol of a transistor indicates the directions of……. • electron current in the emitter • electron current in the collector • hole current in the emitter • donor ion current	1	CO2
Q28	A heat sink is generally used with a transistor to …… • increase the forward current • decrease the forward current • compensate for excessive doping • prevent excessive temperature ris	1	CO2
Q29	A Voltage divider bais provides…… • unstable operating point	1	CO2

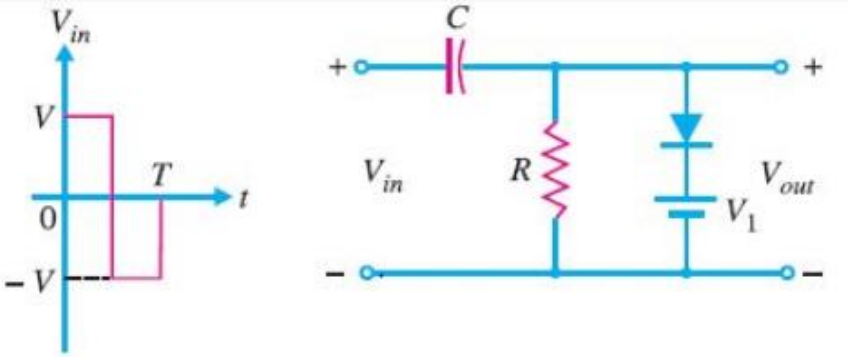
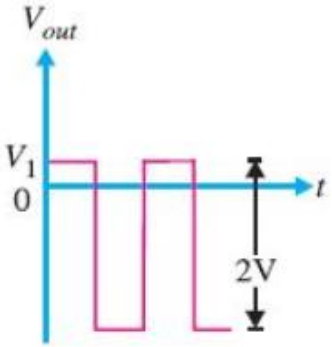
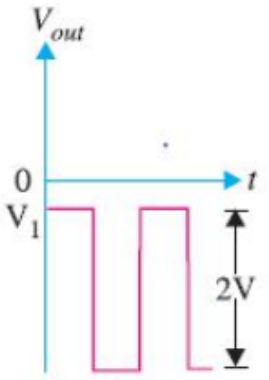
	• stable operating point • a Q point that varies with temperature • all of the above		
Q30	The phase difference between o/p and i/p for a common collector amplifiers is • 270 degrees • 180 degrees • 90 degrees • 0 degrees	1	CO2
Q31	In which region transistor acts as a switch? • Active region • Cut-off region • saturated region • saturated & active region	1	CO2
Q32	Which of the following is valid for both P-N-P as well as N-P-N transistor • The emitter injects holes into the base region • The electrons are the minority carriersin the base region • The EB junction is forward biased for active operation • "When a biased in the active region, current flows into their emitter terminal"	1	CO2
Q33	For a FET when will maximum current flows? • Vgs = 0V • Vgs = 0 V and Vds >= |Vp| • Vds >= |Vp| • Vds = 0 V	1	CO2
Q34	FETs are …… controlled device • Current • Voltage • both current and voltage • None of the above	1	CO2
Q35	The MOSFET stands for • Metal oxidized selenium FET • Metal oxide surface FET • Metal of surface FET • Metal oxide semiconductor FET	1	CO2
Q36	Choose the correct statement • "MOSFET is a unipolar, voltage controlled, two terminal device" • "MOSFET is a bipolar, current controlled, three terminal device" • "MOSFET is a unipolar, voltage controlled, three terminal device" • "MOSFET is a bipolar, current controlled, two terminal device"	1	CO2
Q37	Negative feedback…… • is same as the positive feedback • has no effect on gain of amplifier	1	CO2

