

**FINAL**

**ESH 1204 Radiation and Pollution**

**Main paper 2011**

- 1(a) Describe the structure of an atom. [7]
- (b) Define the following terms
- radioisotope
- Biological half life
- Radioactivity [3]
- (c) Giving appropriate examples, explain the various modes of radioactive decay [15]
- 2 You are required to carry out a radiation environmental survey. Evaluate the dosimetry systems that you could use to achieve this task. [25]
- 3 (a) Giving appropriate examples, identify the types of radioactive waste [5]
- (b) Discuss the disposal options for the various types waste [20]
- 4 Explain the possible causes of accidents in nuclear power reactors. Discuss the impact of a nuclear accident on humankind and the environment [25]
- 5.** Zimbabwe imports radioactive materials for use in various places.  
Discuss the factors that are taken into consideration in the transportation of radioactive material from the place of origin up to the recipients. [25]
6. a) Discuss the uses of ionizing radiation in food industry and agriculture [10]
- b) Discuss strategies that could be used to minimize exposure to non ionizing radiation [15]

END OF EXAMINATION

## SUPPLEMENTARY

- 1 Explain the following modes of radioactive decay
  - i) alpha
  - ii) Beta
  - iii) Electron capture
  - iv) Fission
  - v) Fusion [5x5]
  
- 2 (a) Explain the mode of operation for any two types of nuclear power reactors [12]  
(b) Discuss safety considerations in the design and operation of nuclear power reactors [13]
  
3. (a) Explain the principle of two types of dosimeters that can be used for radiation personnel monitoring [10]  
(b) Explain the advantages and disadvantages of the above dosimeters [10]  
(c) Differentiate the following terms and give their maximum permissible doses
  - i) classified and non classified worker
  - ii) controlled and supervised area [5]
  
4. Zimbabwe imports radioactive materials for use in various places.  
Discuss the factors that are taken into consideration in the transportation of radioactive material from the place of origin up to the recipients. [25]
  
5. Discuss the uses of ionizing radiation. [25]
  
6. (a) Identify sources of ionizing giving their relative contribution to the exposure of population in general [5]  
(b) Compare and contrast the effects of ionising and non ionising radiation [20]

END OF EXAMINATION

