



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

*Faculty of Applied & Health Sciences*

**DEPARTMENT OF PURE & APPLIED SCIENCES  
DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY (DSL09J)**

**APS 2302: PHYSICS TECHNIQUES IV - REFRIGERATION**

END OF SEMESTER EXAMINATION  
**SERIES:** AUGUST/SEPTEMBER 2011  
**TIME:** 2HOURS

**Instructions to Candidates:**

You should have the following for this examination

- Answer booklet

This paper consists of **FIVE** questions

Answer Question **ONE** (Compulsory) and attempt any other **TWO** questions

This paper consists of **THREE** printed pages

### Question One (30 marks)

- a) Discuss the necessary conditions for bacteria growth (3 marks)
- b) State the **THREE** gas laws (3 marks)
- c) Explain the terms;
  - (i) Latent heat of vaporization (2 marks)
  - (ii) Latent heat of fusion (2 marks)
- d) (i) What is a 'Chlorofluorocarbon' (CFC)? (2 marks)
  - (ii) Outline the properties of the CFC's (4 marks)
  - (iii) Give the common uses of the CFC's (4 marks)
- e) What is refrigeration and what are some of its applications? (4 marks)
- f) (i) What is a condenser? (4 marks)
  - (iii) Describe **TWO** types of commonly used condensers. (4 marks)

### Question Two (20 marks)

- a) Bacteria are generally known to be harmful. However, they can also be useful in a number of ways. Explain how refrigeration is used in stemming bacteria in food and other consumables. (5 marks)
- b) Using a well labeled diagram, outline what a typical refrigeration control system does (6 marks)
- c) (i) What is an evaporator? (2 marks)
  - (ii) Give **TWO** uses of an evaporator. (2 marks)

### Question Three (20 marks)

- a) Distinguish between the cyclic and non-cyclic refrigeration (4 marks)
- b) With aid of a diagram, describe the working of a refrigerator that operates on a vapour-compression cycle. (8 marks)
- c) Describe the Gas cycle type of refrigeration and state where it is mostly applicable (4 marks)
- d) Explain the statement 'evaporation causes cooling' (4 marks)

**Question Four (20 marks)**

- a) Discuss the following types of compressors giving the advantages and disadvantages of each;
- (i) Hermetic compressors
  - (ii) Semi-hermetic compressors
  - (iii) Open compressors (12 marks)
- b) Discuss the operation and maintenance of refrigeration and air conditioning equipment citing examples. ( 8 marks)

**Question Five (20 marks)**

- a) What is an air conditioner? (2 marks)
- b) Discuss the following categories of air conditioning applications and give examples for each.
- (i) Comfort applications (4 marks)
  - (ii) Process applications (4 marks)
- c) Discuss the applications of refrigeration and air conditioning principles in a science laboratory. (5 marks)
- d) Discuss air conditioning in regards to health issues (5 marks)