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**NATIONAL OPEN UNIVERSITY OF NIGERIA  
FACULTY OF AGRICULTURAL SCIENCES  
DEPARTMENT OF ANIMAL SCIENCE AND FISHERIES  
SEPTEMBER, 2020\_1**

**COURSE CODE:** ANP 309  
**COURSE TITLE:** Analytical Technique for Animal Production II  
**CREDIT UNIT:** 2 CU  
**TOTAL SCORE:** 70 MARKS  
**TIME ALLOWED:** 2 HOURS  
**INSTRUCTIONS:** ANSWER QUESTION 1 (25 MARKS) AND ANY OTHER THREE(15 MARKS EACH)

- Q1a Define Artificial Insemination (AI).  
b State any four (4) benefits of Artificial Insemination AI.  
c. Enumerate the limitations associated with Artificial Insemination AI?  
d. List and explain factors that enhance semen collection. **25 marks**

- Q2 Briefly explain the following types of biological assay.  
i. Protein Efficiency Ratio  
ii. Net Protein Utilization  
iii. Apparent Digestibility **15 marks**

- Q3 Write short note on the following:  
i. pH of fresh semen  
ii. Semen concentration  
iii. Colour and appearance of semen. **15 marks**

- Q4a Define Digestibility and Digestibility trials.  
b Give the merits and limitations of *in vivo* and *in vitro* trials. **15 marks**

- Q5 Describe the following methods of semen collection:  
a. The use of Electro ejaculator  
b. The use of artificial vagina. **15 marks**

- Q6a. State the properties of enzymes.  
b. What are the protocols for the extraction of of enzymes?  
c. What do you understand by column chromatography? **15 marks**