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اسئلة مقترحة :

مختبر الالكترونيات و الآلات الكهربائية

Electro Machine Lab

اللجنة الأكاديمية لقسم الهندسة الصناعية

2023

Electronics Lab Questions

Questions link:

https://forms.gle/v8ETK2tnVKRX5dzV8

Solve the answers below

Question No.1

1-The main difference between clipper and clamper is the presence of:

Capacitor

2-The transistor has Vc=4V ,Vb=3V and Ve=5V , then the transistor is biased in

Vb< Vc Reverse

Vb< Ve Reverse

Cut off mode

3- The term BJT is short for

bipolar junction transistor

4- Compared to HWR,the FWR has

Full wave Rectifier has:

low ripple voltage=VP/2RFC =1/2*(low ripple voltage half wave)

low ripple voltage

5- A certain transistor has IC = 15 mA and IB = 167 µA; DC is

B=IC/IB =15mA/167 µA=

90

6- is an electronic circuit that changes the DC level of a signal to the desired level without changing the shape of the applied signal

Clamper

7- The circuit which changes the shape of AC input signal is called

Clipper

8- The transistor has Vc=2V ,Vb=3V and Ve=1V , then the transistor is biased in

Vb>Vc Forword

Vb> Ve Forword

Saturation mode

9- Id=3mA ,Vd=0.66V and when Id=3.5mA , Vd=0.7V, the Dynamic or AC Resistance rac=

