بسم الله الرحمن الرحيم

King Fahd University of Petroleum and Minerals
Department of Electrical Engineering

Semester II 2005/2006 **EE445 Industrial Electronics** **Major (2)**

ATTEMPT ALL QUESTIONS
TIME ALLOWED ONE HOUR

A deaf landlord in a village wants to open a shop connected to his living room. Under normal conditions the door of the shop will be closed and the man will be setting in his living room. It is required to design a system that will inform the landlord when a buyer enters the shop. Moreover, it is required to open the shop door for 30 seconds **only** to allow the buyer to enter and then the door will be closed automatically to prevent a burglar from entering the shop for stealing. The system to be used for closing the door is expected to sense the full entrance of the buyer (say when he is two meters inside the shop) and then a motor will operate to close the door. Once the door is closed it **cannot be opened** until the landlord arrives and see the buyer and complete the transactions and then opens the door for the buyer to leave the shop.

You are requested to:

1. Sketch a plan for the shop showing the locations of the sensors required.
2. Specify the types of sensors you need.
3. Design a circuit that can do the job. Assume that a dc motor will be used.
4. Draw a complete circuit diagram of your design.
5. Write a brief explanation of how your circuit works.

Make any necessary assumptions. Assume that all components you need are available.