



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

DIPLOMA IN MECHANICAL ENGINEERING (PLANT-TVET OPTION)

2502/ 105/PM: PLANT MAINTENANCE

DATE: 9/9/2021

TIME: 8:30 – 11:30 AM

INSTRUCTIONS:

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.

1.
 - (a)
 - i) List any **FOUR** functions of lubricants.
 - ii) State any **FOUR** requirements of a good lubricant. (5 marks)
 - iii) list any **TWO** solid lubricants.
 - (b) Explain the following properties of lubricants and their importance:
 - i) Pour point;
 - ii) Viscosity; (6 marks)
 - 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) Give **SIX** problems associated with compressed air distribution. (6 marks)
 (b) Illustrate Three compressed air distribution methods commonly applied in industry. (6 marks)
 (c) Using neat sketches show the position of the following compressed air distribution Accessories supplying air to pneumatic drill and hammer;
 i. Lubricator (8 marks)
 ii. Filter
 iii. Regulator
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)