Set : 1

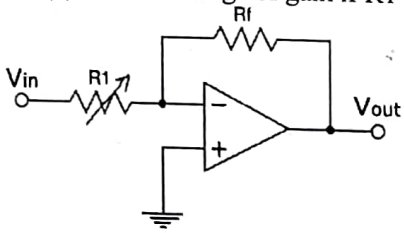
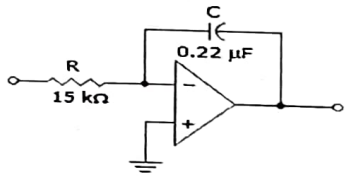
VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

End Semester Examinations May – 2020 (Hybrid KNOCK Model)

COURSE NAME:B.TECH	SEMESTER:1ST
BRANCH NAME:A,B,C,D,E,F,G	SPECIALIZATION:
SUBJECT NAME: BASIC ELECTRONICS	
FULL MARKS: **70**	TIME: **2 Hour**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

		Marks	COs
Q1.	(a) Discuss RC low pass filter and under which condition it will behave as integrator (b) Draw the output waveform, when a square wave is applied to the above circuit.	[10]	CO1
Q2.	(a) Write a brief note on Power amplifiers. (b) Discuss how a BJT can work like an amplifier.	[10]	CO2
Q3.	(a) Find the range of gain if R1 varies from 2.5 kΩ to 10kΩ, R_f=20kΩ and V_{in}=2v.  Fig.1  Fig.2 (b) Find the expression of the output voltage for the above figure2.	[10]	CO3
Q4.	Subtract 39 from 19 using 2'sand 1's complement method.A 3-bit number is represented by ABC with C as LSB (Least Significant bit). Design a logic circuit with basic gates only will produce a 010 bit less than 110 and '0' otherwise.	[10]	CO4
Q5.	Illustrate AM and FM techniques with suitable diagram. Also find the differences between them.	[10]	CO5
Q6.	Draw the block required in FM transmitter and explain their operation.	[10]	CO1/ CO3/ CO5
Q7.	Express the Boolean equation Y=A+B+C in both canonical SOP and POS form.	[10]	CO2/ CO4

7

Set : 7

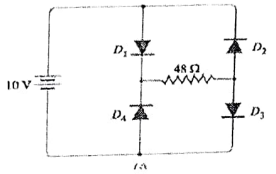
VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

End Semester Examinations May – 2020 (Hybrid KNOCK Model)

COURSE NAME:B.TECH	SEMESTER: 1ST
BRANCH NAME:A,B,C,D,E,F,G	SPECIALIZATION:1ST
SUBJECT NAME:BASIC ELECTRONICS	
FULL MARKS: **70**	TIME: **2 Hour**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

		Marks	COs
Q1.	Calculate the current through 48 Ω resistor in the circuit shown in Fig. Assume the diodes to be of silicon and forward resistance of each diode is 1 Ω. 	[10]	CO1
Q2.	Discuss about voltage substractor using Op-Amp in detail. Also define about slew Rate in Op-Amp.	[10]	CO2
Q3.	(a) Write the characteristics of ideal OPAMP (b) Draw the block diagram of voltage series feedback network.	[10]	CO3
Q4.	(a) Subtract 1101110 from 101011 using 2's complement. (b) Draw EX-OR gate using NOR gates only.	[10]	CO4
Q5.	A sinusoidal modulating waveform of amplitude 5 V and a frequency of 2 KHz is applied to FM generator, which has a frequency sensitivity of 40 Hz/volt. Calculate the frequency deviation, modulation index, and bandwidth.	[10]	CO5
Q6.	(a) What do you mean by spectrum of signal. Find the spectrum of $v(t) = \frac{1}{3}(\sin 2\pi t + 2\sin 5\pi t + 3\sin 6\pi t)$ (b) Discuss the process of sampling, quantization and encoding in detail.	[10]	CO1/ CO3/ CO5
Q7.	(a) In which way the construction of depletion -type MOSFET is similar and different to that of JEFT. (b) Draw the transfer and drain characteristics of an n-channel enhancement MOSFET ,if V_T=3.5v and k=0.4*10^{-3}A/V^2	[10]	CO2/ CO4

