

Australian College of Veterinary Scientists

Membership Examination

June 2011

Medicine of Pigs

Paper 1

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL** three questions

ONE question worth 50 marks 50 marks

TWO questions each worth 25 marks 50 marks

total 100 marks

Paper 1: Medicine of Pigs

Answer **ALL** three (3) questions.

1. Porcine reproductive and respiratory syndrome virus (PRRSV) is exotic to both Australia and New Zealand. Materials considered to be of significant risk for the entry of PRRSV into either country include live pigs and/or products derived from them from countries where the virus occurs. Currently both Australia and New Zealand impose sanitary measures upon uncooked imported pig meat from PRRSV-positive countries. These conditions were largely imposed as the result of work at Lelystad by Van der Linden *et al.*, funded by Biosecurity Australia, which showed that PRRSV could be transmitted to pigs by feeding them uncooked muscle tissue from infected pigs.

Specifically the following condition was applied under the regulations imposed by AQIS as stipulated in the ICON database (Condition C5091- 19):

Meat must be processed by heating to a minimum core temperature of 56°C for not less than 60 minutes or an equivalent heating process as specified below: 56°C for 60 minutes; or 57°C for 55 minutes; etc 70°C for 11 minutes.

This 'pasteurisation' requirement limits the utility of the commodity. For instance, pork treated to the specifications above is no longer suitable for processing into green (red) bacon. As a result, some importers of pork into Australia would like to see this condition removed.

Answer **all** subparts of this question:

- a) Using your knowledge of the prevalence of PRRSV in pig meat at the time of slaughter in PRRSV-positive countries such as Canada and the USA; the impact freeze/thaw cycles, time, and other variables have on viable virus titre; and other factors: discuss the likelihood that pig meat capable of transmitting the PRRSV would be available to Australian (or New Zealand) householders if the heating condition was removed. (20 marks)
- b) Using your knowledge of the limited number of transmission (meat feeding) studies, including the Lelystad work; the waste-feeding practices in Australia (or New Zealand), despite regulation; and the para-commercial and backyard pig keeping sector: discuss what, if any, risk the removal of the heating condition would present for the infection of the commercial Australian herd with PRRSV. (20 marks)
- c) Using your knowledge of PRRSV: discuss the expected health, welfare and economic implications of PRRSV entering a 1000-sow farm in Australia (or New Zealand); assuming the herd was not slaughtered immediately. (10 marks)

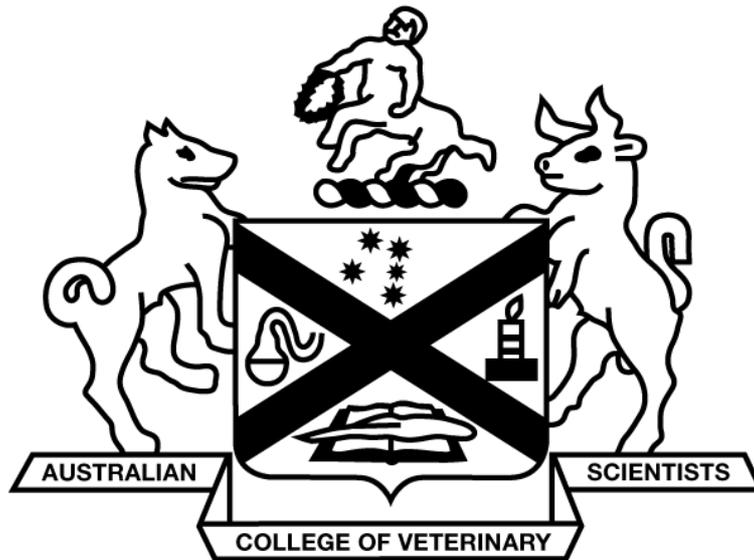
Examination continued on next page

2. Whilst Australia's major competitors in global pig production routinely wean greater than 25 pigs per mated sow per year; on average the Australian herd sits at around 20.5 according to *The Australian Pig Annual* which benchmarks performance of 31 piggeries containing 31,000 breeding sows across Australia. *The Australian Pig Annual* has however identified several herds that consistently produce 25 pigs weaned per mated sow and above.

Answer **all** subparts of this question:

- a) Given that the genetic potential for herd reproductive efficiency is not significantly different across the herds that supply data to *The Australian Pig Annual*, list the key management areas that these high performing herds must be concentrating on to achieve their excellent pigs weaned per mated sow results. (12½ marks)
- b) Briefly outline (dot point format will suffice) key on-farm practices that would be applied for each management area listed. (12½ marks)
3. A key challenge faced by the Australian and New Zealand pork industries is the need to maintain local production of high quality food for a reasonable price and return on production capital invested; without negatively impacting pig welfare, the environment or the health of the consumer. The Pork Cooperative Research Centre, in its 2010 submission to government for refunding, outlined its vision for future pork production in Australia and New Zealand as one of 'high integrity' meat production. List the outcomes the Pork CRC believes will differentiate Australian and New Zealand pork as a 'high integrity' meat and discuss how the Pork CRC will work with the rest of the Australian and New Zealand pig industries to achieve the vision. (25 marks)

End of Paper



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Paper 2

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL** three questions

ONE question worth 50 marks 50 marks

TWO questions each worth 25 marks 50 marks

total 100 marks

Paper 2: Medicine of Pigs

Answer **ALL** three questions.

