

BINDURA UNIVERSITY OF SCIENCE EDUCATION

CHEMISTRY DEPARTMENT

BSc. CHEMICAL TECHNOLOGY (Hons) PART II

CH306: FORENSIC TECHNOLOGY

2 HOURS

ANSWER QUESTION ONE AND FOUR OTHERS, TWO FROM EACH OF THE SECTIONS A AND B. EACH QUESTION CARRIES 20 MARKS

- 1 (a) Define the following terms as applied in forensic technology.
- | | | |
|-------|------------------|----------|
| (i) | Cold hit | [1 mark] |
| (ii) | Paint Data Query | [1 mark] |
| (iii) | Accelerants | [1 mark] |
| (iv) | Becke line | [1 mark] |
| (v) | slot-blot test | [1 mark] |
- (b) Describe three tests for blood alcohol. [9 marks]
- (c) Suggest forensic tests that can be performed on the object below.



[6 marks]

SECTION A: ANSWER ANY TWO QUESTIONS

- 2 (a) State two uses of nuclear DNA. [2 marks]
- (b) Describe the composition of the following;
- (i) Military explosives [2 marks]
 - (ii) Pipe bomb [2 marks]
 - (iii) Deflagration [2 marks]
 - (iv) Commercial Explosives [2 marks]
- (c) Discuss the use of Thin Layer Chromatography (TLC) in forensic investigation. [10 marks]
- 3 (a) Describe the forensic characteristics of soil. [4 marks]
- (b) (i) Describe the major threats of nuclear weapons [4 marks]
(ii) Describe factors that influence radiation damage [4 marks]
(iii) Suggest ways of detecting radiation [4 marks]
- (c) Suggest methods of distinguishing soil samples. [4 marks]
- 4 (a) Describe the advantages and disadvantages of plaster of Paris as a casting material. [4 marks]
- (b) Describe the procedure you would use to determine the difference between a bank note and a counterfeit note produced by a color photocopier. [4 mark]
- (c) There are several methods for the detection of arson. These include passive headspace, dynamic headspace, solid phase micro-extraction and distillation. Discuss each method giving advantages/disadvantages of each. [4 x 3 marks]

SECTION B: ANSWER ANY TWO QUESTIONS

- 5 (a) Evaluate the following techniques,
- (i) Polymerase Chain reaction (PCR) [10 marks]
 - (ii) Restriction fragment polymorphisms (RFLP) [10 marks]
- 6 (a) Describe the following techniques as used in forensic chemistry.
- (i) Bioassays [3 marks]
 - (ii) Blood typing [3 marks]
 - (iii) Colour tests [3 marks]
 - (iv) Infra red spectroscopy [3 marks]

- (b) (i) Describe the characteristic features of finger prints. **[3 marks]**
(ii) What are the challenges for law enforcement on biological weapons? **[5 marks]**
- 7 (a) Describe the process of DNA typing. **[6 marks]**
- (b) Immunoassays are commonly used as initial, screening tools for drug analysis.
- (i) Describe how immunoassays are used in forensic examinations. **[8 marks]**
(ii) Describe the major drawback of this method. **[2 marks]**
- (c) (i) Differentiate biological terrorism from bioterrorism. **[2 marks]**
(ii) Suggest the importance of chain of custody in forensic technology. **[2 marks]**

End of exam