

# IB Style Test on elements new to the 2016 Guide

## Topic 11: Animal Physiology

### Multiple choice questions

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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
  
2. 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
  
3. Which of the following best describes the way ADH controls water reabsorption in the kidney?
  - A. Altering sodium concentrations in the medulla
  - B. Increasing active transport of water molecules
  - C. Decreasing the rate of osmosis
  - D. Making the collecting duct more permeable to water



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4. 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

5. 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



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6. 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 I and II only
- C I and III only
- D All of them

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

- A. Stimulates maternal production of both oestrogen and progesterone
- B. Stimulates maternal production of oestrogen
- C. Stimulates maternal production of progesterone
- D. Stimulates maternal production of FSH

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

- A. Bubonic plague
- B. Smallpox
- C. Cholera
- D. Influenza



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9. 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

10. 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

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### Structured answer questions

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

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

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

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

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15. Outline the role of the synovial joints in determining the range of movement of a limb using specific examples of two types of joint in the body. (4 marks)

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

17. 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)

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

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19. Outline how movement of an insect limb is brought about by antagonistic muscles. (4 marks)

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### Data analysis question

20. The percentage of children vaccinated against measles worldwide and the incidence of the disease itself are outlined in the following table (source WHO):

Year	Percentage of population vaccinated (nearest 1%)	Number of cases in millions $\pm 0.1$
1980	15	4.4
1985	46	2.3
1990	84	1.4
1995	81	0.7
2000	83	0.8
2005	86	0.6
2010	90	0.4

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

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

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c. Evaluate if the data supports the use of vaccination to completely eradicate a disease? (2 marks).

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d. 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)

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e. Outline why epidemiology is important in targeting populations for immunisation. (3 marks).

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