Set : 8

8

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

End Semester Examinations May – 2020 (Hybrid KNOCK Model)

COURSE NAME:B.TECH	SEMESTER: 1ST
BRANCH NAME:A,B,C,D,E,F,G	SPECIALIZATION:1ST
SUBJECT NAME:BASIC ELECTRONICS	
FULL MARKS: **70**	TIME: **2 Hour**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

		Marks	COs
Q1.	Discuss the mechanism of current flow in both intrinsic and extrinsic semiconductors with their crystal structure and energy band diagram.	[10]	CO1
Q2.	What do you mean by input and output characteristics of a common emitter NPN BJT? With the help of neat diagram explain the output characteristics common emitter NPN BJT.	[10]	CO2
Q3.	(a) Write the characteristics of ideal OPAMP. (b) Draw the block diagram of voltage series feedback network.	[10]	CO3
Q4.	(a) Subtract 1101110 from 100011 using 2's complement. (b) Draw EX-OR gate using NOR and NAND gates only.	[10]	CO4
Q5.	A sinusoidal modulating waveform of amplitude 5 V and a frequency of 2 KHz is applied to FM generator, which has a frequency sensitivity of 40 Hz/volt. Calculate the frequency deviation, modulation index, and bandwidth.	[10]	CO5
Q6.	Explain vertical and horizontal deflecting system of CRO.	[10]	CO1/ CO3/ CO5
Q7.	(a) In which way the construction of depletion -type MOSFET is similar and different to that of JEFT. (b) Draw the transfer and drain characteristics of an n-channel enhancement MOSFET ,if V_T=3.5v and k=0.4*10^{-3}A/V^2	[10]	CO2/ CO4

No of copies 400

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Even/Odd Mid Semester Examination for session 2021-22

COURSE NAME: B. Tech | SEMESTER: 1st

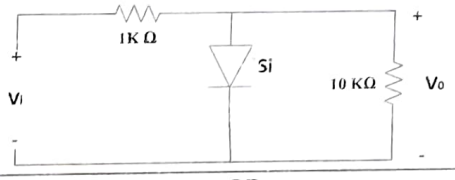
BRANCH / SECTION NAME: H, I, J, K, L, M, N

SUBJECT NAME: BASIC ELECTRONICS

FULL MARKS: **30** | TIME: **90 Minutes**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1.		Answer all Questions.	[2 × 3]
	a)	Define Fourier series and Fourier transform.	- CO1
	b)	Determine α_{dc}, if I_E=2.8mA, I_C=2.75mA and I_{CBO}=0.1μA.	- CO2
	c)	Find the decimal equivalent of (i) $(101.1101)_2$ (ii) $(31BF.67)_{Hex}$	- CO3
Q2.			[8]
	(a)	For an input signal of $V_i = 10 \sin \omega t$,draw the output waveform of half-wave and full-wave rectifier circuit. Calculate the Average Value, RMS value, Ripple factor, and Efficiency parameters for the above output waveforms. (Assume Ideal Diode)	[5]
	(b)	Find the output voltage V_0 for the circuit below for (i) V_i= 5v (ii) V_i= -5v 	[3]
			- CO1
		OR	
	(a)	The reverse saturation current of a Ge PN diode at 27°C is 5μA. Obtain the forward current for the applied voltage of 0.238 V across the junction. Determine the static and dynamic resistance of the diode.	[4]
	(b)	With a neat diagram explain RC integrator circuit. Is it a low pass filter? Justify your claim.	[4] - CO1
Q3.			[8]
	(a)	Sketch the circuit symbols for n-p-n & p-n-p transistors. Explain the doping profile of a transistor. Why is the width of base region very thin?	[4]
	(b)	Draw the input characteristics of a transistor operating in common-base mode. Explain the nature of the curves qualitatively.	[4] - CO2
		OR	
	(a)	With neat diagram discuss the output characteristics of common-emitter configuration of an n-p-n BJT.	[5]
	(b)	Define the currents I_{CBO} and I_{CEO}. Derive the relationship between them.	[3] - CO2
Q4.			[8]
	(a)	With neat diagram explain SR-flipflop. Write its characteristic table.	[5]
	(b)	Represent the XOR gate using universal gates.	[3] - CO3
		OR	
	(a)	Simplify the Boolean function given below. Draw the original logic circuit and simplified circuit. $F(A,B,C) = AB + \overline{(\bar{A}+B)} + AC$	[4]
	(b)	Subtract $(48)_{10}$ from $(23)_{10}$ using 2's complement method by replacing signed binary numbers for the decimal numbers.	[4] - CO3