= $\Delta v / \Delta i$

=0.7- 0.66 /3.5 mA - 3 mA =

80 Ω

10- Which of the following diodes is reverse biased

A

11-What are the two types of bipolar junction transistors

npn and pnp

12- The transistor has Vc=4V ,Vb=3V and Ve=1V , then the transistor is biased in

Vb<Vc Reverse

Vb> Ve Forword

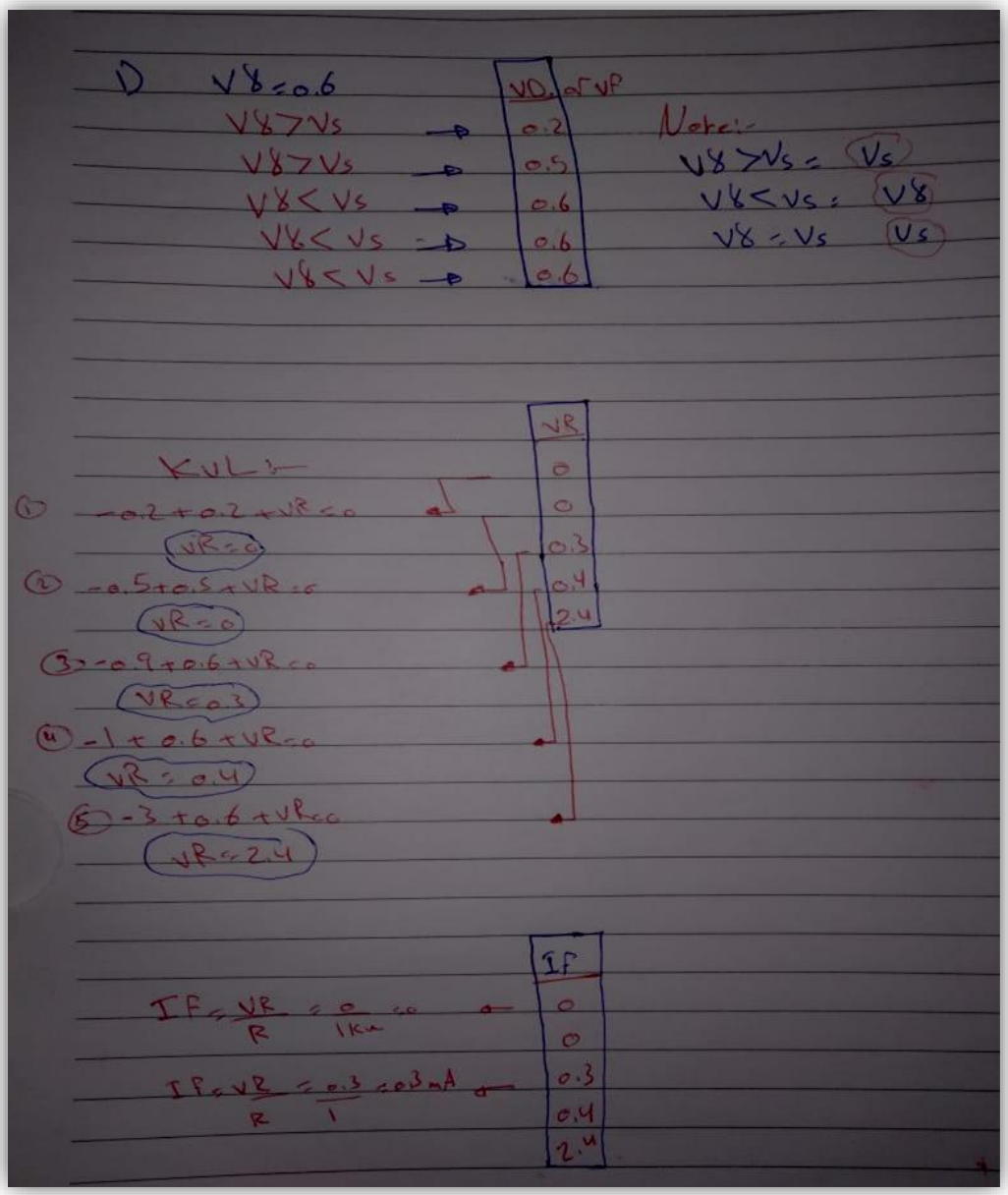
Foreword Active mode

13- In which of the following figures, junction diode is forward biased

B

Question No.2

1- For the circuit shown below consider Vɣ=0.6 then fill the table



2) the RD at 3V

RD=VD/IF=0.6/2.4*10^-3=250

3) the rD at 1V

rD= Δv/ Δi=VD(3)-VD(0.9)/IF(3)-IF(0.9)=0.6-0.6/2.4-3=0

Question No.3

1) For the circuit shown below ,the Vo Avg is

VP-Vɣ/π=

5-0.6/ π= 1.4

2) For the circuit the average power dissipated in the diode is

V=IR

0.6=I*2000

I=0.3mA

P=VI

P=1.4*0.3Ma=0.42mW

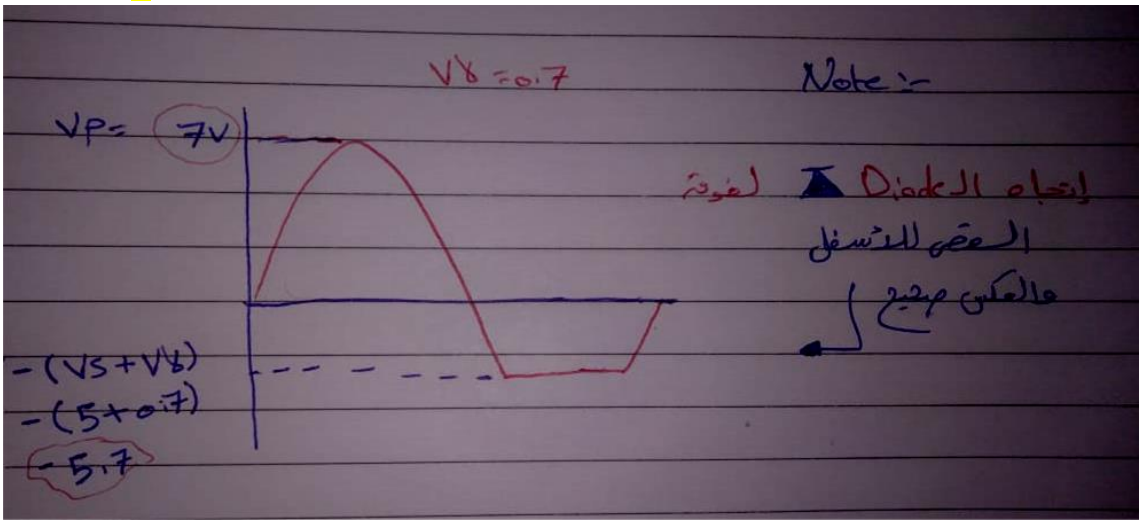
Question No.4

1) For the circuit shown below , What is the name of the circuit

Clipper

2) the output wave form (Vɣ=0.7)

