Benha University
Faculty of Engineering at Shoubra
Electrical Engineering and Control program.

Final Term Exam
Date: (29/05/2019)
Subject: Electronics (1)
Duration: 2 hours

- **Answer all the following questions**
- **The exam is in Three Pages**

- **No. of questions : 5**
- **Total Mark: 40 Marks**

Question (1)

(a) For the circuit shown below Determine V_o, I_1, I_{D1} **and** I_{D2}. Use practical model. Assume diodes to be similar *(5 marks)*
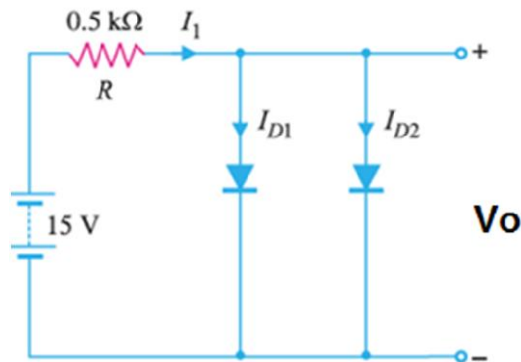
(b) Draw (only) two different circuits used to clip sine wave signal in positive and negative levels to be like a square wave *(5 marks)*

Question (2)

(a) A zener diode used as a regulator at **6.8V**, connected in shunt regulation with unknown load resistance. If the DC input was **5V** and the series resistance between the supply and zener is **10 Ω**, calculate the value of the load resistance that makes the power dissipated through the series resistance be *1W*. *(5 marks)*

(b) Draw the expected output from the following circuit if the input is with **30V** peak to peak. Assume diode is silicon. *(5 marks)*
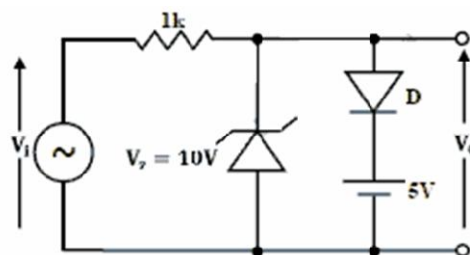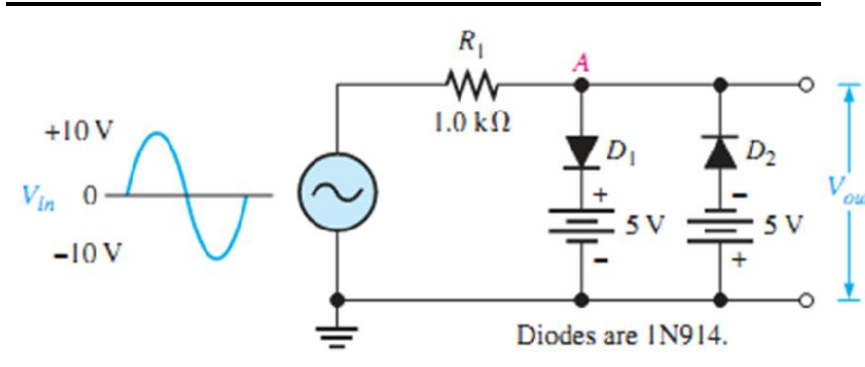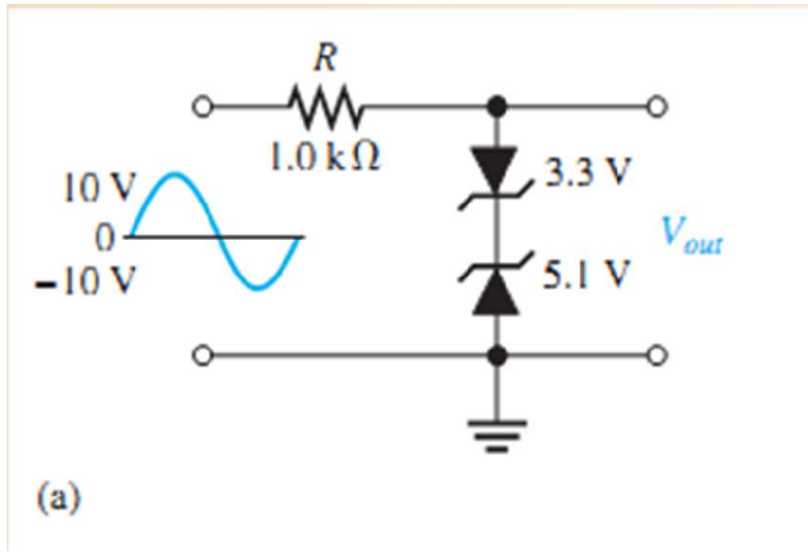
_Vo = 0.7 V_

Solution. The applied voltage forward biases each diode so that they conduct current in the same direction.

$$I_1 = \frac{\text{Voltage across } R}{R} = \frac{15 - 0.7}{0.5 \text{ k}\Omega} = 28.6 \text{ mA}$$

Since the diodes are similar

$$I_{D1} = I_{D2} = \frac{I_1}{2} = \frac{28.6}{2} = \textbf{14.3 mA}$$

_1-b_

(a)

Diodes are 1N914.

2-a

$Is = P/(Rs)^2 = 0.316A$

$VIN < Vz$

So zener is off (open circuit)

So $Is = IL = 0.316A$

$RL + RL = VIN / (Is) = 5/0.316 = 15.8$

$RL = 500 - 10 = 5.8\ \Omega$

2-b