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Even Mid Semester Examination for session 2021-22

COURSE NAME: B.TECH

SEMESTER:2ND

BRANCH NAME:A, B, C, D, E, F,G
SUBJECT NAME: BASIC ELECTRONICS

FULL MARKS: **30**

TIME: **90 Minutes**

Answer **All** Questions.
The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

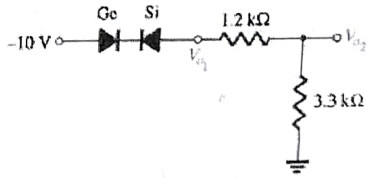
Q1. Answer all Questions. **[2 × 3]**

a) Discuss the mechanism of current low in both intrinsic and extrinsic semiconductor with energy band diagram.
b) Explain how zenor diode acts as regulator.
c) Subtract 1101110 from 101011 using 2's complement method.

Q2. **[8]**

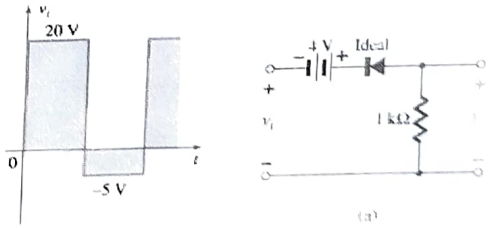
(a) Describe about the types of resistances in diode and their mathematical equations. [2+2]
For an ideal Ge diode at a temp of 125^0C has I s of 30μA. Find the dynamic resistance for a 0.2v biasing potential in Forward bias condition.

(b) (i) Draw the V-I characteristics of PN junction diode and discuss different voltages Associated it. [2+2]
(ii) Analyze and find V_{01} and V_{02} for the circuit given below.

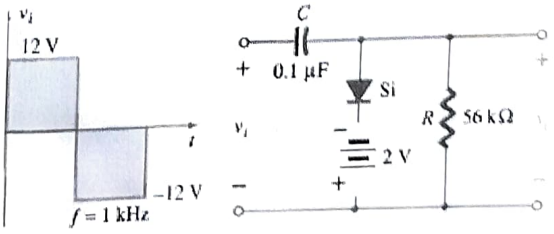


OR

(a) Determine Output voltage for the network. [4]



(b) Sketch the output waveform for the following circuit. [4]



$-V_{in} + 4 - V_0 = 20$

$V_0 = 4 - 3$

$= -1$

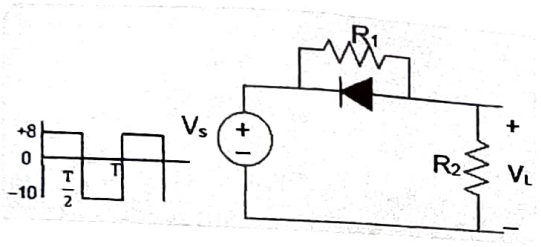
Q3.

A full-wave centre tap rectifier with a 120-V rms sinusoidal input has a load resistor of 1 Kilo-Ohm.

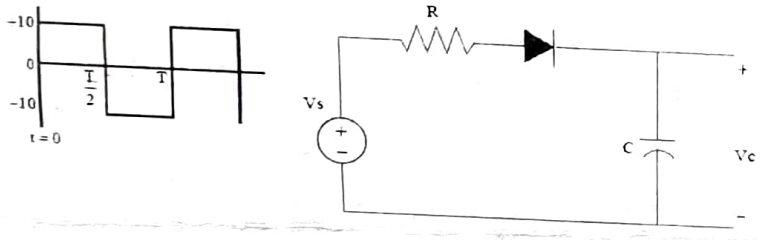
a. If silicon diodes are employed, what is the dc voltage available at the load? [2+2+2]
b. Determine the required PIV rating of each diode.
c. Find the maximum current through each diode during conduction.
d. What is the required power rating of each diode?

