



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2014/2015

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

EXAMINATION FOR DIPLOMA III PLANT IN MECHANICAL AND
MANUFACTURING ENGINEERING

PLANT THEORY AND PRACTICE

DATE: 20/3/2015

TIME: 2 HRS

Instructions

- *This paper consist of 5 question*
- *Answer question I and any other two questions*
- *Question one carries 30 marks and it is compulsory*
- *The other four questions carry equal marks each 20 marks*

1. a) With the aid of sketches, explain the following types of shaft misalignment.
 - i) Angular
 - ii) Parallel
 - iii) Radial (6 marks)
 - b) i) Outline three types of vibration control materials and list two desirable properties of each. (6 marks)
 - ii) State four causes of vibration in machine and four methods of control. (8 marks)
 - c) i) State any four dynamic factors that influence the type of machine foundation. (4 marks)
 - ii) With the aid of diagrams explain the principle of operation of the following in reference to shaft alignment.
 - a) Autocollimeter
 - b) Angle Dekkor (6 marks)
2. a) i) State any four functions four lubricants. (2 marks)

- ii) Define and explain the importance of the following properties of lubricants.
- a) Viscosity
 - b) Cloud and pour point
 - c) Flash point (6 marks)
- b) i) With the aid of sketches, explain the principle of hydrodynamic lubrication. (4 marks)
- ii) Illustrate the following lubrication methods.
- a) Symphon wick
 - b) Fog lubrication of pneumatic cylinder (8 marks)
3. a) Explain the need for additives as used in lubrication and state the type of additives used in turbines, electric motors and hydraulic oils. (10 marks)
- b) i) Define the terms used in machines vibrations.
- i) Resonance
 - ii) Magnification
 - iii) Transmissibility (6 marks)
- (ii) State any two desirable properties of refrigerant for each of the following considerations.
- a) Thermodynamic
 - b) Physical (4 marks)
4. a) i) State four function of hydraulic accumulators. (4 marks)
- ii) Outline any five precautions necessary when working on pneumatic accumulators. (5 marks)
- b) List any five requirements when installing hoses in hydraulic systems. (5 marks)
- c) i) State four functions of compressed air receiver explosion. (4 marks)
- ii) List two causes of air receiver explosion. (2 marks)
5. a) With the aid of sketches, explain the construction and operation of the following components of compressed air distribution system.
- a) Regulator
 - b) Lubricator (10 marks)
- b) Explain the following problems of steam distribution system and state any three remedies for each.
- a) Pipe corrosion
 - b) Water hammer (6 marks)
- c) Draw a labeled diagram of an air receiver and explain briefly the parts . (4 marks)