



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 (DSLTO9A)

APS 2302: PHYSICS TECHNIQUES IV - REFRIGERATION

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 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)** from **SECTION A** and any other **TWO** questions from **SECTION B**

Maximum marks for each part of a question are clearly shown

This paper consists of **THREE** printed pages

SECTION A (Compulsory)

Question One (30 marks)

- a) Distinguish between a dehumidifier and an air conditioner (4 marks)
- b) Discuss the following
- (i) Boyles Law (2 marks)
 - (ii) Charles Law (2 marks)
 - (iii) Pressure Law (2 marks)
- c) Write short notes on the **THREE** modes of heat transfer (6 marks)
- d) Give the properties of chlorofluorocarbons (5 marks)
- e) Discuss the use of a heat pump in air conditioning (4 marks)
- f) Bacteria are present in everything and it is impossible to completely avoid them. Explain how one can preserve perishable foods (2 marks)
- g) Give **THREE** uses of hydro chlorofluorocarbons (3 marks)

SECTION B (Attempt any TWO questions)

Question Two (20 marks)

- a) What does a typical refrigeration control system do? (9 marks)
- b) Outline the components of a typical refrigeration control system (3 marks)
- c) (i) Explain the working of an evaporator (5 marks)
- (ii) Explain the use of an evaporator in air conditioning (3 marks)

Question Three (20 marks)

- a) Discuss the following refrigeration systems
- (i) Vapor compression cycle (4 marks)
 - (ii) Vapor absorption cycle (4 marks)
 - (iii) Magnetic refrigeration (4 marks)
- b) Describe the Gas cycle type of refrigeration and state where it is mostly applicable. (4 marks)
- c) Explain the working of a domestic refrigerator

Question Four (20 marks)

- a) Write short notes on the following:
- (i) Hermetic compressors (3 marks)
 - (ii) Semi-hermetic compressors (3 marks)
 - (iii) Open compressors (3 marks)
- b) Outline the challenges of the refrigeration control system (5 marks)
- c) Discuss the working principle of a condenser unit used in central air conditioning systems (6 marks)

Question Five (20 marks)

- a) Explain a condenser as used in refrigeration and air conditioning (3 marks)
- b) Discuss the following types of condensers
- (i) Surface condenser (3 marks)
 - (ii) Liebig condensers (3 marks)
 - (iii) Graham condensers (3 marks)
 - (iv) Allihn condensers (3 marks)
- c) Discuss the health issues related to air conditioning (5 marks)