



MACHAKOS UNIVERSITY

University Examinations 2019/2020 Academic year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR
DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING

2601/102 : PHYSICAL SCIENCE

DATE: 4/11/2020

TIME: 2.30-5.30 PM

INSTRUCTIONS TO CANDIDATES

Answer all the questions.

1. a). With the help of sketch diagrams describe the distribution of bond electrons in;
 - i. Ionic
 - ii. Covalent and
 - iii. Polar Covalent compounds (6 marks)
- b). Explain why ammonia gas dissolved in kerosene does not have effect on litmus dye (2 marks)
- c). Briefly describe the nature of the following; (8 marks)
 - i. Amphoteric salts
 - ii. Hygroscopic
 - iii. Efflorescent and
 - iv. Deliquescent compounds
2. a). Define, with examples, acids and bases according to:
 - i. Arrhenius (3 marks)
 - ii. Bronsted-Lowry (3 marks)
- b). Outline the difference between strong acid and a concentrated acid. Give an appropriate example in each case (4 marks)

- c) Using examples, differentiate between an acid salt and a normal salt (3 marks)
3. a) Briefly describe the mole concept. (3 marks)
- b) Calculate the mole of Potassium Chloride that is contained in 4grammes (3 marks)
- c) Calculate the mass of Magnesium Chloride that is contained in 0.02 mole solution. (Potassium 19, Magnesium 23, Chlorine 35) (3 marks)
- d) Find the concentration of a solution that is made by dissolving 3grammes of Potassium Sulphate in 100cm^3 of water. (4 marks)
4. a) Using an appropriate example in each case describe the following:-
- i. Fused Calcium Chloride is a laboratory drying agent (4 marks)
- ii. Cobalt Chloride paper is a laboratory moisture indicator (4 marks)
- b). Name two intermolecular forces (2 marks)
- c). Briefly explain why Methane (CH_4) is a gas while trichloromethane (CHCl_3) is a liquid at room temperature. (4 marks)
5. Using the outermost energy level shell show how atoms are bonded in the following molecules. Use dots (.) and crosses (x) to represent electrons. (6 marks)
- a) CCl_4
- b) PCl_3
- c) CHCl_3
- d) N_2
- e) CO_2
- f) NH_3
- (C= 6, Cl =17, P= 15, H= 1, O=8, N= 7)
6. a). Describe how the metallic bond favours the existence of the three major properties of metals, namely; (6 marks)
- i. Malleability
- ii. Ductility and
- iii. Conductivity
- b). List any four methods of preparing salts (2 marks)