



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FIRST YEAR THIRD SEMESTER EXAMINATION FOR

DIPLOMA IN MECHANICAL ENGINEERING

2502/ 105/PM: PLANT MAINTENANCE

DATE: 18/12/2020

TIME: 8:30 – 11:30 AM

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination

Answer booklet;

Drawing instruments

Non-programmable scientific calculator

This paper consists of **FIVE** questions.

Answer ALL the **FIVE** questions.

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

1. (a). i). List any **FOUR** functions of lubricants.
ii). State any **FOUR** requirements of a good lubricant. (5marks)
iii). list any **TWO** solid lubricants.
- (b). Explain the following properties of lubricants and their importance:
i). Pour point;
ii). Viscosity;
(6marks)
iii). Flash point.

- (c). With the aid of diagrams, explain the working principle of the following lubricating device:
- i). Drop feed oiler;
 - ii). Syphon wick feed lubricator. (9 marks)
2. (a). i). Outline **FOUR** functions of compressed air receivers;
- ii). Draw a labelled diagram of an air receiver; (8 marks)
 - iii). Explain **FOUR** statutory requirements of an air receiver.
- (b). Illustrate compressed air generation plant and explain function of each component. (6 marks)
- (c). Explain the function of the following components in a compressed air distribution system:
- i). Pressure regulator
 - ii). Lubricator (6 marks)
 - iii). Filters
- 3 (a). i). List any **FOUR** functions of hydraulic accumulators;
- ii). State any **FOUR** requirements of a good hydraulic fluid; (6 marks)
 - iii). list any **TWO** hydraulic fluids.
- (b). Using neat diagrams explain the basic components of hydraulic system. (4 marks)
- (c). i). State any **THREE** main types of hydraulic fluid contaminants and any **TWO** of their effects.
- ii). list any **FOUR** selection criteria for hydraulic reservoir. (10 marks)
 - iii). Outline any **FOUR** precautions to be observed before servicing a hydraulic valve.
- 4 (a). i). List SIX causes of accidents in a work place;

- marks)
- ii). Explain **FOUR** uses of accident investigation reports; (8 marks)
 - iii). Explain **THREE** types of accidents.
 - (b). i). List **FOUR** classes of fire
 - ii). With the aid of diagram, explain the operation of a portable carbon dioxide fire fighting equipment. (6 marks)
 - (c). i). Explain **THREE** OSHA safety provisions for the following:
 - I. Prime mover;
 - II. Machine floor
 - ii). State **TWO** general duties as stipulated in OSHA 2007 for the following:
 - I. Inspectorate;
 - II. Employer and employee. (6 marks)
- 5
- (a). i). Explain **FOUR** factors considered when selecting a pump;
 - ii). Explain why **FIVE** reasons why centrifugal pumps are widely used in industry;
 - iii). List **TWO** ways of classifying pumps. (10 marks)
 - (b). With aid of well labeled diagram describe any **THREE** types of centrifugal impeller and where they are applied. (5 marks)
 - (c). Give **FIVE** differences between centrifugal and reciprocating pumps. (5 marks)