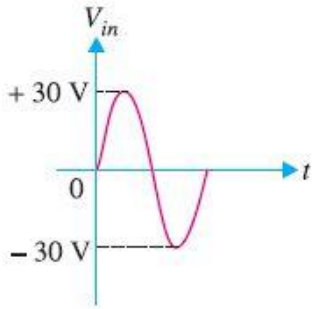
	• Increases the gain of ampllifier • Decreases the gain of ampllifier		
Q38	The output of a particular op-amp increases 5V in 10 µs. The slew rate is …….. • 5 v/µs • 0.5 V/µs • 5 V/ms • 0.5 V/ms	1	CO3
Q39	With 0 volts at both the input terminals of an op-amp. The output of op-amp should be: • 0 V • equal to slew rate rating • equal to CMRR rating • equal to the voltage gain	1	CO3
Q40	A votage follower amplifier configuration has a voltage gain of……. • 1 • infinity • "2,00,000" • -1	1	CO3
	SECTION B (60 marks)		
Q1	Calculate the current flowing through the silicon and germanium diodes if the circuit given below: Consider the forward voltage for Ge as 0.3 V and for Si as 0.7 V  • Ge diode: 6.6 mA and Si dioide: 0 mA • Ge diode: 3.2 mA and Si dioide: 3.2 mA • Si diode: 6.4 mA and Ge diode: 0 mA • Si diode: 3.3 mA and Ge diode: 3.3 mA	3	CO4
Q2	An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10:1.Find the	3	CO4

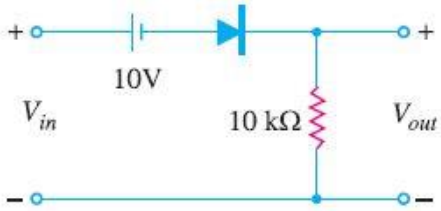
	output d.c. voltage across Load resistance .  • 32.53 V • 10.36 V • 7.3 V • 23 V		
Q3	For the rectifier circuit given below, calculate the d.c. output voltage:  • 46 V • 20.7 V • 29.27 V • 65 V	3	CO4
Q4	For the zener diode configuration shown below:, calculate the voltage across 10KOhm resistor	3	C01

	 • 50V • 70V • 80V • None of the above		
Q5	For the zener diode configuration given below, find the maximum zener current  • 1 mA • 5 mA • 9 mA • 14 mA	3	CO4
Q6	For the common base circuit shown below, determine the value of collector current.  • 4.87 mA • 5.3 mA • 6.08 mA • 6.7 mA	3	CO4
Q7	Find the value of alpha for the transistor shown below:	3	CO4

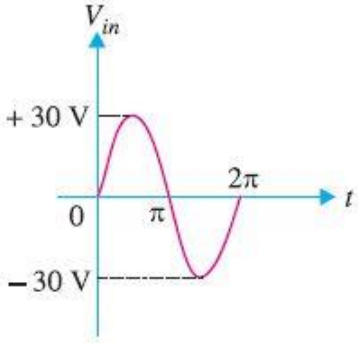
	 • 30.98 • 1 • 0.89 • 0.88		
Q8	For the circuit given in figure below, determine V1 and V2:  • V1 =12 and V2 =0.3 • V1=12 and V2 = 0 • V1 =11.3 and V2 = 0.3 • None of the above	3	CO4
Q9	in the bridge rectifier shown in the figure below, the diodes are assumed to be ideal. find the output DC voltage and frequency  • DC o/p voltage – 52 V and output frequency – 100 Hz • DC o/p voltage – 52 V and output frequency - 50 Hz • DC o/p voltage -57.5 V and output frequency100Hz	3	CO4

	• DC o/p voltage -57.5 V and output frequency - 50Hz		
Q10	Identify the output waveform for the following circuit with respect to given input waveform  Choices:   None of the above	3	C04
Q11	For the following clipper circuit identifiy the output waveform with respect to the input waveform given below:	3	CO4

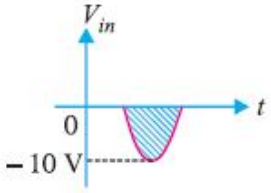


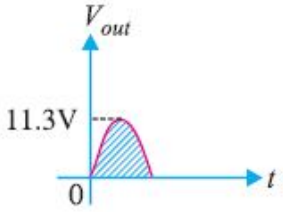


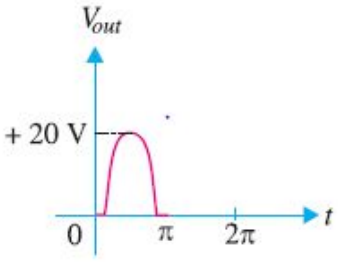
3Choices:



