KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE OF EDUCATION AND EXTENSION

SECOND SEMESTER 2024/2025

[JANUARY – APRIL, 2025]

AGEN 341: FARM STRUCTURES

STREAM: Y2 S2 **TIME: 2 HOURS**

DAY: WEDNESDAY, 12:00 - 2:00 P.M. **DATE: 16/04/2025**

INSTRUCTIONS:

1. Do not write anything on this question paper.

2. Answer ALL the questions in section A and any other TWO questions in section B.

SECTION A;(30 MARKS)

1. a) Describe functions of farm structures (3 marks)

b) Explain the steps followed in finding maximum bending moment (3 marks)

c) Farm structures are different from urban structures due to the nature of the loads they carry and purpose of their use. Explain different types of loads (4 marks)

d) Explain the functions of ventilations in livestock structures (4 marks)

e) Explain the uses of steel in construction (4 marks)

f) Explain the different types of farm fences (3 marks)

g) Define quantity surveying (2 marks)

h) What are the requirements of grain storage structures (3 marks)

i) Two timber posts, 140 mm square and 4 m high, are subjected to an axial load of 110 kN each. One post is made of pine timber (E = 7800 N/mm^2) and the other is Australian Blackwood (E = 15300 N/mm^2). How much will they shorten due to the load? (4 marks)

SECTION B; (40 MARKS)

QUESTION TWO (20 MARKS)

2. a) Define a greenhouse and explain five materials used as greenhouse coverings (6 marks)

b) Explain the characteristics of a Piggery (6 marks)

c) Calculate the housing requirements for 80 female goats and 5 male goats with followers. Assumption;

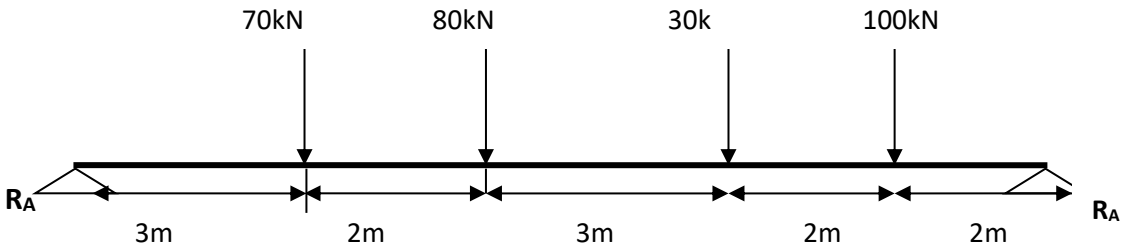
80% of females give birth to young ones every year. Twinning rate is 1.5 per year. Kids are reared up to 9 to 12 months of age and sold out . Sketch the spaces per category of goat/kids. (8 marks)

QUESTION THREE (20 MARKS)

3. a) Distinguish types of poultry houses (3 marks)

b) Design a bag storage structure for storing 250 tonnes of rice. The dimension of one bag is 100 cm long, 60 cm wide and 30 cm high. A distance of 0.8 m and 2 m is to be kept from the walls and between the stacks respectively. Sketch the floor plan of the godown/warehouse (9 marks)

c) Find R_A and R_B (5 marks)



d) Describe the classes of building stones (3 marks)

QUESTION FOUR (20 MARKS)

4. a) Explain the different parts of a slow sand water filter (4 marks)

b) What are the advantages of earth as a building material? (5 marks)

c) A brick pier is 0.6 m square and 3 m high and weighs 18 kN/m^3. It is supporting an axial load from a column of 480 kN. The load is spread uniformly over the top of the pier. Calculate:

i) The stress in the brickwork immediately under the column (2 marks)

ii) The stress at the bottom of the pier (4 marks)

d) Illustrate the uses of the following types of roads

i. Earth roads
ii. Gravel roads
iii. Water bond macadam roads
iv. Tar or bitumen roads
v. Cement concrete roads (5 marks)

QUESTION FIVE (20 MARKS)

5.a) Work out the economical diameter and depth of silo to store sufficient quantity of silage for a herd of 140 buffaloes having an average weight of 670 kg each. The buffaloes are fed with silage for 160 days/year. (8 Marks)

Design Criteria

- Rate of removal = 10 cm/day
- Silage fed per day = 4 kg/100 kg of body weight
- Depth = 2 – 3 times diameter
- 1 m^3 of silage = 650 kg

b) Describe the following dairy milking parlors

i. Parallel milking parlor (2 marks)
ii. Tandem milking parlor (2 marks)
iii. Herringbone milking parlor (2 marks)
iv. Rotary milking parlor (2 marks)

c) Discuss the various requirements of a good road (4 marks)