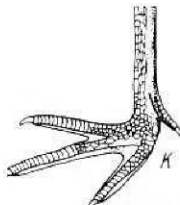


# INTERNATIONAL KANGAROO SCIENCE CONTEST 2016

Time Allowed: 60 minutes

All questions worth 4 points.

1. The birds adapted to the aquatic environment have interdigital membrane. The foot from the image belongs to the following bird:



- A) duck                      B) goose                      C) swan  
D) stork                      E) pelican

2. To prepare a fruit salad, Andrew uses 3 apples, 2 pears, 7 apricots and 2 oranges. How many true fruits does Andrew use?



- A) 5                              B) 9                              C) 14  
D) 10                            E) 12

3. We want to heat up a quantity of water by using the solar energy. The water will be heated fastest if it is placed in:

- A) a glass vessel                      B) a plastic vessel  
C) a ceramic vessel                      D) a metal vessel  
E) a thermos (a vacuum flask)

4. Which of the following statements is true when referring to the weight of a body (i.e. the force on the body due to gravity)?



- A) It can be experimentally determined by using a balance  
B) It increases when the body moves from the North Pole to the Equator  
C) The gravity does not act on a book resting on a table  
D) On the top of Hymalaya, the body's weight is less than at the sea level  
E) The gravity does not act on a body rising vertically

5. Organisms that get the nutritive substances from the soil are:



- A) field mushrooms
- B) sunflowers
- C) common orange lichens
- D) red clover
- E) common ferns

6. The wind pollinates the following plants;



- A) cherry tree
- B) apple tree
- C) fir tree
- D) sun flower
- E) poppy

7. A big and light plastic ball is launched vertically up, and then returns to the ground. Knowing that (at low speeds) the air resistance is directly proportional to the speed, select the true statement from the list below:



- A) at the maximum height, the ball's speed is maximum
- B) at the maximum height, the ball's acceleration is null
- C) the ball hits the ground with a speed equal to the launch speed
- D) the ascending time of the ball is equal to the descending time
- E) at the maximum height, the only force that acts on the ball is the gravity force

8. Snakes neither chew nor tear their food, but swallow it whole. What receptor is missing for this group of reptiles?

- A) olfactory receptor
- B) auditory receptor
- C) visual receptor
- D) gustatory receptor
- E) heat receptor

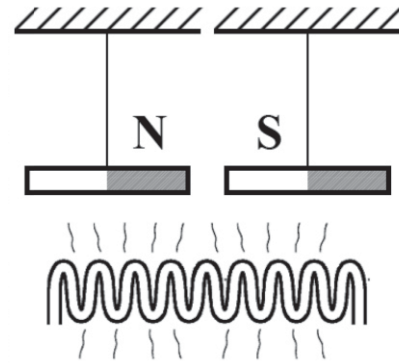


9. The Canadian Waterweed (*Elodea Canadensis*) is an aquatic plant. If we cut the stem and place it in a glass of water, exposed to strong light, we observe bubbles coming out from the place of cut. These bubbles are:



- A) oxygen, produced in photosynthesis  
B) carbon dioxide, produced in photosynthesis  
C) oxygen, produced in breathing  
D) carbon dioxide, produced in breathing  
E) water, produced in transpiration
10. In a vessel **A** we mix 5 cm<sup>3</sup> of alcohol and 5 cm<sup>3</sup> of water. In a vessel **B** we mix 5g of alcohol and 5g of water. Knowing that the density of water is 1g/cm<sup>3</sup> and that of alcohol is 0.8g/cm<sup>3</sup>, we can say that:
- A) the masses of the liquids from the two vessels are equal  
B) the volumes of the liquids from the two vessels are equal  
C) the alcohol- water mixtures from the two vessels have equal densities  
D) the alcohol- water mixture from vessel A has a higher density than the one from vessel B  
E) the alcohol- water mixture from vessel B has a higher density than the one from vessel A
11. If the environmental temperature is 20<sup>0</sup> C, what is the body temperature of a frog?
- A) 37<sup>0</sup>                      B) 20<sup>0</sup>                      C) 19<sup>0</sup>  
D) 35<sup>0</sup>                      E) 18<sup>0</sup>
12. The urine of people with diabetes compared to the urine of healthy people contain more:
- A) sodium                      B) water                      C) calcium  
D) glucose                      E) chlorine

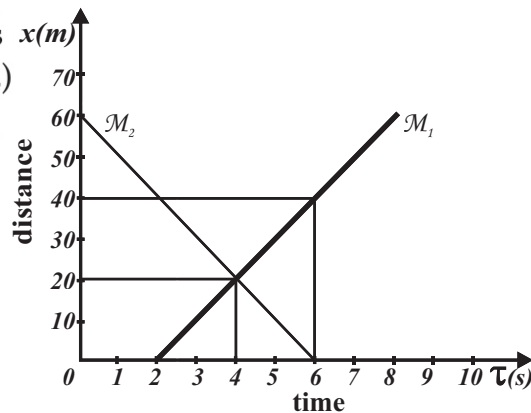
13. Two bar magnets are hanged horizontally above a powerful heat source, with opposing poles next to each other, as in the figure.



Which is the behavior of magnets over the time?