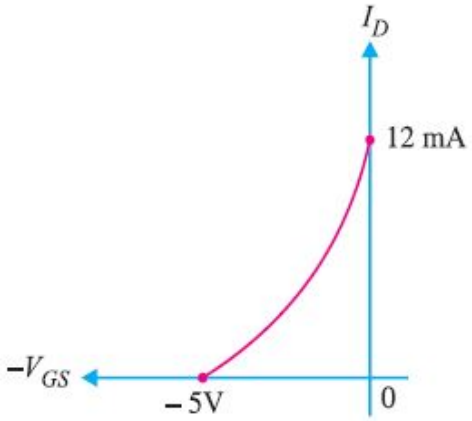
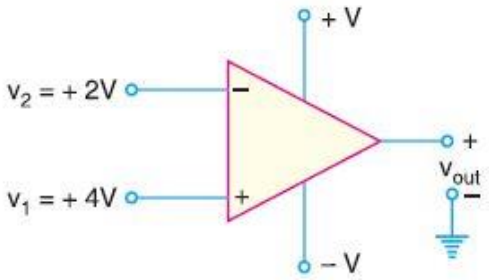
3

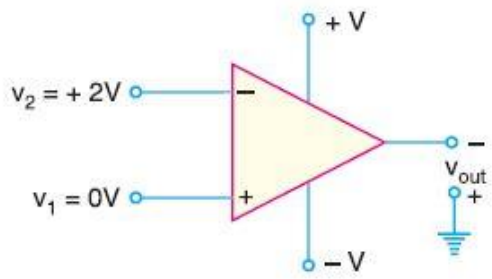
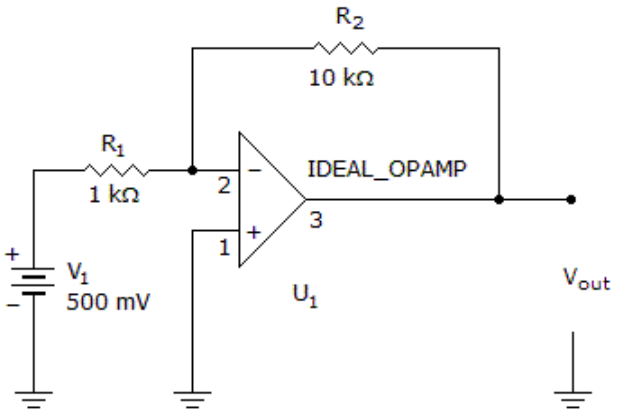
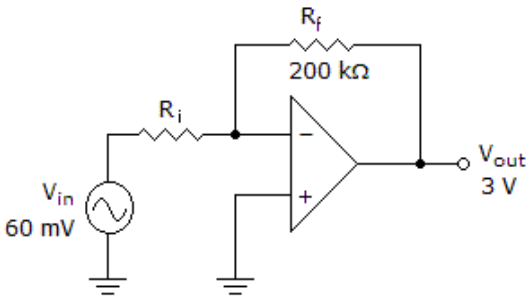


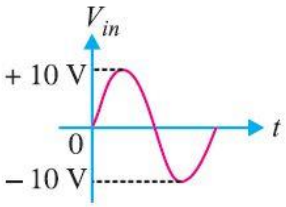


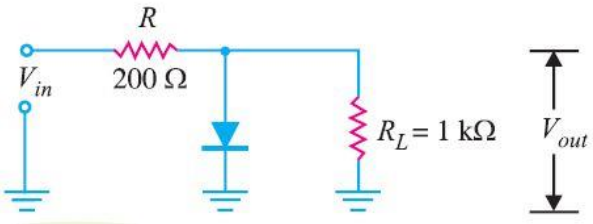


Q12	The transconductance curve for a JFET is given below, Determine the I_{DSS} from the	3	CO4

	graph.  • -12 mA • 0 mA • -5 V • 12 mA		
Q13	A JFET has the following paramters: IDSS=32 mA, VGS(off)= -8V, VGS= -4.5V. Calculate the value of drain current. • 32 mA • -6.12 mA • -32 mA • 6.12 mA	3	CO4
Q14	For the op-amp configuration given below, calculate the output (assume gain=5)  • 10 V • -10 V • 30 V • -30 V	3	CO4
Q15	Calculate the output voltage for the following op-amp configuration. Assume the op-amp as 741C	3	CO4

