

QNSMARTI:H:QPCODE

Reg.No :

Name :

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) QNSMARTI:H:EXTYPE
EXAMINATION QNSMARTI:H:Y:MONTH QNSMARTI:H:Y:YEAR
QNSMARTI:H:S: IV SEMESTER**

QNSMARTI:H:C:DSE

QNSMARTI:H:C:CODE – MG4DSECHEA01

**QNSMARTI:H:C:NAME - CRIME SCENE INVESTIGATION, MANAGEMENT
AND RECONSTRUCTION**

(QNSMARTI:H:C:REYYEAR ADMISSION ONWARDS)

Duration: 2hrs

Maximum Marks: 70marks

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and
Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer

Answer any **5** questions

Each question carries **4** marks

- | | | |
|----|--|--------------------------------------|
| 1. | Describe circumstantial evidence & its evaluation by Indian Courts. | [QNSMARTI:T:A1] /
[QNSMARTI:CO:1] |
| 2. | Define admissibility and explain why it is important for forensic evidence. | [QNSMARTI:T:A2] /
[QNSMARTI:CO:1] |
| 3. | Define the role and responsibilities of a Crime Scene Investigator at a crime scene. | [QNSMARTI:T:A3] /
[QNSMARTI:CO:4] |
| 4. | What is meant by contamination in forensic science? | [QNSMARTI:T:A4] /
[QNSMARTI:CO:4] |
| 5. | What is crime scene reconstruction? | [QNSMARTI:T:A5] /
[QNSMARTI:CO:5] |
| 6. | Name any two key methods used to document a crime scene and its evidence. | [QNSMARTI:T:A6] /
[QNSMARTI:CO:3] |

7. Define an indoor crime scene. Why do indoor scenes often preserve evidence better? [QNSMARTI:T:A7] / [QNSMARTI:CO:2]

[4x5 = 20]

Part B

Short Essay

Answer any **5** questions

Each question carries **7** marks

8. Explain the importance of SOPs and quality procedures in forensic analysis of evidence and controls. [QNSMARTI:T:A8] / [QNSMARTI:CO:1]
9. What is the Frye Standard? Write two limitations of Frye Standard. [QNSMARTI:T:A9] / [QNSMARTI:CO:1]
10. Explain the forensic significance of theft and robbery crime scenes. [QNSMARTI:T:B10] / [QNSMARTI:CO:2]
11. Explain the procedures involved in securing and preserving a crime scene. [QNSMARTI:T:B11] / [QNSMARTI:CO:4]
12. Discuss the importance of crime scene documentation in forensic investigation. [QNSMARTI:T:B12] / [QNSMARTI:CO:3]
13. Explain why thorough documentation is essential for crime scene reconstruction. [QNSMARTI:T:B13] / [QNSMARTI:CO:5]
14. Explain how forensic lab results feed into the evaluation of evidence in reconstruction. [QNSMARTI:T:B14] / [QNSMARTI:CO: 5]

[7x5 = 35]

Part C

Essay

Answer any **1** questions

Each question carries **15** marks

15. (a). Explain real (physical) evidence and its forensic significance. [QNSMARTI:T:B15] / [QNSMARTI:CO:1]
(b) Explain the five stages of forensic analysis and the key variables affecting each stage.
16. (a).Discuss the need for inter-agency coordination in criminal investigations and explain the roles of police, forensic laboratories, medical experts, prosecutors, and the judiciary. [QNSMARTI:T:B16] / [QNSMARTI:CO:4]
(b). Critically analyse the problems caused by poor coordination among agencies and suggest appropriate remedial measures.

[15x1 = 15]

Part A

Multiple Choice Questions

Answer all questions

Each question carries 1 mark

1. In UV-Vis spectroscopy, a *bathochromic shift* (red shift) means: (CO 1)
 - A) Absorption shifts to shorter wavelength
 - B) Absorption shifts to longer wavelength
 - C) Absorption intensity decreases
 - D) Transmittance becomes zero
2. The elastic scattering of light (no change in energy) is known as: (CO 2)
 - A) Raman scattering
 - B) Infrared scattering
 - C) Rayleigh scattering
 - D) Brillouin scattering
3. Which equation is the basis for X-ray diffraction by crystals? (CO 2)
 - A) Illkovic equation
 - B) Bragg's equation
 - C) Boltzmann equation
 - D) Van Deemter equation
4. In SEM, the image of a sample is formed by detecting: (CO 3)
 - A) Transmitted electrons
 - B) Reflected light
 - C) Secondary electrons emitted from the surface
 - D) Absorbed X-rays only
5. Which of the following is *not* a typical signal used in SEM imaging? (CO 3)
 - A) Secondary electrons
 - B) Backscattered electrons
 - C) Fluorescent photons
 - D) X-rays for elemental analysis
6. What does TEM stand for? (CO 3)
 - A) Transmission Electron Microscope
 - B) Transmit Electrical Microscope
 - C) Transmission Energy Microscope
 - D) Transverse Electron Microscope
7. In TEM, the electrons used for imaging: (CO 3)
 - A) Bounce off the surface
 - B) Pass through the ultra-thin sample