A



Question No.5

1) $I_B = \frac{V_{BB} - V_{BE_{on}}}{R_B} = \frac{5 - 0.6}{100k\Omega} = 0.044mA$

2) $I_C = \beta I_B = 100 * 0.044 \times 10^{-3} = 4.4\,mA$

3) $I_E = I_C + I_B = 0.044 + 4.4 = 4.444mA$

4) V_{CE} →

$V_{CC} = I_C * (R_C + R_E) + V_{CE}$

$10 = 4.4 \times 10^{-3} (2 \times 10^3 + 0) + V_{CE}$

$V_{CE} = 1.2\ V$

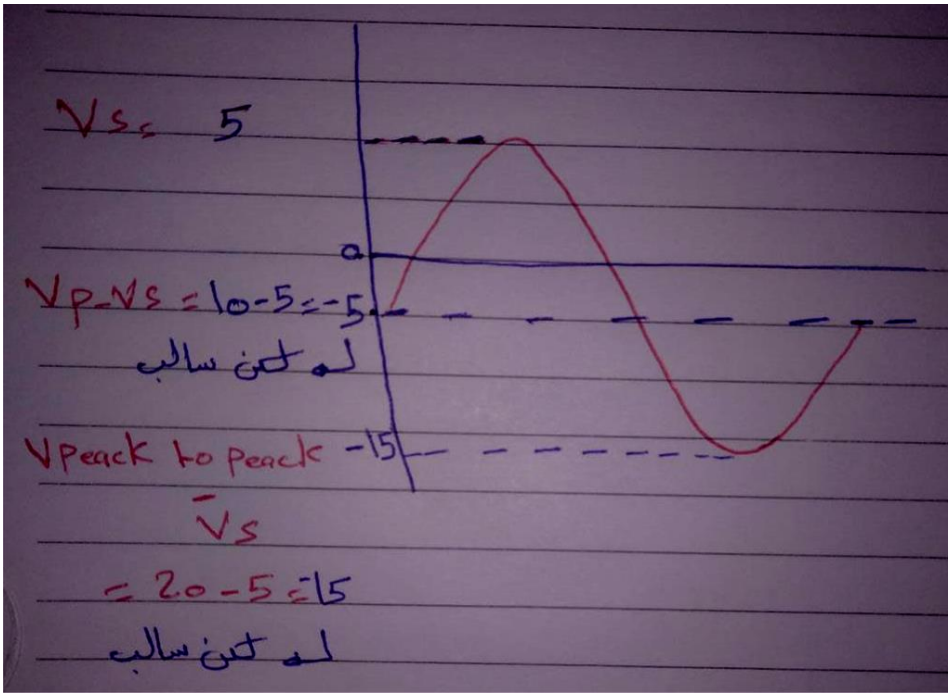
Question No.6

1) For the circuit shown below , What is the name of the circuit ? (Ideal diode)

