ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATTE, NIGERIA

BASIC & APPLIED SCIENCES

BIOLOGICAL SCIENCES

SECOND SEMESTER EXAMINATION

2017/2018 ACADEMIC SESSION

COURSE CODE: BTH 406
COURSE TITLE: FORENSIC BIOLOGY
DURATION: 2 HOURS

HOD's SIGNATURE

NAME:.....MAT. No:.....

INSTRUCTION

Answer FOUR questions in total; any TWO from each section.

SECTION A

1. a. i) State the Locard's Exchange Principle? ii) List the types of samples collectable from crime scenes.
   b. i) What is CODIS? ii) How does it help in solving criminal cases?
   c. Explain evidence collection priority at crime scenes.

2. a. Why is Cytochrome c Oxidase subunit I (COI) an appropriate gene for DNA barcoding in animals?
   b. Explain the following:
      i) Paleobarcoding
      ii) Environmental barcoding
      iii) Plant barcoding
   c. Briefly explain five applications of DNA barcoding?

3. a. What are the limitations of conventional fingerprints in solving criminal cases?
   b. Outline the procedures involved in DNA fingerprinting.
   c. What are the ethical and legal issues in the use of DNA for Fingerprinting?

SECTION B

4. A break-in occurred at a high school, and several computers were stolen. At the time of the break-in, the building was empty. A motion detector tripped by movement in one of the hallways alerted the police. When the police arrived to investigate, they found one of the doors leading into the school had been propped opened with paper wedged in the door jam. The door appeared to be locked, but it could be easily pushed open. Near the door, police found cold soft drinks can recently drained leading to suspect that it was left by one of the intruders. The can was bagged as evidences and a DNA sample was obtained from the lip of the can. The neighborhood was canvassed, and a clerk in a convenience store remembered selling canned soft drinks to two young males just before the break-in occurred. The surveillance video in the convenience store was examined, and the clerk provided the police with the names of all males who were in the store just prior to the break-in. Three suspects were identified from the video, and blood samples and conventional fingerprints were collected from the suspects.

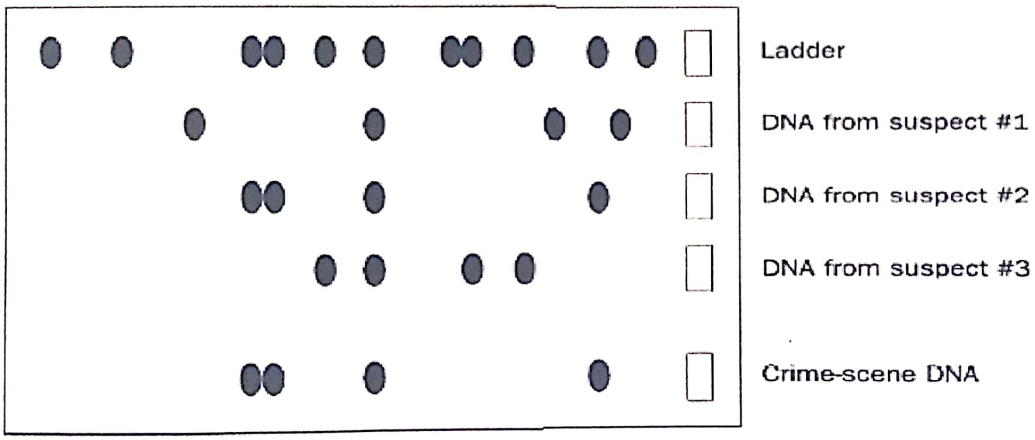

Figure 1

Given the DNA fingerprints in Figure 1

i) Does the DNA from the crime scene match the DNA from any of the suspects?
ii) Is there more than one DNA match? Explain.
iii) Is the DNA profile sufficient to convict a suspect? Explain.
iv) What information do the mismatch cases convey?
v) What is the significance of the ladder?

5. Six individuals were sampled from a supposed family pedigree. The pattern revealed by the DNA fingerprint suggests that two individuals are identical twins. A is one of the parents (father) but the other parent (mother) is unknown.

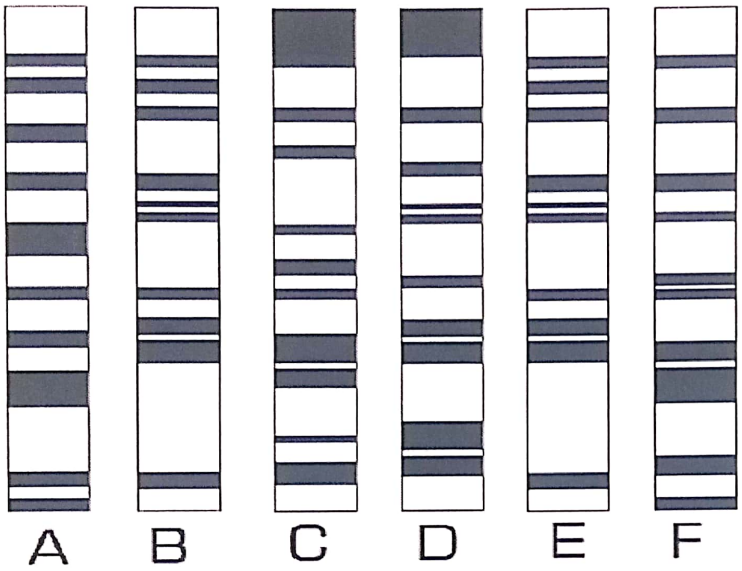

Figure 2

Using the fingerprint in Figure 2

i. What is the relationship of C with D?
ii. Are C and D the offspring of A?
iii. Which two individuals are the identical twins?
iv. Apart from A, who is also the parent of F?
v. What is the relationship between F and E?

6. Two men are claiming to be the father of the child of a rich heiress who died suddenly without leaving a will. They are both suing for custody of the child. A DNA sample was collected from a hair found in the hairbrush of the dead heiress. Blood samples were collected from each man and the baby.

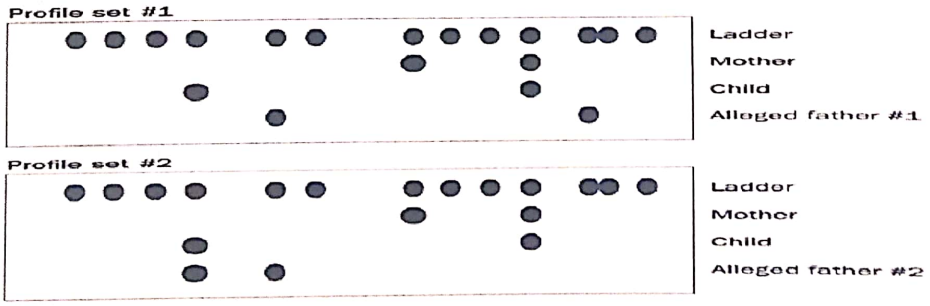

Figure 3

Using the finger print in figure 3

i. Can either man be excluded as father? Explain.
ii. Which man may be the father of the child? Explain.
iii. Is this DNA profile sufficient to establish paternity? Explain.
iv. From which parent is the mitochondrial DNA inherited? Explain.
v. Can you ascertain that the heiress is actually the mother of the child? Explain.