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MATRIC NO:	19/ENG08/009
DEPARTMENT:	<b>BIOMEDICAL ENGINEERING</b>
COURSE CODE:	ENG 222
<u>COURSE TITLE</u> :	ELECTRICAL ENGINEERING II

## QUESTION

1. Describe a Zener diode regulator, and:

- i. sketch the symbol and I-V characteristics curve,
- ii. sketch and label the circuit diagram

2. A 5W maximum rated Zener diode has 500mA maximum current flowing through it. If a 20Vmax bridge rectifier circuit is connected as input to the regulator circuit. Calculate:

- i. The minimum value of the series resistor to the Zener diode
- ii. The current across the diode at full load of  $500\Omega$

NOTE: Whoever submit an already-submitted solution (File) will be cancelled. Your evidence of personal solution will only be graded.

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	nent : Biomedi	cal Enginee	ring		
IAZ	ener dirde r	aulater 1	2	1 di la 1	alt as late
volta	age across smo	all loads. It	is decire	and to work	used to regulate to is zener break
dow	n require . It a	cts und li	Ke norma	L P-N into	tion diodes unde
form	and biased a	condition A	nd when t	this is app	fied to the disde
. it a	llows large an	nount of els	ectric cur	rent and k	locks only small
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and the second s					Romin = Vs/1

2. ai	Ven
	Zener diade
	D.
	Power = 5W mark
	Current = 500mA max
	0
	Bridge rectifier circuit Voltage = 20V max
	vovage = 20V max
E	
0 Cu	Icillate the minimum value of restance.
	P=IV
	$\frac{V = P = 5W = 5}{I 500 \text{ mA} 500 \times 10^{-3} 500} = 10V$
	1 500mA 500×10° 500
	Rs CResistor of senies)
	$R_s = \frac{V_s - V_z}{T_z}$
	Iz
	$V_{\rm S} = 20V$
	$V_{Z} = 10V$
	$J_Z = 500 \text{ mA}$
	$\frac{R_{5} = (20 - 10)V}{500 \text{ mA}} = \frac{10}{500 \times 10^{-3}} = 20 \text{ A}$
	500mA 500×10
-0	
ii th	e hoad current IL if a load resistor of 500-2
	$T_{L} = V_{Z} = 10V = 0.02 \text{ mA}$
	RL 500-1-
	and the second se

