



**THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE**

**(A Constituent College of JKUAT)**

(A Centre of Excellence)

# **Faculty of Engineering & Technology**

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

**DIPLOMA IN MECHANICAL ENGINEERING (PLANT OPTION)**

EPL 2203: PLANT TECHNOLOGY

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2012**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Drawing Instruments*

This paper consists of **FIVE** questions. Answer any other **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

**Question One (Compulsory)**

- a) Sketch the hydraulic symbols of the following:
- (i) Electric motor
  - (ii) Cylinder double acting
  - (iii) Cooler
  - (iv) Pressure switch
  - (v) Filter
- b) State the functions of each of the following in a hydraulic circuit:
- (i) Relieve valve
  - (ii) Pressure switch
  - (iii) Accumulator
  - (iv) Check valve
  - (v) Fitter
- (10 marks)
- c) State the statutory requirements on a steam boilers under the Factories Act. (4 marks)
- d) Explain the procedure of starting the boiler from the cold. (6 marks)

**Question Two**

- a) (i) State **THREE** disadvantages of having an oversized steam pipe.
- (ii) State **THREE** disadvantages of having an undersized steam pipe.
- b) A process requires 5000kg/hr of dry saturated steam at 7 bars for the flow velocity not to exceed 25m/s. Calculate the pipe size. (10 marks)

**Question Three**

- a) Define the following:
- (i) Shaft alignment
  - (ii) Offset misalignment
  - (iii) Angular misalignment
- b) State any **SEVEN** symptoms of machine misalignment. (10 marks)
- c) Explain the common cause of safety valve failure on a boiler and state its remedy. (4 marks)
- d) Explain the process of operation of a blow-down valve. (6 marks)

**Question Four**

- a) State **TEN** benefits that accrue from adopting good shaft alignment practice in a plant. (10 marks)
- b) Explain the effects of the following problems associated with boiler feed water and how they can be eliminated:
- (i) Scale
  - (ii) Foaming
- (10 marks)

### Question Five

- a) State the causes of each of the following problems on belt drives, and their remedies:
- (i) Rapid v-belt wear
  - (ii) Belt slippage
  - (iii) Belt squeal
- (6 marks)**
- b) Sketch the universal coupling and state its advantage over the rigid coupling. **(4 marks)**
- c) List in a **FIVE** point format how you would conduct a simple method of capacity assessment of the compressor at the shop floor. **(10 marks)**