Kaferelsheikh University Faculty of Engineering Department of Electrical Engineering

Year: First Subject: Electronic

Name:



Date: 6/1/2016 Time allowed: 1.5h Full Mark: 45 degree Final Exam: 1 page Academic Number:

## [1] Question One:

## A) Explain each of the following:

a. Mobility of charged particle. b. Energy hill.

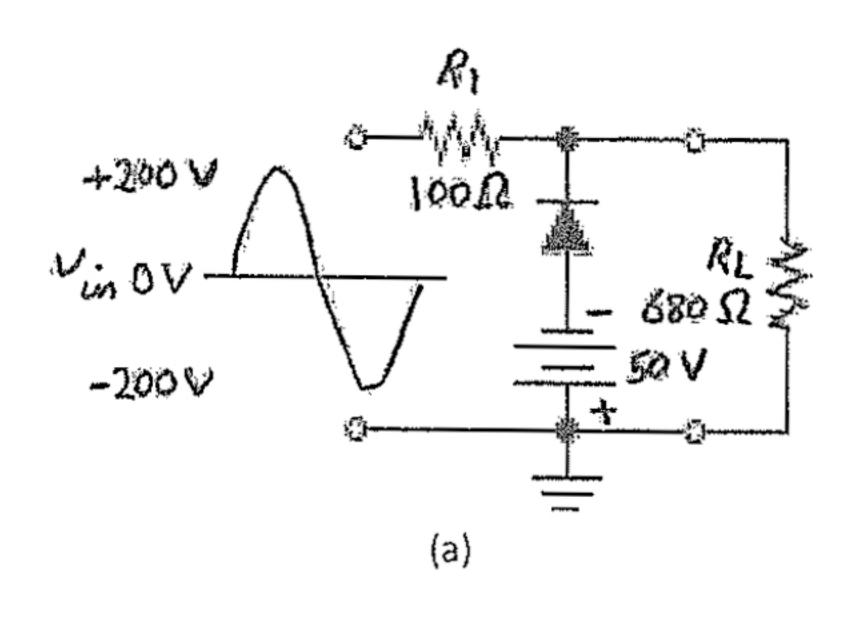
c. saturation velocity.

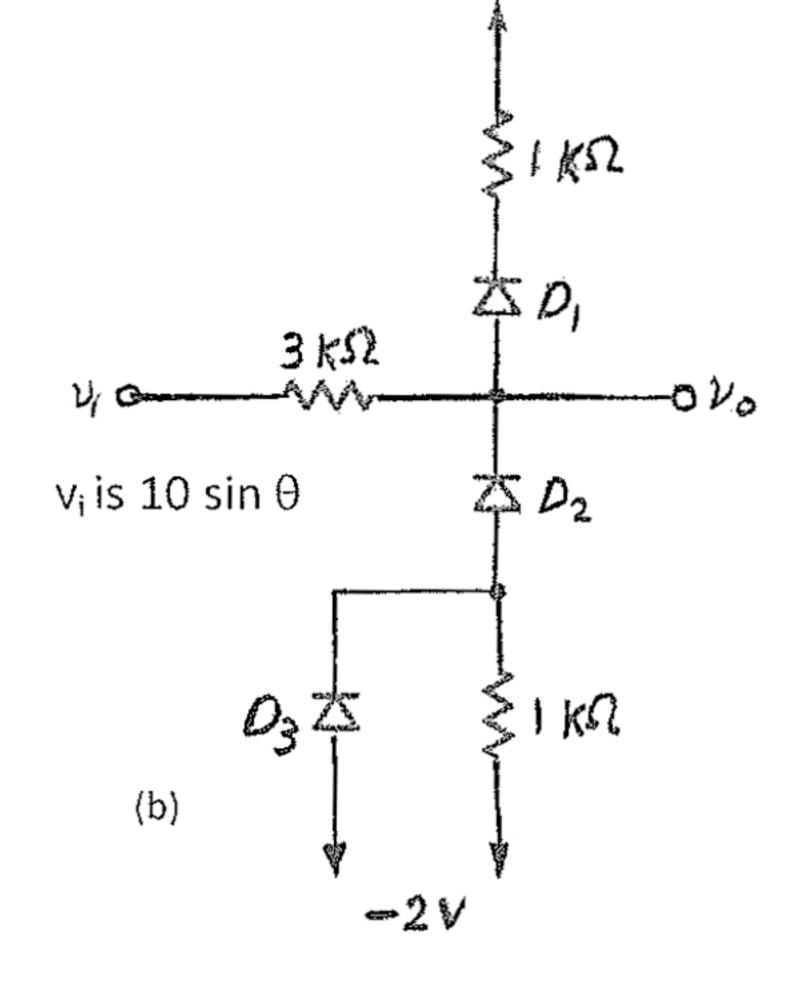
d. Static resistance and dynamic resistance of a diode.

e. junction potential.

B) Derive expression for charges stored in the depletion region, then find the depletion region's width. +1 1

C) Determine  $v_0$  for each network of shown below for the input shown.





## [2] Question Two:

- A) To obtain equal electron and hole drift currents. How should the carrier density to obtain? then define the other type of current?
- B) Explain conductivity of p type semiconductor.
- C) Draw the circuit of bridge rectifier and explain its operation with the help of input and output waveforms.
- D) Find the current flow in a silicon bar of 10 μm length having a 5μm x 4μm cross-section and having free electron and hole densities of 105/cm<sup>3</sup> and 1015/cm<sup>3</sup>, respectively, with 1 V applied end-to-end. Use  $\mu_n = 1200 \text{ cm} 2/\text{Vs}$  and  $\mu_p = 500 \text{cm}^2/\text{V-s}$ .

With best wishes

Dr. noha abd al-salam