



THE KENYA POLYTECHNIC

GRAPHIC ARTS DEPARTMENT

DIPLOMA IN PRINTING TECHNOLOGY

END OF YEAR I EXAMINATIONS

NOVEMBER 2006

SCIENCE

3 HOURS

INSTRUCTIONS TO CANDIDATES:

Answer any FIVE questions.

All questions carry equal marks and the maximum marks for each part of a question are as shown.

This paper consists of 3 printed pages.

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1. (a) Explain the important role played by science within the printing industry by outlining the effects in:
 - (i) Pre-press section (6 marks)
 - (ii) Press section (6 marks)
 - (iii) Post-press section (6 marks)(b) State the TWO internationally recognized systems of measurement. (2 marks)
2. (a) Outline the transition elements. (5 marks)
(b) Explain THREE different roles played by Transition elements within the printing industry by presenting an example to support the role placed forth. (15 marks)
3. (a) Define Electrolysis. (2 marks)
(b) By use of examples, outline THREE different roles played by electrolysis within the printing industry. (18 marks)
4. Outline the Periodic table by:
 - (i) Explaining the term "Groups of Elements" (6 marks)
 - (ii) Explaining the term "Period" (6 marks)
 - (iii) Explaining the terms Ionic and Covalent bonds. (8 marks)
5. (a) Explain the difference between heat and temperature. (4 marks)
(b) State any FOUR effects of heat on materials. (8 marks)
(c) A piece of copper of mass 1.5kg is heated to 140°C and then quickly placed in a copper vessel called calorimeter of mass 0.75kg and containing 0.75kg of water, both at a temperature of 10°C. The temperature of calorimeter and its contents is thus increased to 30°C. Determine the specific heat capacity of copper. (Specific heat capacity of water = 4.2kJ/kg°C). Assume no other heat losses during the transfer. (5 marks)
(d) A steel rod 3m long in a printing machine has its temperature raised from 15°C to 125°C. If the coefficient of linear expansion of the steel used is 0.0000119, calculate the linear expansion in mm. (3 marks)

6. Explain the nature of matter in relation to Kinetic theory. (20 marks)
7. Explain the following terms as used in science:
- (a) Metal
 - (b) Metalloid
 - (c) Physical properties
 - (d) Chemical properties
 - (e) Periodic table
 - (f) Ohms law
 - (g) Law of conservation of energy
 - (h) Anode
 - (i) Cathode
 - (j) Cation (20 marks)
8. (a) Outline FOUR factors that affect the electrical resistance of a material conductor. (8 marks)
- (b) Define the following terms as applied in mechanical properties of materials:
- (i) Stress
 - (ii) Strain
 - (iii) M. O. E.
 - (iv) Hooke's law
 - (v) Factor of safety
 - (vi) Hardness (12 marks)