OR

(a) In the circuit shown, Vs is a square wave of period T with maximum and minimum amplitude of 8V and -10V respectively. Assume that the diodes are ideal and R1=R2=50 Ohm. Find the average value of V_L. [4]



(b) In the circuit shown, Vs is a square wave of period T=4ms with R=500 Ohm and C=10microFarad. The capacitor is initially uncharged at t=0 and the diode is assumed to be ideal. Find the voltage across the capacitor Vc at 3ms. [4]



Q4.

(a) Do the following conversion **[8]**
$(27)_{10} = (\ )_{16} = (\ )_8 = (\ )_2 = (\ )_5$ [4]

(b) If the following are the signed binary number in 2's complement format, What are their decimal equivalent values. [4]
(a) 1001, (b) 00110, (c) 11011 (d) 01010

OR

(a) Derive AND, OR, X-OR, NOT using NAND and NOR gate. [4]

(b) (I) Simplify the following Boolean expression: $(AB+C+D)(D+\bar{C})(\bar{C}+D+E)$ [2+2]

(II) Apply demorgan theorem to the following expression: $\overline{(A+\bar{B}+C+\bar{D})}+\overline{(ABC\bar{D})}$

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA, ODIS

Mid Semester Examination November - 2020

COURSE NAME: B. Tech.

SECTION NAME: H, I, J, K, L, M, & N

SEM

FULL MARKS: **20**

SUBJECT NAME: **Basic Electronics**

TIME: **2 Hours**

Answer **All** the Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all the Questions. **[1 × 5]**

a) What is the importance of doping in semiconductors?

b) Calculate the ripple factor and average voltage of half wave and full wave rectifier for $V_m = 16V$.

c) Differentiate between Fourier series and Fourier transform.

d) What is the advantage of 2's complement representation of binary numbers?

e) Write the function of flip flop.

Q2.

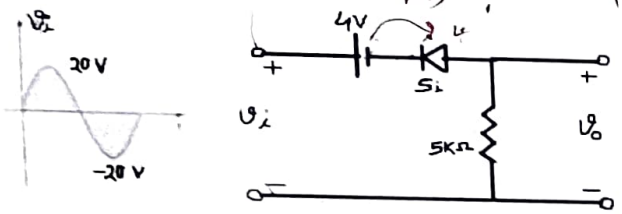
a) With neat diagram explain RC differentiator. Is it an HPF? Justify your claim. **[5]**

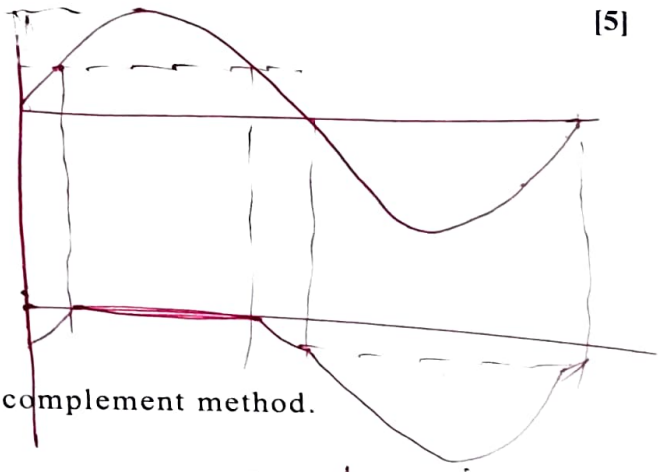
OR

b) With neat diagram explain Forward bias and reverse bias operation of pn junction Ge diode. Draw its V~I characteristic curve.

Q3.

a) Determine v_o for the network given below: **[5]**





OR

b) Perform the arithmetic operation using binary 2's complement method.