1. Detailed below is physical data typical of the performance achieved on many current commercial Australian and New Zealand piggeries.

Answer **all** subparts of this question:

- a) From the data provided, outline the strengths and weaknesses of this business by benchmarking its performance against current industry standards. (15 marks)
- b) Identify where improvements can be made to ensure performance is at least equivalent to industry standards. (10 marks)
- c) Discuss the advice you would give as a consultant to the business to assist it meet these new objectives and targets. (25 marks)

Breeding herd

| | | |
|-----------------------------|------------------------------|----------------|
| Pigs born total | 11.2 per litter | |
| Pigs born alive | 10.4 per litter | |
| Pigs weaned per litter | 9.6 per litter | |
| Litters per sow per year | 2.3 | |
| Average weaning age | 26 days | |
| Farrowing rate | 83% | |
| Weaning to service interval | 6.8 days | |
| Weaning weight | 6.5 kg | |
| Sow culling rate | 45% | |
| Sow mortality | 7.5% | |
| Boar replacement rate | 50% | |
| Feed used per sow | 1.2 tonnes per sow per annum | |
| Diet specification | Dry sows | Lactating sows |
| DE | 12.9 MJ/kg | 14 MJ/kg |
| Av Lysine: DE | 0.3 g/kg | 0.5 g/kg |

Data continued over page

Weaner herd performance

| | |
|---------------------|---------|
| Period of occupancy | 56 days |
| Average weight in | 6.5 kg |
| Average weight out | 36.5 kg |
| Mortality | 2.0% |

Live weight FCR in period 1.65:1

| Diet specification | Weaners 4-8 weeks | Weaners 9-12 weeks |
|--------------------|-------------------|--------------------|
| DE | 14.5 MJ/kg | 14.5 MJ/kg |
| Av Lysine: DE | 0.75 g/kg | 0.70 g/kg |

Finisher herd performance

| | |
|------------------------|---------|
| Av period of occupancy | 75 days |
| Av Live weight in | 36.5 kg |
| Av Weight out | 98.5 kg |
| Mortality | 1.5% |

Live weight FCR in period 2.75:1

| Diet specification | Growers 13-16 weeks | Finisher 17-23 weeks |
|--------------------|---------------------|----------------------|
| DE | 14.0 MJ/kg | 13.5 MJ/kg |
| Av Lysine:DE | 0.65 g/kg | 0.55 g/kg |

Slaughter house returns

| | |
|--------------------|---|
| Average carcass wt | 72 kg |
| Average P2 | Boars 12 mm Gilts 14 mm Swickers Kingaroy |

Examination continued on next page

2. A client rings you up to arrange his quarterly visit as he is frustrated by ongoing problems with his breeding herd. Some sows seem to take longer than expected to cycle after weaning, increased numbers return to service after mating (a significant number of these at irregular intervals), there is also a significant increase in the number of abortions and stillborns.

When you get to the farm, the farmer mentions the occasional sow also goes down at farrowing with a fever, they usually start panting and die, and there's one right now in the old farrowing room he wants you to take a look at. As you walk through the farrowing rooms you notice that many of the sows, both expecting and lactating, have swollen vulvas. The sow in question farrowed yesterday. She clearly has a fever and is panting. You also think she looks mildly anaemic and note that she doesn't appear to have any milk. You have your suspicions as to what the problem is but think it would be nice to confirm your diagnosis as, although suspected, to occur in Australia the disease has never been definitively confirmed. You are aware that it has been diagnosed in New Zealand. You take a blood sample and make a smear to confirm your suspicions.

What diseases would you consider in your differential diagnosis? Write the farmer a description of the disease you suspect is the most likely including the required short and long-term courses of action to bring it under control. Also include in your report a brief discussion of what, if any, potential there is for eradication. (25 marks)

3. Answer **one (1)** of the following; **EITHER a) OR b)**:

a) Write a short review entitled 'Rectal Prolapses in Growing Pigs'. Discuss briefly the pathogenesis, incidence, implications, potential outcomes and treatment options. Give special consideration to the risk factors or predisposing factors that influence the incidence of the condition. (25 marks)

OR

b) Examine the performance monitor report over the page and from the data it contains:

- i. List the indices (e.g. percent repeat services) that you consider to be of concern in this report. (5 marks)
- ii. List the possible causes of each of the problems that you have identified in i) above. (10 marks)
- iii. Identify a single disease entity that you think best explains the problems you have identified and justify your choice by explaining how it may account for each problem and the temporal displacement of the clinical signs (problems identified in i) relative to one another. (10 marks)

