King Saud University

College of Engineering

GE 105: **Introduction to Engineering Design**

Quiz 2 Solution

In the table below several items of a need analysis required for the problem formulation of the design of a refrigerator are listed. The symbols A, B, C, and D represent the basic design steps that need to be defined, as follows:

- (A) Problem statement,
- (B) Objectives,
- (C) Constraints,
- (D) Criteria

Circle the most appropriate design step indicator corresponding to the ten items shown in the given table. **Only one step indicator should be selected for each item.**

1	The temperature and humidity must be easily controlled meaning an easy operation.	A	B	C	D
2	The volume should be more than $1m^3$ with a maximum height of 1.2 m in order to store sufficient amount of medicines.	A	B	C	D
3	The refrigerator will provide remote and isolated areas with medicines and vaccines.	A	B	C	D
4	It is desired to design a solar refrigerator to be used in remote areas to store medicines and vaccines.	A	B	C	D
5	The refrigerator must store vaccine and medicines at specific temperatures and must use only solar energy	A	B	C	D
6	The price of the refrigerator should not be more than 3000 SR	A	B	C	D
7	The maintenance cost should be low.	A	B	C	D
8	The different parts should easily assembled and dismantled	A	B	C	D
9	The refrigerator must be 100 % powered by solar energy	A	B	C	D
10	The body of the refrigerator must be highly resistant to the environment conditions in order to exhibit long life.	A	B	C	D

Dr. Mohammed Ali

Problem Statement:

It is desired to design a solar refrigerator to be used in remote areas to store medicines and vaccines. **(4)**

Objectives:

1. The refrigerator will provide remote and isolated areas with medicines and vaccines. **(3)**
2. The refrigerator must store vaccine and medicines at specific temperatures and must use only solar energy. **(5)**

Constraints:

1. The volume should be more than $1m^3$ with a maximum height of 1.2 m in order to store sufficient amount of medicines. **(2)**
2. The price of the refrigerator should not be more than 3000 SR. **(6)**
3. The refrigerator must be 100 % powered by solar energy. **(9)**

Criteria:

1. The temperature and humidity must be easily controlled meaning an easy operation. **(1)**
2. The maintenance cost should be low. **(7)**
3. The different parts should easily assembled and dismantled. **(8)**
4. The body of the refrigerator must be highly resistant to the environment conditions in order to exhibit long life. **(10)**