(i) $(10)_{10} - (28)_{10}$

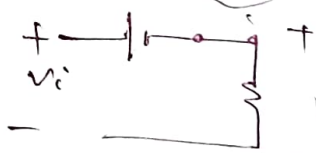
(ii) $(28)_{10} - (10)_{10}$

Q4.

a) Simplify the Boolean expressions given below. **[5]**

(i) $Y = \overline{A(B + A.\overline{B}) + \overline{A\overline{B}} + A.B.C}$

(ii) $Y = \overline{(A + B)}(\overline{A} + \overline{C})(\overline{B} + \overline{C})$



$v_i - 4 - v_o = 0$

$(v_o = v_i - 4)$

$-v_i - 4 - v_o = 0$

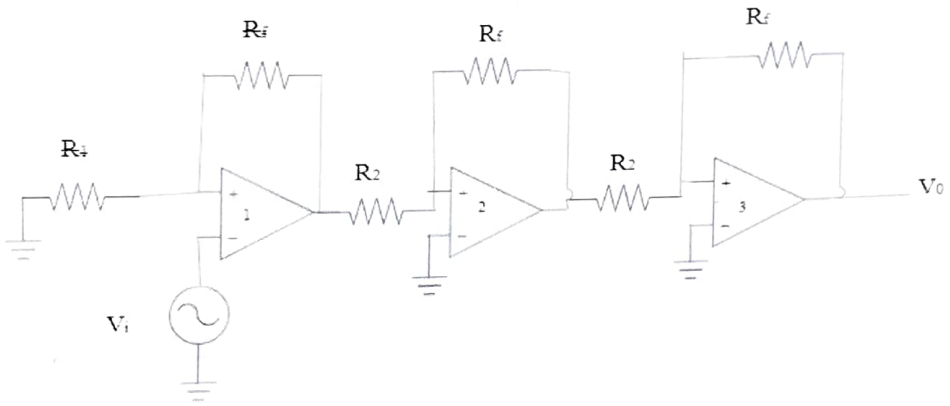
$v_o = -(v_i + 4)$

OR

b) (i) Determine the binary equivalent of $(25.75)_{10}$ and $(75.25)_8$

(ii) Prove the given Boolean expression using Boolean identities:

$\overline{A}B + B\overline{C} + BC + A\overline{B}\overline{C} = B + A\overline{C}$



b) What is the Difference practical OP-AMP and ideal OP-AMP? **[4]** -CO3

Q5.

a) Explain the utility of "Universal gate". **[4]** -CO4

b) Simplify the Boolean Expression using Boolean Algebra Method and draw the logic circuit. **[4]** -CO4
Y=(A+B)(A′+C)(B+C) = AC + BC + A'B

OR

a) Subtract 748 from 983 using 9's Complement method. **[4]** -CO4

b) I. Convert 14.625_{10} to binary. **[4]** -CO4

II. Convert the binary fractional number 0.1101 into its decimal equivalent.

Q6.

a) Write the working principle of CRO. **[4]** -CO5

b) Give Comparison between AM and FM **[4]** -CO5

OR

a) Write the advantages of electronic multimeter. **[4]** -CO5

b) Draw the schematic diagram of CRT. **[4]** -CO5

END SEMESTER EXAMINATION

COURSE NAME: B.Tech. SEMESTER: 1st & 2nd
BRANCH NAME: All SPECIALIZATION: NA

SUBJECT NAME: Basic Electronics

FULL MARKS: 50 TIME: 2.30 Hours

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Any supplementary materials to be provided

Q1 Answer all Questions. **[2×5]**

a) Why semiconductor devices are preferred over to vacuum tube devices? -CO1
b) Why FET is called "voltage operated device"? -CO2
c) List ideal characteristics of OPAMP. -CO3
d) Convert $(AD)_{16}$ into binary then decimal. -CO4
e) Why time base is used in a CRO? -CO5

Q2.

a) Find the concentration(Density) of holes and electrons in N-type silicon at 300^0k, If the conductivity is 300 S/cm.Given that n_i=1.5*$10^{10}/cm^3$, μ_n=1300cm^2/V-S, μ_p=1300cm^2/V-S **[4]** -CO1
b) Explain Fermi level in n-type semiconductor. **[4]** -CO1

