*Total No. of Questions: 21*

**Enrollment No :** _____

MEDICAPS UNIVERSITY

# Faculty of Science

# End Semester Examination May 2025

## FS3CO21 Forensic Biology

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|---|---|---|---|---|---|
| **Programme** | : | B. Sc. (Hons.) | **Branch/Specialisation** | : | FS |
| **Duration** | : | 3 hours | **Maximum Marks** | : | 60 |

**Note:** *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

**Section 1 (Answer all question(s))**

| | | Marks | CO | BL |
|---|---|---|---|---|
| **Q1.** | What is the main characteristic of diatom cells that makes them useful in forensic science? | 1 | 1 | 1 |

- ○ Their ability to change color
- ◉ Their unique cell walls made of silica
- ○ Their ability to regenerate
- ○ Their ability to produce toxins

| | | | | |
|---|---|---|---|---|
| **Q2.** | Which of the following is a key feature of pollen grains? | 1 | 1 | 1 |

- ○ They are present in all plants
- ◉ They can help identify the plant species in forensic cases
- ○ They can be seen only under a microscope
- ○ They are unaffected by the environment

| | | | | |
|---|---|---|---|---|
| **Q3.** | What is the primary forensic significance of hair evidence? | 1 | 2 | 1 |

- ○ To determine the cause of death
- ◉ To identify a suspect or victim through DNA analysis
- ○ To assess the time of death
- ○ To identify fingerprints

| | | | | |
|---|---|---|---|---|
| **Q4.** | Which test is commonly used to detect the presence of semen at a crime scene? | 1 | 2 | 1 |

- ○ Kastle-Meyer test
- ◉ Acid phosphatase test
- ○ Luminol test
- ○ ELISA test

| | | | | |
|---|---|---|---|---|
| **Q5.** | Which test is used to determine the species identification? | 1 | 3 | 1 |

- ○ Luminol test
- ○ Keratin test
- ◉ Precipitin test
- ○ Gluten test 1

| | | | | |
|---|---|---|---|---|
| **Q6.** | Species that are very likely to become extinct in the near future are called | 1 | 3 | 2 |

- ◉ Endangered species
- ○ Threatened species
- ○ Extinct species
- ○ None of these

| | | | | |
|---|---|---|---|---|
| **Q7.** | In forensic entomology, which of the following insects is most commonly used to estimate the time of death in cases of human decomposition? | 1 | 4 | 2 |

- ○ Musca domestica
- ○ Sarcophaga spp.
- ◉ Calliphoridae family
- ○ Formicidae family

| | | | | |
|---|---|---|---|---|
| **Q8.** | Which stage of insect development is commonly used by forensic entomologists to determine the post-mortem interval (PMI)? | 1 | 4 | 2 |

- ○ Adult fly
- ○ Pupa
- ◉ Larvae
- ○ Egg

| | | | | |
|---|---|---|---|---|
| **Q9.** | What is the primary role of forensic microbiology in criminal investigations? | 1 | 5 | 3 |

- ◉ To identify human DNA
- ○ To analyze microbial evidence in criminal cases
- ○ To analyze toxicology reports
- ○ To identify trace evidence from clothing

**Q10.** Which environmental factor is most likely to influence microbial growth on a body after death? **1 5 2**

- (●) Ambient temperature
- ( ) Clothing material
- ( ) Hair type
- ( ) Nutrients

## Section 2 (Answer all question(s))

**Marks CO BL**

**Q11.** What is diatoms ? What are their different classification? Write about the significance of diatoms. **3 1 4**

| Rubric | Marks |
|---|---|
| define | 1 |
| classification | 1 |
| significance | 1 |

**Q12. (a)** What is pollination? Explain its various types and their forensic significance. **7 1 1**

| Rubric | Marks |
|---|---|
| define | 1 |
| types | 3.5 |
| forensic significance | 2.5 |

**(OR)**

**(b)** Describe the various examination of wood in investigation and write about their significance in forensic science with the help of a case study.

| Rubric | Marks |
|---|---|
| introduction | 1 |
| examination | 3 |
| significance | 1.5 |
| case study | 1.5 |

## Section 3 (Answer all question(s))

**Marks CO BL**

**Q13.** Discuss the structure of human hair and compare it with animal hair. **3 2 1**

| Rubric | Marks |
|---|---|
| structure | 1.5 |
| comparision 3 points | 1.5 |

**Q14. (a)** Discuss in detail the various methods used for the identification of blood, semen, and saliva in forensic investigations through preliminary and confirmatory tests. **7 2 5**

| Rubric | Marks |
|---|---|
| introduction | 1 |
| identification test 2 marks each blood, semen, and saliva | 6 |

**(OR)**

**(b)** Explain the hair growth cycle with the help of the diagram and their role in investigation.

| Rubric | Marks |
|---|---|
| hair growth cycle | 4 |
| diagram | 1 |
| role | 2 |

## Section 4 (Answer all question(s))

**Marks CO BL**

**Q15.** Describe the methods used in the identification of pug marks for species identification in wildlife forensics. **4 3 3**

| Rubric | Marks |
|---|---|
| introduction | 1 |
| method | 2 |
| forensic significance | 1 |

**Q16. (a)** Explain the illegal trade in wildlife items, such as skins, bones, horns, and plants. Discuss the role of forensic science in investigating these crimes. **6 3 2**

| Rubric | Marks |
|---|---|
| illegal trading introduction | 1 |
| illegal trade items | 4 |
| role | 1 |

**(OR)**

**(b)** What are different confirmatory and preliminary test for species identification?

| Rubric | Marks |
|---|---|
| confirmatory test | 3 |
| preliminary test | 3 |

## Section 5 (Answer all question(s))

**Marks CO BL**

**Q17.** Explain the process of collecting entomological evidence during death investigations and its significance in determining the time of death. **4 4 3**

| Rubric | Marks |
|---|---|
| collection method | 3 |
| significance | 1 |

**Q18. (a)** Discuss the basics of forensic entomology and explain the role of different insects in death investigations, including how maggots are used to estimate the post-mortem interval. **6 4 4**

| Rubric | Marks |
|---|---|
| basics of forensic entomology | 1.5 |
| significance | 1.5 |
| role | 1.5 |
| maggots in PMI | 1.5 |

**(OR)**

**(b)** Discuss the biology of maggots and the temperature tolerances of necrophagous flies. How these factors help in estimating the post-mortem interval?

| Rubric | Marks |
|---|---|
| biology of maggots | 2 |
| temperature tolerance of necrophagous flies | 2 |
| factors | 2 |

## Section 6 (Answer any 2 question(s))

**Marks CO BL**

**Q19.** Discuss the involvement of microorganisms in bioterrorism and their implications in forensic investigations. **5 5 3**

| Rubric | Marks |
|---|---|
| introduction | 1 |
| involvement | 2 |
| implications | 2 |

**Q20.** Discuss the fundamentals of forensic microbiology, including the identification of bacteria and viruses that are of forensic importance. **5 5 2**

| Rubric | Marks |
|---|---|
| fundamental | 1 |
| identification of bacteria | 1.5 |
| identification of viruses | 1.5 |
| forensic importance | 1 |

**Q21.** Explain the concept of microbial profiling in forensic microbiology. What are the different methods for microbial identification particularly in cases of human remains? **5 5 3**

| Rubric | Marks |
|---|---|
| introduction | 1 |
| microbial profiling in investigation | 1 |
| methods | 3 |

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