- C) Are absorbed without transmission
 - D) Scatter only from the surface
8. Which technique is commonly used to confirm the formation of silver nanoparticles by detecting a surface plasmon resonance (SPR) peak? (CO 4)
- A) XRD
 - B) UV-Vis Spectroscopy
 - C) SEM
 - D) FTIR
9. Nanomaterials can trigger inflammatory responses by activating which immune cells? (CO 5)
- A) Red blood cells
 - B) Macrophages and neutrophils
 - C) Platelets
 - D) Epithelial cells only
10. Which molecular technique can be used to measure changes in *cytokine gene expression* after nanoparticle exposure? (CO 5)
- A) PCR (Polymerase Chain Reaction)
 - B) TLC (Thin Layer Chromatography)
 - C) SEM imaging
 - D) UV-Vis spectroscopy

Part B

Short Answer

Answer any 6 questions

Each question carries 5 marks

11. Explain how changes in molecular structure or environment can lead to bathochromic, hypsochromic, and hyperchromic effects in a UV-Visible spectrum. (CO 1)
12. Explain what X-Ray Diffraction (XRD) is and describe three key uses of this technique in material characterization (CO 2)
13. Explain the main components of a Scanning Electron Microscope (SEM) and describe how each component contributes to producing a high-resolution image of a sample's surface. (CO 3)

14. Analyse how SEM can provide different types of information (e.g., surface topography vs. compositional contrast) based on the type of electrons detected. (CO 3)
15. Give a note of various electron microscopic techniques for nanomaterial characterisation. (CO 3)
16. Explain the basic principle of Transmission Electron Microscopy (TEM). (CO 3)
17. Briefly explain the Zinc Oxide nanoparticles characterisation using various electron microscopic techniques. (CO 4)
18. Analyse and explain two major mechanisms by which nanomaterials induce toxicity in living organisms. (CO 5)
19. Analyse how different genotoxicity assays identify and distinguish between various forms of genetic damage in cells. (CO 5)

Part C

Short Essay

Answer any 2 questions

Each question carries 15 marks

20. Discuss the operating principle and key instrumental elements of FTIR spectroscopy, and analyse its applications in identifying functional groups and surface chemistry in nanoparticle systems. (CO 1)
21. Compare and contrast the principles, imaging mechanisms and sample preparation requirements Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) in the analysis of nanoparticles. (CO 3)
22. Explain the fundamental principles and working mechanism of the Transmission Electron Microscope. (CO 3)
23. Analyse the mechanisms by which nanomaterials induce inflammation in living organisms, and discuss how these inflammatory effects can be measured experimentally both *in vitro* and *in vivo*. (CO 5)

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS)

FOURTH SEMESTER EXAMINATION

MG4DSECHEA03-MANUFACTURE OF PETROCHEMICALS I

Duration: 2 hrs.

Maximum marks: 70

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer Questions

Answer **Any 5** Questions

Each question carries **4** marks

1. Describe the Frasch process for sulphur extraction [Understand] [CO1]
2. Write a short note on hydrogen as a fuel. [Remember] [CO1]
3. Differentiate between homopolymer and copolymer. Give examples for each. [Understand] [CO2]
4. Define plastics and explain any four important properties of plastics. [Remember] [CO3]
5. Compare thermoplastics and thermosetting plastics. [Understand] [CO3]
6. List the moulding constituents of plastics and explain the role of any four. [Remember] [CO3]
7. Define elastomers and name two examples. [Remember] [CO4]

(5x4=20)

Part B

Short Essay Type Questions

Answer **Any 5** Questions

Each question carries **7** marks

8. Explain manufacture of hydrogen by partial oxidation of hydrocarbons. [Understand] [CO1]
9. Describe the manufacture of nitrogen compounds from petroleum. [Understand] [CO1]
10. Explain the manufacture of sulphur by Claus process. [Understand] [CO1]
11. Illustrate the manufacture of HDPE and compare it with LDPE. [Analyse] [CO 2]

12. Outline the preparation, properties, and uses of Phenol-formaldehyde resin. [Remember] [CO3]

13. Discuss the different moulding techniques. [Understand] [CO3]

14. Explain the differences among elastomers, plastics and fibres. [Understand] [CO4]

(5x7=35)

Part C

Essay Type Questions

Answer Any **1** Question

Each question carries **15** marks

15. Compare PET and PBT with respect to preparation, properties, applications, and environmental aspects. [Analyse] [CO 2]

16. Differentiate viscose rayon and acetate rayon with respect to manufacture, properties and uses. [Analyze, CO 4]

(1x15=15)