	 • 0.4 MV • -0.4 MV • Vsat • -Vsat		
Q16	What is the output Voltage for the given circuit?  • -5 V • 5 V • 10 V • -10 V	3	CO4
Q17	 What value of input resistance is needed in the given circuit to produce the given output voltage? • 50 Ohms • 4 KOhms • 40 KOhms • 50 KOhms	3	CO4
Q18	For the circuit shown below, determine the magnitude of output voltage and identify the circuit	3	CO4





- negative shunt clipper

For +ve half: 8.33 V
For -ve half: 0.7 V

- positive shunt clipper

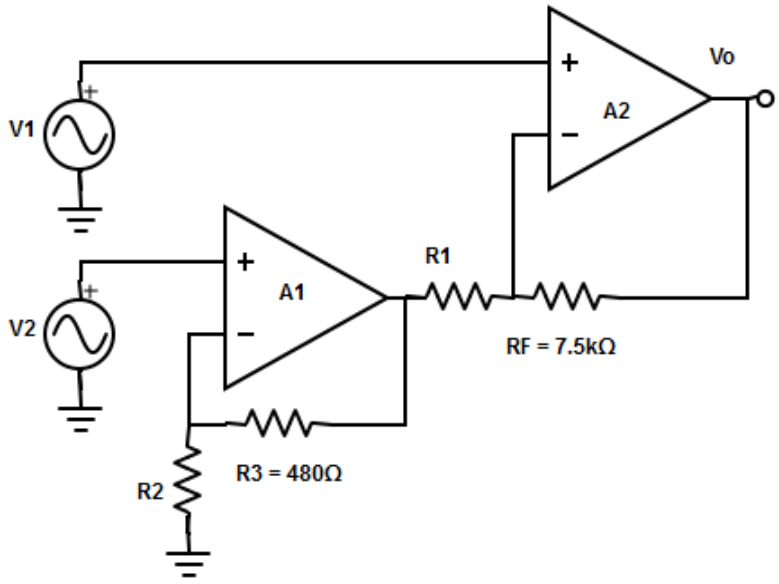
For +ve half: 0.7 V
For -ve half: 8.33 V

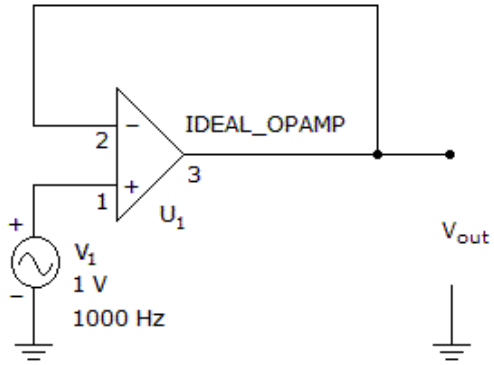
- negative shunt clipper

For +ve half: 8.33 V
For -ve half: 0.7 V

- positive shunt clipper

For +ve half: 8.33 V
For -ve half: 0.7 V

Q19	Determine the output voltage from the diagram. Where V_1=-4.3Vpp and V_2 = -5.1Vpp sinewave at 1KHz  • 12 Vpp sinewave at 1KHz • 13.3 Vpp sinewave at 1KHz • 14 Vpp sinewave at 1KHz	3	CO4

	• 11 Vpp sinewave at 1KHz		
Q20	What is the output waveform for the circuit given below?  1 V at 1 KHz -1 V at 1 KHz 10 V at 1 KHz - 10 V at 1 KHz	3	CO4