Question 3 continued on next page

BREEDING PERFORMANCE

| | Nov -97 | Dec -97 | Jan -98 | Feb -98 | Mar -98 | Apr -98 | May -98 | Jun -98 | Jul -98 | Aug -98 | Sep -98 | Year Summary | TARGET |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------------|---------|
| Total number of services | 43 | 42 | 37 | 38 | 48 | 41 | 44 | 49 | 47 | 47 | 37 | 515 | |
| Percent repeat services | 23.3 | 9.5 | 13.5 | 7.9 | 10.4 | 19.5 | 25 | 28.6 | 34 | 17 | 16.2 | 18.6 | <10.0 |
| Percent multiple matings | 88.4 | 90.5 | 97.3 | 94.7 | 93.8 | 97.6 | 97.7 | 98 | 89.4 | 93.6 | 94.6 | 94.4 | >95 |
| Weaning - 1st service interval | 5.5 | 4.6 | 4.5 | 6.9 | 6.8 | 5.1 | 5.9 | 5.6 | 5.6 | 5.9 | 4.4 | 5.6 | 5-7days |
| Percent sows bred by 7 days | 90 | 100 | 100 | 88.5 | 90.6 | 96.2 | 92.3 | 92 | 90.9 | 88.6 | 100 | 93.5 | >95 |
| Entry - 1st service interval | 57 | 57 | 80 | 40 | 46 | 45 | 54 | 47 | 55 | 96 | 65 | 55 | <30 |
| Number of sows farrowed | 32 | 32 | 38 | 29 | 31 | 36 | 30 | 30 | 38 | 31 | 28 | 389 | |
| Average parity of farrowed sows | 4.2 | 3.6 | 3.1 | 3.4 | 3.4 | 3.6 | 3.4 | 2.9 | 3.4 | 3.3 | 3.1 | 3.4 | <3.5 |
| Average total pigs per litter | 11.7 | 12.8 | 12.2 | 13 | 12.4 | 12.6 | 13.4 | 11.5 | 13 | 12.9 | 11.8 | 12.5 | >11.5 |
| Average pigs born alive/litter | 10.6 | 11.3 | 11.1 | 10.7 | 9.8 | 10.8 | 11.1 | 10.3 | 11.4 | 10.6 | 10.8 | 10.8 | >10.5 |
| Percent stillborn pigs | 5.9 | 10 | 7.3 | 14.1 | 18 | 11.2 | 10.4 | 6.6 | 9.5 | 12.8 | 5.7 | 10.1 | <7 |
| Percent mummies | 3.5 | 1.2 | 1.5 | 3.5 | 2.6 | 3.5 | 6.5 | 4.3 | 2.2 | 5 | 2.7 | 3.1 | <1.5 |
| Farrowing rate | 74.4 | 78 | 79.2 | 70.7 | 79.5 | 94.7 | 73.2 | 73.2 | 79.2 | 72.1 | 68.3 | 76.7 | >85 |
| Adjusted farrowing rate | 76.2 | 78 | 84.4 | 78.4 | 79.5 | 94.7 | 81.1 | 76.9 | 79.2 | 72.1 | 68.3 | 79.2 | >90 |
| Farrowing interval | 148 | 151 | 150 | 149 | 159 | 151 | 157 | 152 | 156 | 170 | 151 | 154 | 150 |
| Litters/mated female/yr | 2.26 | 2.26 | 2.2 | 2.14 | 2.13 | 2.11 | 2.19 | 2.18 | 2.14 | 2.26 | 2.34 | 2.2 | 2.3 |
| Number of litters weaned | 31 | 30 | 40 | 34 | 29 | 37 | 36 | 28 | 35 | 35 | 30 | 408 | 36 |
| Total pigs weaned | 277 | 273 | 368 | 330 | 261 | 319 | 307 | 247 | 324 | 331 | 279 | 3704 | 360 |
| Pigs weaned per sow | 9.6 | 9 | 10 | 10 | 9.1 | 8.8 | 8.2 | 10.4 | 8.9 | 9.7 | 9.4 | 9.4 | 10 |
| Pre-weaning mortality | 12.6 | 13.6 | 11.1 | 10.1 | 15 | 10.1 | 16.8 | 14.8 | 12.4 | 12 | 13.6 | 13.2 | <8-12 |
| Average weaning wt (kg) | 8.2 | . | . | 8.7 | . | 8.5 | 7.7 | 7.1 | 6.3 | . | 7.6 | 7.8 | 8 |
| Average age at weaning | 24.8 | 27.5 | 28.1 | 28.8 | 27.7 | 27.2 | 26.6 | 27 | 27.2 | 28.1 | 25.2 | 27.2 | 28 |
| Adjusted 21 day litter wt | 62 | 65 | 62 | 61 | 60 | 61 | 60 | 59 | 61 | 62 | 61 | 61 | >61.2 |
| Pigs weaned/mated female/ yr | 21.7 | 20.3 | 22 | 21.3 | 19.3 | 18.6 | 18 | 22.8 | 19.2 | 21.9 | 22 | 20.7 | 24 |
| Pigs weaned/crate/year | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133 |
| Pigs weaned / lifetime female | 50 | 34 | 59 | 43 | 43 | 44 | 34 | 56 | 36 | 37 | 42 | 43 | >40 |

End of paper