



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN ELECTRICAL POWER ENGINEERING

EEP 31106

MATERIALS SCIENCE & PROCESSES

END OF SEMESTER ONE EXAMINATIONS

SERIES: FEBRUARY 2011 SERIES

TIME: 2 HOURS

Instructions to Candidates:

1. You are required to have the following for this examination;
 - Answer booklet
 - A non-programmable scientific calculator
2. Answer Question **ONE(COMPULSORY)** and any other **TWO** Questions.

(COMPULSORY)

Question ONE

- a) i) Define the term corrosion. (1 mark)
- ii) Explain the following terms as applied to corrosion: (3 marks)
I) Uniform corrosion
II) Pitting corrosion
- iii) Explain why vehicles in Mombasa rust at a faster rate than those in Nairobi. (2marks)
- b) i) Define the term hazard. (1 mark)
- ii) State any TWO common hazards in a metal workshop. (2 marks)
- iii) List any THREE general workshop rules. (3 marks)
- c) i) Explain what is meant by the terms: (3 marks)
I) Mechanical properties of materials
II) Physical properties of materials
- ii) Define the following terms:
I) Plasticity
II) Fusibility
III) Malleability
IV) Ductility
- d) i) High tensile bolt cutter were assembled from several component parts; handles, strap and jaws. Which type of steel would be used to make the respective components? (3 marks)
- ii) State reasons why the steels named in (d) (i) above are the most suitable for making the different components. (3 marks)
- e) i) Define the term metallurgy. (1 mark)
- ii) State any TWO methods that can be used to reduce metal ores to their respective metals. (2 marks)
- iii) List any TWO impurities found in:
I) Aluminium ore
II) Copper ore

(ANSWER ANY OTHER TWO QUESTIONS)

Question TWO

- a) i) Explain the term marking out. (2 marks)
ii) State any THREE tools used in marking out and their uses. (6 marks)
- b) Explain the THREE different types of measurements which are made on metal surfaces in order to translate a picture of an article into hardware. (9 marks)
- c) Draw a rough sketch of a 0.25mm micrometer showing a measurement of 5.95mm and how it is obtained. (3 marks)

Question THREE

- a) i) State the TWO requirements of cutting fluids. (2 marks)
ii) List any FIVE reasons why cutting fluids are used during machining. (5 marks)
iii) Explain the THREE principal classes of cutting fluids in general use. (9 marks)
- b) State FOUR reasons why the heat generated during machinery must be kept in check. (4 marks)

Question FOUR

- a) i) Define the term insulator. (1 mark)
ii) State any TWO examples of insulators. (1 mark)
- b) i) Differentiate between the TWO major types of plastics. (6 marks)
ii) List any THREE applications for each type named in (b) (i) above. (6 marks)
- c) i) Define the term injection moulding as applied to plastics. (1 mark)
ii) State any TWO reasons why plastics are manufactured using injection moulding process. (2 marks)
iii) State any THREE products that are manufactured using injection moulding process. (3 marks)

Question FIVE

- a) i) State the material used to manufacture cold chisels. (1 mark)
ii) State the FOUR types of cold chisels in common use. (4 marks)
iii) State one use for each type of cold chisel named in (a) (ii) above. (4 marks)
- b) i) Sketch an adjustable hacksaw and label its parts. (4 marks)
ii) State the THREE specifications of the hacksaw blades. (3 marks)
iii) In a certain workshop, there are only two hacksaw blades available: 18 teeth / 25mm and 24 teeth / 25mm. Select the most suitable blade for cutting the following work pieces:
I) Thick mild steel block
II) Thin copper wire
III) A 25mm diameter mild steel bar. (3 marks)
- c) State the material used to manufacture hammer heads. (1 mark)