

TOPIC 11 ANIMAL PHYSIOLOGY TEST - ANSWERS

Multiple choice questions

1. Which of the following could be used in a vaccination?

- I Attenuated microbes
- II Antigen molecules from a pathogen
- III A harmless pathogen that challenges the immune system

A I only

B I and II only

C I and III only

D All of the above

1. Which of the following shorten on the contraction of a muscle fibre?

- I Myosin filaments
- II The sarcomere
- III The light band
- IV The distance between Z lines

A I and II only

B II, III and IV only

C II and III only

D All of them

1. Which of the following best describes the way ADH controls water reabsorption in the kidney?

- 1. Altering sodium concentrations in the medulla
- 2. Increasing active transport of water molecules
- 3. Decreasing the rate of osmosis
- 4. **Making the collecting duct more permeable to water**

1. Which of the following statements about gametogenesis in humans is correct?

	Spermatogenesis		Oogenesis	
A	Involves oxytocin	Unequal cytoplasmic division produces one gamete per division	Involves FSH	Two equally sized gametes produced from one meiotic division
B	Involves FSH	Four equally sized gametes produced from one meiotic division	Involves FSH	Unequal cytoplasmic division produces one gamete per division
C	Involves estrogen	Four equally sized gametes produced from one meiotic division	Involves estrogen	Four equally sized gametes produced from one meiotic division
D	Involves FSH	Unequal cytoplasmic division produces one gamete per division	Involves oxytocin	Unequal cytoplasmic division produces one gamete per division

1. Which of the following are involved in the control of muscular contraction?

- I Tropomyosin
- II ATP
- III Calcium ions
- IV The neuromuscular junction

A I only

B I, III and IV only

C I and III only

D All of them

1. Which of the following applies to excretion in mammals that conserve water because they live in an arid environment?

I Lengthened Loop of Henle

II Low sodium concentration in the medulla of the kidney

III Producing urine hypertonic to blood

A III only

B 1 and II only

C I and III only

D All of them

1. Which of the following statements most accurately describes the function of hCG hormone during pregnancy?

1. **Stimulates maternal production of both oestrogen and progesterone**

2. Stimulates maternal production of oestrogen

3. Stimulates maternal production of progesterone

4. Stimulates maternal production of FSH

1. Which human disease was the first to be eradicated by a programme of vaccination?

1. Bubonic plague

2. **Smallpox**

3. Cholera

4. Influenza

1. Which row correctly compares the levels of each chemical in the renal artery and renal vein?

	Oxygen	Protein	Urea	Carbon dioxide	Glucose
A	Higher in renal vein	Lower in renal vein	Higher in renal vein	Equal concentration in both artery and vein	Equal concentration in both artery and vein

B	Equal concentration in both artery and vein	Higher in renal vein	Equal concentration in both artery and vein	Higher in renal vein	Lower in renal artery
C	Lower in renal vein	Equal concentration in both artery and vein	Lower in renal vein	Higher in renal artery	Higher in renal vein
D	Lower in renal vein	Equal concentration in both artery and vein	Lower in renal vein	Higher in renal vein	Lower in renal vein

1. The placental barrier between mother and foetus allows for exchange of

- I Respiratory gases
- II Erythrocytes
- III Ions
- IV Antibodies

A I only

B I, III and IV only

C I and III only

D All of them

Structured answer questions

1. Outline two ways in which Edward Jenner's testing of a smallpox vaccine would now be considered unethical. (2 marks)

Use of a child as test subject/purposely infecting a child with cowpox

Testing by inoculation of live pathogen/testing using smallpox pathogen

Absence of informed consent

Inadequate/absent safety procedures/ lack of animal testing/laboratory work

1. Outline how the acrosome and cortical reactions at fertilisation prevent polyspermy (the fertilisation of an ovum by more than one sperm). (3 marks)

Acrosome (enzymes) digest zona pellicuda

Cortical granules release/exocytose cortical granules

(which) digest binding proteins

No further sperm can bind to membrane

1. Outline, using a specific example, how the excretion of nitrogenous waste is related to the environment of an animal. (3 marks)

(Nitrogenous waste/environment must match for 2 or more marks)

Terrestrial/marine organisms

Excreted as urine

Aquatic organism/freshwater

Released by diffusion/over body surface

(shelled) Eggs/birds

Uric acid

Insoluble/saves water/mass/non-toxic

1. Describe the control of the secretion of oxytocin during pregnancy and birth. (5 marks)

Oxytocin causes uterine contractions (for parturition)

Progesterone inhibits oxytocin secretion during pregnancy

Negative feedback

At birth, progesterone levels drop

Inhibition removed/Pituitary gland secretes oxytocin

Oxytocin release/uterine contractions increase oxytocin release

Positive feedback

1. Outline, using a specific example, the role of the synovial joint in determining the range of movement of a limb. (4 marks)

Synovial joints allow movement (between bones)

Movement allowed in certain planes/directions

Due to structure of joint/position of ligaments

2 marks maximum

Hinge joint/elbow (other)

Flexion and extension

Hip/Pivot/Ball and socket joint

Flexion and extension and rotation (adduction, abduction)

2 marks maximum

1. Draw a labelled diagram of a human kidney. (5 marks)

One mark for each part correctly drawn and labelled

Capsule

Cortex

Medulla

Pyramids

Pelvis

Renal artery

Renal vein

Ureter

1. Urine is commonly tested for a number of substances. Suggests why the presence of protein in the urine is indicative of kidney damage. (4 marks)

Protein is not normally in urine

Proteins are macromolecules/large molecules

Cannot enter the filtrate/does not pass through membranes

Damage to Bowman's capsules/membranes could allow protein to enter filtrate

Would then appear in urine/not able to be reabsorbed

1. Outline how active transport and osmosis are involved in reabsorption in the proximal tubule of the kidney. (4 marks)

Active transport uses energy (to transport molecules)

1. Describe the relationship between the incidence of measles infections and the percentage of the population immunised. (2 marks)

Negative correlation

Greater the percentage of the population inoculated, less of population infected

Possibly attaining a plateau

1. Suggest one reason for the decline in the percentage of the population immunised between 1990 and 1995. (1 mark).

Fear/knowledge of possible side effects of vaccine

Lower chance of infection

Ethical/religious objections

1. Does the data tend to support the use of vaccination to completely eradicate a disease? (2 marks).

Supports- negative correlation

Does not support – infection number is significant even with high inoculation levels

1. One vaccination is 93% effective in producing immunisation and two vaccinations are 97% effective (source – Center for Disease Control, Atlanta, USA, 2014 figures). Explain why a second vaccination can increase the effectiveness of immunisation. (3 marks)

First vaccination gives a primary response

Booster vaccination gives a secondary response

Presence of memory cells (from initial inoculation)

Faster reaction/greater production of antibodies

Increased number of memory cells

1. Outline why epidemiological studies are important in targeting populations for immunisation. (3 marks).

Study of distribution/patterns of disease in populations

Statistics of outbreaks are studied

Use of databanks

Target populations/at risk identified

Programmes initiated