Clamper

2) the output wave form

C



Question No.7

1) For the circuit shown below (Ideal diode), the circuit represents

full wave rectifier

2) The average value of the output signal is

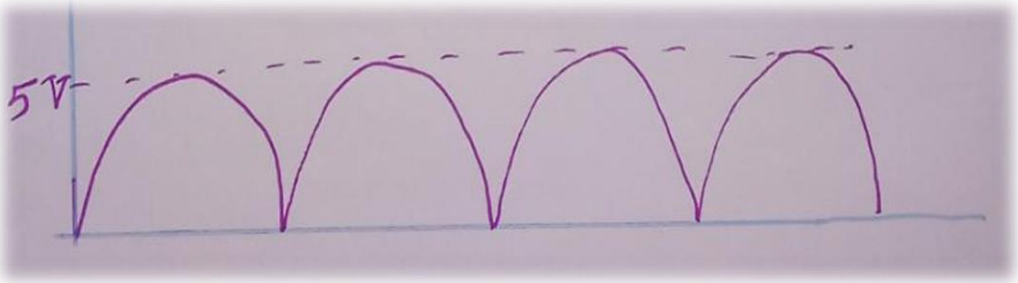
=2Vinp /π

2*5/ π

= 3.18v

3) the output wave form

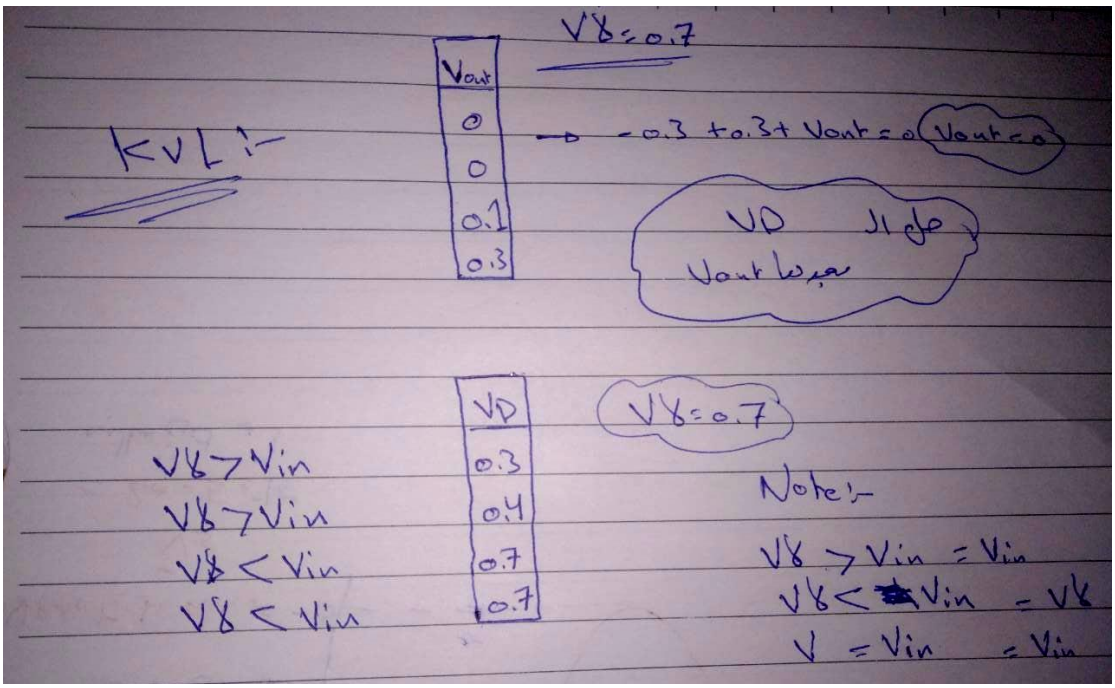
B



Question No.8

1) For the following circuit below fill the table below

B



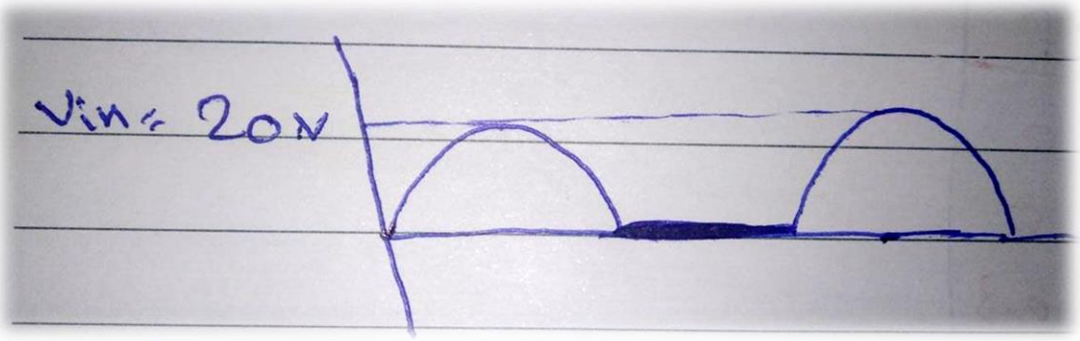
Question No.9

1) For the circuit shown below assume (Ideal diode), the circuit represents

half wave rectifier

2) the output wave form

A



3) The average voltage

V0 avg=Vin/ π

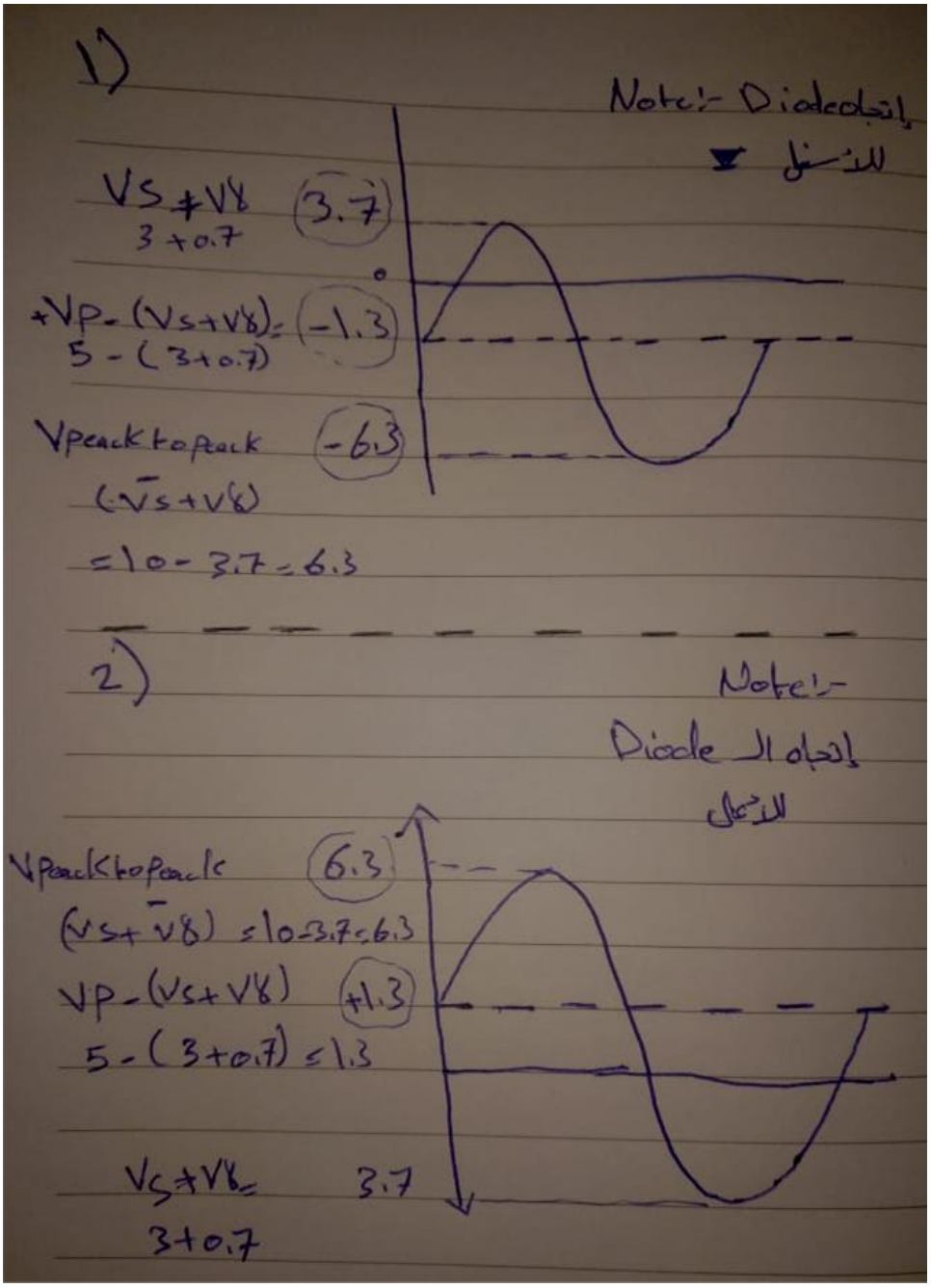
20/ π=6.366v

