



# MURANGA UNIVERSITY COLLEGE

(CONSTITUENT COLLEGE OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY)  
SUPPLEMENTARY/SPECIAL EXAMINATION

DIPLOMA IN MECHANICAL ENGINEERING

PAS 1106: CHEMISTRY II

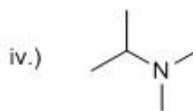
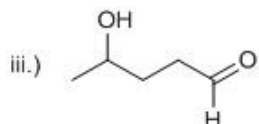
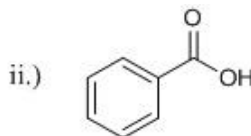
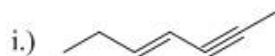
TIME: 2 HOURS

## Instruction to the Candidate

- i. Answer Question **ONE** and any other **two** questions
- ii. Question one carries 30 marks and the rest 20 marks

### QUESTION 1 (30 MARKS)

- a.) Describe the following terms;
  - i.) functional group (2marks)
  - ii.) electronic configuration (2 marks)
- b.) Name all the functional groups found in the following organic compounds (i-v); (10 marks)



- c.) State five methods of Gravimetric Analysis (10 marks)
- d.) State three methods of volumetric analysis (6 marks)

### QUESTION 2 (20 MARKS)

- a.) Draw the electronic configuration of the following atoms;
  - i.) Argon (Z=10) (4 marks)
  - ii.) Oxygen (Z=8) (4 marks)
- b.) Describe the following hybridization process;
  - i.)  $sp^3$  (4 marks)
  - ii.)  $sp^2$  (4 marks)
  - iii.)  $sp$  (4 marks)

### QUESTION 3 (20 MARKS)

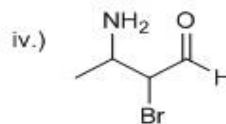
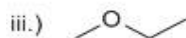
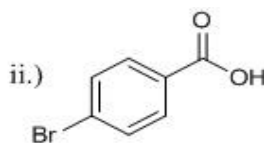
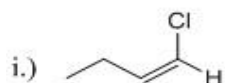
- a.) Draw the following organic compounds;
- i.) 1-chloroethanol (2 marks)
  - ii.) 2-bromopropene (2 marks)
  - iii.) Para-nitrophenol (2 marks)
  - iv.) Meta-chloroaniline (2 marks)
  - v.) 2-Amino-3-bromobenzoic acid (2 marks)
  - vi.) 3-ethyl-2-butene (2 marks)
- b.) Find the Oxidation numbers of the underlined elements in the following compounds;
- i.)  $\text{H}_2\underline{\text{P}}\text{O}_4$  (4 marks)
  - ii.)  $\text{Na}\underline{\text{C}}\text{O}_3$  (4 marks)

### QUESTION 4 (20 MARKS)

- a.) Explain the following observations;
- i.) Water has bond angle of  $104.5^\circ$ , alcohol has bond angle of  $111^\circ$  while ethers have  $118^\circ$  (4 marks)
  - ii.) Phenol are considered acidic while alcohols are not (4 marks)
  - iii.) Ethers are soluble in non-polar solvents (organic solvents) but alcohols are soluble both in non-polar and polar solvents (4 marks)
  - iv.) Alcohols burn but water do not (4 marks)
- b.) Discuss the chemistry of water (4 marks)

### QUESTION 5 (20 MARKS)

- a.) Name the following organic compounds;



(8 marks)

- b.) Define the following terms;
- i.) Standard solution (2 marks)
  - ii.) Titrant (2 marks)
  - iii.) Endpoint (2 marks)
  - iv.) Equivalent point (2 marks)
- c.) Explain the procedure of Gravimetric analysis (4marks)