

UNIVERSITY OF FORT HARE

SPECIAL EXAMINATIONS

JANUARY/FEBRUARY 2019

AGG 311

Subject: Farm Buildings

Time: 3 hours

Marks: 100

This paper consists of 6 pages including the cover page

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External Examiner
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Instructions

Use of non programmable calculators is permitted.

Make use of the data tables provided at the back of the question paper.

Tick which questions you answer on the front page of your answer sheet.

ANSWER all QUESTIONS

Table 2: Standards and droppers required for stock fencing.

Conditions	Stock type	Spacing between standards	Number of droppers between standards
Intensive stock Mainly soft soil Constant animal pressure	Only large or only small	12	2
	Mixed	12	3
Average	Only large or only small	16	3
	Mixed	16	4
Extensive farming Only occasional contact by animals .	Only large or small	20	4
	Mixed	20	5

6. A poultry house that is 11 m wide and 18 m long will need illumination in order to increase productivity. The preferred lamps will use 15 W energy saver bulbs. Calculate how many lamps will be required to provide sufficient light. (6)

Table 3: Light output of different types of lamps. (lumens/ lamp)

Incandescent		Energy savers		Fluorscent (strip)		
Watts	Lumens	Watts	Lumens	Watts	Length(mm)	Lumens
40	430	11	605	15	450	600
60	810	13	715	20	600	900
100	1 600	15	825	40	1200	2250
150	2 500	20	1100	60	1200	3250

Table 4: Lighting requirements Illumination (lux)

Animal houses		Farm buildings		Dwelling	
Animal	Illn.(lux)	Type	Illn.(lux)		Illn.(lux)
chickens	5-15	Dairy wash up	1000	Kitchen gen.	100
animal feeding	200	Bulk tanks	1000	Kitchen work ar.	350
Milk parlour	200	Barns, stores	40	Rooms gen.	75

Light output at source (l m) = Area of room(m²) x required illumination(Lux) x 2

7. A pig enterprise is planned for 140 breeding sows with an average of 2.483 farrowings per year and 10.7 piglets weaned per farrowing. Baconers will be produced with an average live mass of 85 kg at slaughter. Dressing percentage is 70%. Price expected for dressed carcasses is R21. 24/kg. Price expected for fresh manure is R329/ton. The expected average total number of pigs will be 1690 and the average mass will be 50 kg. The daily excretion of pigs is 7.2% of animal mass. The total cost of the buildings is estimated to be R3 500 000. Interest rates are 14%. The life expectancy of the buildings is 20 years. Decide if the income generated will justify the cost of the buildings. (16)

Mass of annual undiluted excretion

$$= \text{number of animals} \times \text{average body mass(kg)} \times \frac{\% \text{ daily excretion}}{100} \times \frac{365}{1000} \left(\frac{\text{ton}}{\text{yr}} \right)$$

Allowable annual expenditure on building

$$= \frac{\text{annual gross income} \times \% \text{ income that can be spent on facility (table 2)}}{100}$$

100

Table 7: Use of standard concrete mixes (applicable to table 7)

Kind of work	Mix number
General purpose lean mixture for foundations, weirs, thickness over 500mm.	D or E
General reinforced work on buildings, walls, pavements, light floors.	C
Important reinforced work, driveways, garage and workshop floors, heavy precast articles, septic tanks, reservoirs, gate posts.	A or B
Fencing posts, small precast articles, concrete less than 75mm thick, top layers of concrete floors	F or G

Table 8: Standard concrete mixes according to volume. (Hand compaction)

1 Mi x No.	Strength MPa	2 Ston e size (mm)	3 Material per bag of cement			4 Material per m ³ of concrete			5 Material for mixing in small batches		
			Sand (litre)	Ston e (litre)	Wate r (litre)	Cemen t (bags)	San d (m ³)	Ston e (m ³)	Cemen t (bags)	San d (m ³)	Ston e (m ³)
A	30	20	80	90	20	8.1	0.65	0.73	1	1.75	2
		40	80	120	20	7.4	0.59	0.89	1	1.75	2.75
B	25	20	90	100	22	7.2	0.65	0.72	1	2	2.25
		40	90	130	22	6.6	0.59	0.86	1	2	3
C	20	20	110	120	25	6.4	0.70	0.77	1	2.5	2.5
		40	110	150	25	5.8	0.64	0.86	1	2.5	3.5
D	15	20	140	140	30	5.5	0.77	0.77	1	3.25	3.25
		40	140	170	30	5.0	0.70	0.85	1	3.25	3.75
E	10	20	170	170	35	4.6	0.80	0.80	1	3.75	3.75
		40	170	200	35	4.2	0.71	0.84	1	3.75	4.25
F	30	10	90	60	19.5	9.1	0.81	0.54	1	2	1.33
G	20	10	120	70	25	7.2	0.86	0.54	1	2.66	1.5

Table 9: Bricks and mortar required per m² of wall with 10 mm mortar joints.

Size of brick or building block (mm)	Wall thickness	Number of bricks per m ² of wall	Volume of mortar (m ³) per m ² wall
215 x 102.5 x 65mm	102.5mm, half brick	60	0.018
215 x 102.5 x 65mm	215mm, one brick	120	0.043
M4 block 390Lx90Wx190H	90 mm hollow	12.5	0.012
M6 block 390Lx140Wx190H	140 mm hollow	12.5	0.020

Wastage: Concrete 10%
 Bricks and blocks 5 to 10%
 Mortar 15%
 Plaster 20%

Standard thickness of plaster 15 mm

Table 10: Uses of standard Mortar mixes (Applicable in table 11)

Type of work	Mix number
Fill below machine bases, drain pipe joints	a
Walls above roof level or below floor level, cavity walls load bearing 102mm walls, stone slate or concrete paving blocks.	b
Internal or external walls above floor level and below roof level.	c