- A) They always attract each other.
- B) They always repel each other.
- C) Initially the magnets repel each other, but as they heat up above a critical temperature, they attract each other again.
- D) Initially the magnets attract each other and, after heating up above a critical temperature, they repel each other.
- E) Initially the magnets attract each other and, after heating up above a critical temperature, they do not interact.

14. The figure shows the position-time graphs of the straight line movement (M1 and M2) of two objects.



Knowing that they move on the same line, which of the following statements is true?

- A) The objects move the same distance before meeting each other.
  - B) The objects move for the same time before meeting.
  - C) The objects move in the same sense on the trajectory.
  - D) The speeds of the objects are equal.
  - E) At the moment of the meeting, the second object has a velocity of 10m/s relative to the first object.
15. The sea star (starfish) feeds mostly on shells. Fishermen have tried to limit their number by catching and cutting them into pieces, which they threw into the water. As a result, the number of starfish increased due to the following process:



- A) regeneration
- B) burgeoning
- C) fecundation
- D) respiration
- E) digestion



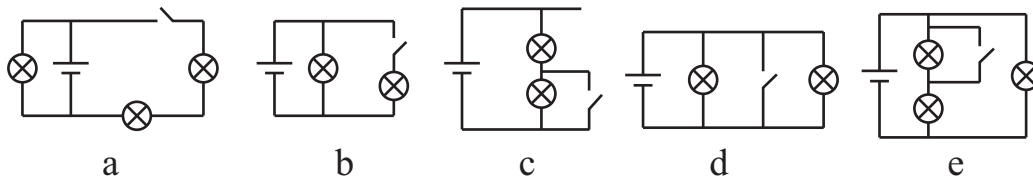
16. Jules Verne's heroes are shipwrecked on an uninhabited island and they lit a fire by using the spectacle's lens of one of them. Which of the following statements is true?

- A) They use a diverging lens.
- B) The spectacle wearer is short-sighted.
- C) The lens they used is thicker in the middle than at the ends.
- D) The image formed by that lens is virtual and inverted.
- E) The rays of light which are incident on that lens are only reflected.

17. Leaving a plant in a transparent plastic bag, Mary observed that water drops are formed on the walls of the bag. Water is produced in the following process:

- A) photosynthesis
- B) respiration
- C) transpiration
- D) absorption
- E) conduction

18. In which of the following circuits does the switch closure cause damages to the generator?



- A) a
- B) b
- C) c
- D) d
- E) e

19. Lacrimal glands secrete tears, which wash the surface of the eye. Which of the following animals have not lacrimal glands?

- A) carp
- B) gray lizard
- C) pigeon
- D) pit viper
- E) dog

20. A heavy object is falling from an airplane that flies horizontally with a constant speed. Choose the right statement.

- A) The initial speed of the object is null.
- B) The object will keep moving on a trajectory parallel to the airplane.
- C) The object hits the ground at the point vertically below the falling point.
- D) The object hits the ground when it is vertically below the plane.
- E) The object moves in the opposite direction of the airplane.

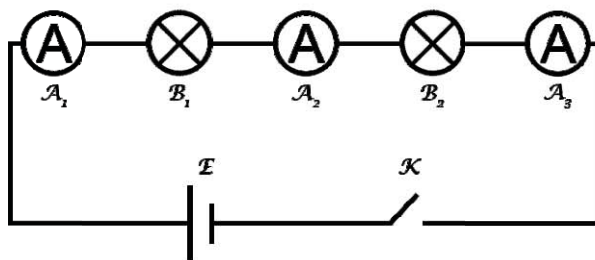


25. Snails and mussels have in common the following characters:



- A) they breathe through gills  
 B) they have spiral shell  
 C) they live in terrestrial environment  
 D) they feed on particles  
 E) they multiply through eggs

26. Consider the circuit in the figure and assume that switch **K** is closed. Choose the correct statement.



- A) The ammeters  $A_1$ ,  $A_2$  and  $A_3$  show different values.  
 B) The bulbs  $B_1$  and  $B_2$  are short-circuited.  
 C) By interchanging the bulbs' position, the electric current in circuit is zero.  
 D) By connecting an identical battery in series with the existing one, the ammeters show either a value which is greater than the initial one or zero.  
 E) By removing the bulbs from the circuit, the current through the ammeters becomes zero.

27. When we eat an orange, the released juice comes from:

- A) nucleus  
 B) cytoplasm  
 C) chloroplasts  
 D) cell membrane  
 E) vacuoles

28. Jim has a glass of water. He wants to increase the density of the glass's content. In order to do this, Jim has to:

- A) add an equal volume of oil to that of water  
 B) cool the water to the temperature  $t = 0^\circ\text{C}$   
 C) reduce the volume of water from the glass  
 D) add in the glass a quantity of alcohol with the mass equal to that of water  
 E) dissolve two tea spoons of sugar in the water

# INTERNATIONAL KANGAROO SCIENCE CONTEST 2016

Time Allowed: 60 minutes

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29. Which of the following is **not** a reptile?

- A) a turtle
- B) an alligator
- C) a snake
- D) a chameleon
- E) a frog

30. Two identical jars contain air: the first, dry air, the second, humid air (that is, air with water vapours). Which one is heavier?

- A) the jar containing humid air
- B) the jar containing dry air
- C) both jars have the same mass
- D) it depends on the temperature
- E) it depends on the volume of the jars