

Examples of exam questions ECVPT examination

Part 2 : Certifying essay questions

Exam procedure (in short)

- During the exam there will be 2 – 5 essay questions.
- You have 3 hours (180 minutes) to complete this paper.
- Each essay is marked. Compensation between essays is not possible.
- Marks will not be awarded or deducted for English grammar, spelling and style.
- Use bullet points, diagrams and/or brief statements where appropriate.
- Type your essays using the word processor provided.

Please find below one example of a certifying essay question. A answer key (in short) is at the end of this document.

1. Mechanism of antimicrobial resistance

The introduction of antimicrobial agents in human and animal clinical medicine has been one of the most significant achievements of the 20th century. However, shortly after their introduction, drug resistance began to emerge and now antimicrobial resistance is a global public health problem that causes a threat to human and animal health and should be considered seriously.

Major economic losses and animal welfare problems could arise in veterinary medicine, if antimicrobial resistance evolves towards a comparable critical level. As the use of antimicrobial drugs in veterinary medicine may result in the transfer of resistance to man, it is likely that the so-called reserve-antimicrobial drugs will be restricted to use in human medicine. The minimal, strictly necessary and rational use of the available antimicrobial drugs should be encouraged in veterinary practice. However, the implementation of such a policy is not easy, as it requires a knowledge of the epidemiology and development of antimicrobial resistance.

- a) Describe the genetic determinants of antibiotic resistance (20%)
- b) Describe what are transposons and integrons and briefly illustrate their functions (20%)
- c) Introduce some examples of biochemical mechanisms of resistance to antimicrobials (20%)
- d) Introduce and describe briefly the concept of cross-resistance (20%)
- e) Describe some antimicrobial resistance concerning pathogens of veterinary interests that can be transferred to humans (20%).

The examiners are expecting a relevant brief introduction citing the major issues.

Answer Certifying essay questions (in short):

a) What the examiners are looking for is:

- Antimicrobial resistance is classified as either intrinsic (or constitutive or natural) or acquired.
- An explanation of what intrinsic resistance is and what that means with at least one example.
- An explanation of what acquired resistance is and what that means with at least one example for each type of acquired resistance.

REFERENCES:

Prescott J.F. Antimicrobial drug resistance and its epidemiology. In: Antimicrobial therapy in veterinary medicine. 3rd edition, 2000. Iowa State Press, pp 27-49.

Chambers H.F. General principles of antimicrobial therapy. In Goodman & Gilman's The Pharmacological Basis of Therapeutics. Brunton L.L., Lazo J.S., Parker K.L. 11th edition, 2006. McGraw-Hill, New York, pp 1095-1110.

Webster C.R.L. Antibiotics: general principles of use. In Clinical Pharmacology. Webster C.R.L. 2001. Teton NewMedia, Jackson pp. 72-73.

Rang H.P., Dale M.M., Ritter J.M. & Moore P.K. Basic principles of chemotherapy. In: Pharmacology. 5th edition, 2003. Churchill Livingstone, pp 620-634.

b) What the examiners are looking for is:

- An explanation of what a transposon is, how they are made up and what they do. In addition, information on different transposons from simple to more complex is expected. It is important to include what transposons mean in antibiotic resistance
- An explanation of what an integron is, how they are made up and what they do. In addition, information on different integrons is expected. It is important to include what integrons mean in antibiotic resistance

REFERENCES:

Rang H.P., Dale M.M., Ritter J.M. & Moore P.K. Basic principles of chemotherapy. In: Pharmacology. 5th edition, 2003. Churchill Livingstone, pp 620-634.

H. Harbottle, S. Thakur, S. Zhao, D. G. White 2006. Genetics of antimicrobial resistance. Animal Biotechnology, 17:111-124.

Prescott J.F. Antimicrobial drug resistance and its epidemiology. In: Antimicrobial therapy in veterinary medicine. 3rd edition, 2000. Iowa State Press, pp 27-49.

Chambers H.F. General principles of antimicrobial therapy. In Goodman & Gilman's The Pharmacological Basis of Therapeutics. Brunton L.L., Lazo J.S., Parker K.L. 11th edition, 2006. McGraw-Hill, New York, pp 1095-1110.

c) What the examiners are looking for is:

- Enzymatic inactivation of antibiotics including the classes of antibiotics where this might be seen and an explanation of the effects of enzymes in antibiotic resistance citing at least one example.
- Modification of drug-sensitive sites or drug-binding sites including examples of classes of drugs that this affects and a more detailed explanation citing at least one example.
- Decreased accumulation of drug into the bacterial cell including the classes of antibiotics that might be affected and explaining the role of this in antibiotic resistance in detail and citing at least one example.
- Development of different pathways unaffected by the antibiotic with the classes of antibiotics effected and citing at least one example.

REFERENCES:

Rang H.P., Dale M.M., Ritter J.M. & Moore P.K. How drugs act: general principles. In: Pharmacology. 5th edition, 2003. Churchill Livingstone, pp 7-21.

Prescott J.F. Antimicrobial drug resistance and its epidemiology. In: Antimicrobial therapy in veterinary medicine. 3^d edition, 2000. Iowa State Press, pp 27-49.

Chambers H.F. General principles of antimicrobial therapy. In Goodman & Gilman's The Pharmacological Basis of Therapeutics. Brunton L.L., Lazo J.S., Parker K.L. 11th edition, 2006. McGraw-Hill, New York, pp 1095-1110.

d) What the examiners are looking for is:

- An explanation of cross resistance, whereby it is important which classes of antibiotics are affected and citing at least one specific example, if possible including the mechanism.

REFERENCES:

Aarestrup F. M. 2005 Veterinary Drug Usage and Antimicrobial Resistance in Bacteria of Animal Origin. Basic & Clinical Pharmacology & Toxicology 96: 271-281.

Prescott J.F. Antimicrobial drug resistance and its epidemiology. In: Antimicrobial therapy in veterinary medicine. 3rd edition, 2000. Iowa State Press, pp 27-49.

e) What the examiners are looking for is:

- In which areas in veterinary medicine antibiotic resistance is most important and in which types of bacteria and why, with at least one example for major classes of antibiotics affected.
- In addition, an explanation of why this is a risk and threat and what that means for One Health are expected.

REFERENCES:

Rang H.P., Dale M.M., Ritter J.M. & Moore P.K. How drugs act: general principles. In: Pharmacology. 5th edition, 2003. Churchill Livingstone, pp 7-21.

Prescott J.F. Antimicrobial drug resistance and its epidemiology. In: Antimicrobial therapy in veterinary medicine. 3rd edition, 2000. Iowa State Press, pp 27-49.

Chambers H.F. General principles of antimicrobial therapy. In Goodman & Gilman's The Pharmacological Basis of Therapeutics. Brunton L.L., Lazo J.S., Parker K.L. 11th edition, 2006. McGraw-Hill, New York, pp 1095-1110.