4) The average current in the diode

Id avg= V0 avg/R load

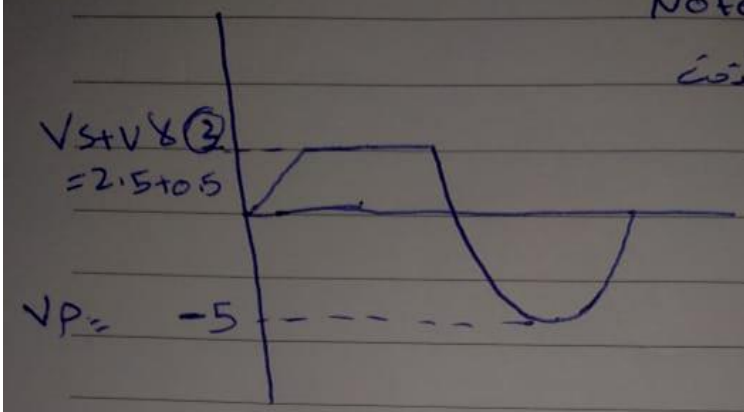
6.366/1000= 6.36mA

Question No.10



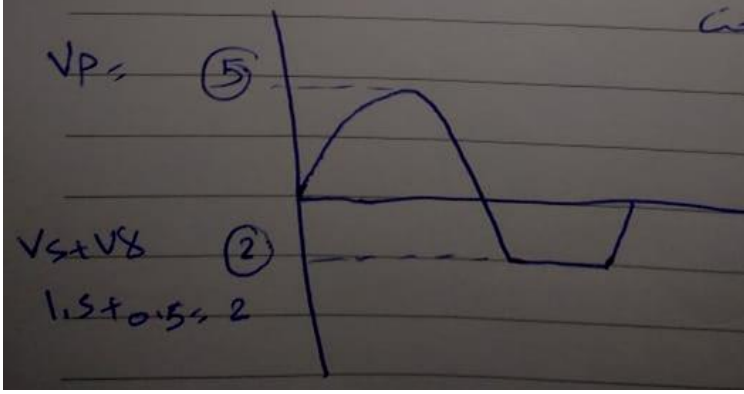
3)

Note:
إتجاه الـ ▼ لتحت
العقد لفوق



4)

Note:
إتجاه الـ Diode لفوق
العقد لتحت



Question No.11

1) If β=200 , α equal=

α= β/1+ β

200/1+200=65.66

2) If α=0.99 , β equal=

β = α/1- α

0.99/1-0.99=99

3) If β=100 and Ic=30mA , IB equal

IB = Ic/ β

30mA/100 = 300 µA

Question No.12

1) V Average in full wave formula

V Average =2(VP-2Vɣ)/π

2) V Average in half wave (Ideal diode)

V Average =VP/π

3) V Average in half wave (offest diode) formula

V Average =VP-Vɣ/π

Question No.13

1) V_{BB} or $V_{th} = \frac{R_1}{R_1+R_2} * V_{cc}$

$= \frac{10}{60} * 20 = 3.33\,V$

2) RR or $R_{th} = \frac{R_1 \times R_2}{R_1+R_2} = \frac{50 \times 10}{50+10} = 8.33\,K\Omega$

3) $I_B = \frac{V_{BB} - V_{BE\,on}}{R_B + (\beta+1) * R_E}$

$= \frac{3.33 - 0.7}{10^3 * 8.33 + (200+1) * 1000} = 12.56\,MA$

4) $I_C = \beta * I_B = 200 * 12.56\,MA = 2.513\,mA$

5) $I_E = (1+\beta) * I_B = (1+200) * 12.56 \times 10^{-6} = 2.52\,mA$

6) $V_{CE} = V_{cc} - I_c (R_c + R_E)$

$= 20 - 2.513 \times 10^{-3} (3000+1000)$

$= 9.948\,V$

Question No.14

1) What type of diode circuit is used to add or restore a dc level to an electrical signal

Clamper

2) An open circuit can have any voltage across its terminals, but the current is always

