KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages) **Reg. No: ……**

Question Code: 26E03413 **Course Code : 24UMCF41**

UG Degree - End Semester Examinations, April 2026

Fourth Semester

B.Sc. CRIMINOLOGY AND FORENSIC SCIENCE

Forensic Physics and Ballistics

(For those who joined in July 2024 onwards)

Time : 3Hours **Maximum : 75 Marks**

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

CO:1 K:1 1. Birefringence is commonly observed in

(a) Amorphous materials (b) Liquids only

(c) Crystalline materials (d) Gases only

CO:1 K:1 2. Which instrument is commonly used in forensic physics to measure refractive index and examine optical properties?

(a) Densitometer (b) Spectroscope

(c) Microscope (d) Refractometer

CO:2 K:2 3. The "3R Rule" in glass fracture examination helps to determine

(a) Refractive index (b) Direction of force

(c) Types of glass (d) Chemical composition

CO:2 K:1 4. The major component of cement responsible for strength is

(a) Gypsum (b) Sodium carbonate

(c) Tricalcium silicate (d) Potassium nitrate

CO:3 K:2 5. The forensic importance of fiber evidence lies in its ability to

(a) Determine blood group (b) Identify age of victim

(c) Estimate time of death (d) Link suspect, victim and crime scene

CO:3 K:2 6. The presence of unusual pollen grains in soil may help in

(a) Establishing geographical origin (b) Determining blood group

(c) Identifying fingerprints (d) Estimating age of suspect

CO:4 K:1 7. What was the name of the earliest known firearm?

(a) Matchlock (b) Arquebus

(c) Flintlock (d) Hand cannon

CO:4 K:2 8. The component of a cartridge that initiates the firing process is called

(a) Primer (b) Bullet

(c) Case (d) Gunpowder

CO:5 K:2 9. A screwdriver leaving parallel lines on a surface produces

(a) Compression mark (b) Striated mark

(c) Impact mark (d) Casting mark

CO:5 K:1 10. Casting of tyre marks is commonly done using

(a) Wax (b) Sand

(c) Water (d) Plaster of Paris

PART – B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

CO:1 K:3 11. (a) Demonstrate how different regions of the electromagnetic spectrum are used in forensic science investigations

(OR)

(b) Illustrate how the principles of density and refractive index can be used in the forensic examination of physical evidence.

CO:2 K:4 12. (a) Analyze the types and composition of cement by differentiating their constituents and characteristics

(OR)

(b) Compare and differentiate the types of glass used in buildings and vehicles based on their properties and uses.

CO:3 K:3 13. (a) Show the classification of fibers to determine their major constituents.

(OR)

(b) Demonstrate how matching torn pieces of cloth can be used to establish a connection between related materials.

CO:4 K:3 14. (a) Show how the different parts of a firearm function together in the general firing mechanism.

(OR)

(b) Illustrate the use of colour tests to detect gunshot residue (GSR).

CO:5 K:4 15. (a) Assess the forensic importance of tool marks in solving assault.

(OR)

(b) Differentiate between compression marks and striated marks.

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

CO:1 K:5 16. (a) Assess the forensic importance of birefringence and other optical properties of crystalline materials in the examination of evidence.

(OR)

(b) Critically evaluate the working principles and forensic applications of microscopy, spectroscopy and densitometer in forensic physics.

CO:2 K:5 17. (a) Assess the significance of glass fracture patterns and the 3R rule in determining the direction of impact.

(OR)

(b) Evaluate the reliability of concrete analysis and cement evidence in establishing a connection between a suspect and a crime scene.

CO:3 K:4 18. (a) Assess the evidentiary value of analyzing adhering materials such as soil dust, and plant debris found on clothing.

(OR)

(b) Appraise the methods used for the classification and examination of soil in forensic investigations.

CO:4 K:6 19. (a) Develop a comprehensive explanation of ballistics including internal external and terminal ballistics with examples.

(OR)

(b) Design a classification system for firearms and define each major type with examples.

CO:5 K:3 20. (a) Illustrate the different types of tool marks and show how they can be used to link a tool to a crime scene.

(OR)

(b) Interpret tyre marks to determine their importance in forensic investigations.