OR

a) In P-type semiconductor, the Fermi level is 0.3ev above the valance band at the room temperature. of 300^0K. Determine new position of Fermi level for the temperature of 400^0K. **[4]** -CO1
b) Write the characteristics of Zener Diode. **[4]** -CO1

Q3.

a) A BJT has I_C=2mA and I_B=5μA. Determine the value of I_E, β and α. **[4]** -CO2
b) What are the difference between N-Channel JFET and P-Channel JFET? **[4]** -CO2

OR

a) How does the depletion layer become broader and narrower in JFET? **[4]** -CO2
b) In a Common Emitter Transistor Circuit if β=100 and I_B=50μA, compute the values of α,I_E,I_C. **[4]** -CO2

Q4.

a) Calculate the output Voltage of Op-amp summing amplifier for the following sets of voltages and Resisters. Use R_f=1MΩ in all cases. **[4]** -CO3

$(a)\ V_1 = +1V, V_2 = +2V, V_3 = +3V, R_1 = 500k\Omega, R_2 = 1M\Omega, R_3 = 1M\Omega$
$(b)\ V_1 = -2V, V_2 = +3V, V_3 = +1V, R_1 = 200k\Omega, R_2 = 1\Omega, R_3 = 1M\Omega$

b) Write the comparison between positive and negative feedback amplifiers. **[4]** -CO3

OR

a) Calculate the output voltage using the circuit for resistor components of value R_f = 470kΩ, R_1 = 4.3kΩ, R_2 = 33kΩ, R_3 = 33kΩ for an input of 80μV. **[4]** -CO3

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Even Repeat Mid Semester Examination for session 2022-23

COURSE NAME: B.TECH | SEMESTER:2ND

BRANCH NAME:A,B,C,D,E,F,G
SUBJECT NAME: BASIC ELECTRONICS

FULL MARKS:**30** | TIME:**90 Minutes**

Answer **All**Questions.
The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all Questions. **[2×3]**

a) What is forbidden energy gap? How does it occur? Define what is its magnitude for Si and Ge? - CO1
b) How α and β related to each other? Define β in transistor. - CO2
c) Subtract 1101110 from 101011 using 1's complement method. - CO3

1 10 1110

Q2. **[8]**

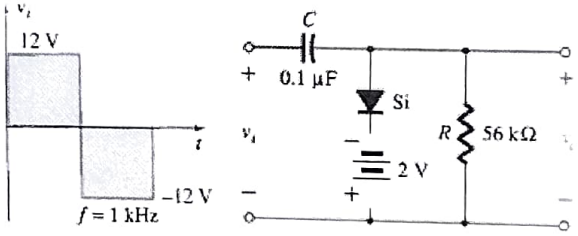
(a) Describe about the types of resistances in diode and their mathematical equations. - CO1
For an ideal Si diode at a temp of 125^{0}C has I s of 20μA. Find the dynamic resistance for a 10v biasing potential in Forward bias condition. [2+2]

(b) (i) Draw the V-I characteristics of PN junction diode and discuss different voltages Associated it. [2+2]
(ii) Explain how RC low pass filter acts as Integrator.

OR

(a) Describe working principle of common Emitter BJT Amplifier. - CO1 [4]

(b) Sketch the output waveform for the following circuit. [4]



Q3. **[8]**

A full-wave centre tap rectifier with a 120-V rms sinusoidal input has a load resistor of 1 Kilo-Ohm. - CO2 [2+2+2+2]

a. If silicon diodes are employed, what is the dc voltage available at the load?
b. Determine the required PIV rating of each diode.
c. Find the maximum current through each diode during conduction.
d. What is the required power rating of each diode?

OR

(a) Draw and explain bridge rectifier with necessary diagram. - CO2 [4]

(b) Explain transistor action as a switch. [4]

Q4. **[8]**

(a) Do the following conversion - CO3
$(129.5)_{10} = (\ )_{16} = (\ )_8 = (\ )_2 = (\ )_5$ [4]