0A

3) Refer to the figure given below. Which diode arrangement will supply a negative output voltage?

c

4) What best describes the circuit

Half-wave rectifier

5) Which diode arrangement will supply a positive output voltage

A

6) When a transistor is used as a switch, it is stable in which two distinct regions

saturation and cutoff

7) Which of the following is true for an npn or pnp transistor

IE = IB + IC

8) DC power should be connected to forward bias a diode as follows

+anode, – cathode

9) The average value of a half-wave rectified voltage with a peak value of 200V is

V Average =VP/π

=200/ π=63.7

10) bride rectifier consists of

4diodes

11) Which of the following is not a necessary component in a clamper circuit

Independent DC Supply

Diode, Capacitor and Resistor are necessary to build a clamper circuit. An independent DC supply is required to bring an additional shift

12) For a sinusoidal input of 20 Vpeak to the given circuit, what is the peak value of the output waveform

25V

Explanation: In the given circuit, the output becomes zero for v_i less than -5 V. Hence, the peak value of the output is 25 V owing to the additive effect of V for v_i.

13) For the given circuit for a 20 Vpeak sinusoidal input vi, what is the value of vi at which the clipping begins

-5V

Explanation: Considering the connection of diode, it is evident that the diode becomes reverse biased when v_i < -5 V. Hence, clipping starts at -5 V.

14) The transistor has Vc=3V ,Vb=4V and Ve=5V , then the transistor is biased in

Vb>Vc Forword

Vb< Ve Reverse

Reverse active mode

15) What is the peak-to-peak voltage value (VPP

+10V-(-10V)=20V

16) is the conversion of alternating current (AC) to direct current (DC)

Rectifier

17) The basic rectifier circuits are

A+B+C

18) choose the correct answer **A (NPN) - B (PNP)**

Question No.15

1) For normal operation of a pnp BJT, the base must be _____ with respect to the emitter and _____ with respect to the collector

negative, positive

2) βDC is the ratio of IC to IE

False

3) Refer to this figure. Determine the minimum value of IB that will produce saturation.Use VCE = 0.2V

Apply kirchoff's voltage law in the output side

10=4.7*10^3*Ic+0.2

on solving Ic=2.085 ma.

For common emmiter configuration we know Ic=b*Ib
where b=200

So, Ib = 2.085/200 = 10.425µA

4) In this circuit βDC = 100 and VIN = 8 V. The value of RB that will produce saturation is: (Vce = 0.2 v) (vbe=0.7 v)
Then apply kcl for output circuit.
20-0.2/2.5 = 7.92mA = ic
ic = bib
ib = ic/b = 7.92/100 = 0.0792.
Then kvl for input side.
8 - 0.7-0.0792 * rb = 0,
rb = 8-0.7/0.0792 = 92kohms

Question No.16

1) Choose the correct answer below

A	function generator
B	capacitor
C	breadboard
D	digital multimeter
E	resistor
F	transistor
G	dual trace oscilloscope

2) These lines of five holes are known as

nodes

3) ripple voltage of half wave rectifier formula

Vr =(VP-Vɣ)/F*R*C

4) ripple voltage of full wave rectifier formula

Vr =(VP-2Vɣ)/2*F*R*C

5) choose the right answer

V avg full wave > V avg half wave

6) What is the peak voltage value

10

7) Transistor biasing represents ……. Conditions

d.c

8) Operating point represents

Zero signal values of IC and VCE

9) Total emitter current is

IB + IC

10) ripple factor of half wave rectifier formula

%r = (Vr / Vavg) *100%

11) The ripple factor of a full-wave rectifier circuit compared to that of a half wave rectifier circuit without filter is

less than half that for a half-wave rectifier circuit

12) Shunting the ac component away from the load is the task of a

Filter

13) From the given I-V characteristics of a silicon diode, what is the approximate value of rav between marked points

Explanation: r_{av} is the average AC resistance, found between two marked points in the I-V graph. Here r_{av}=0.1/14mA=7Ω.

14) What is the name of the figure below

zener diode

15) In the image below, the diode characteristics diagram Answer the questions below

A	reverse
B	forward