University of Oxford, Biomedical Sciences Admissions Test – Sample Questions

Maths

1. A store offers a 20% discount on the label price of all products. For every purchase of more than 5 units of the same product, an additional 25% discount is given on the discounted price. (The second discount is not applied to the first 5 products).

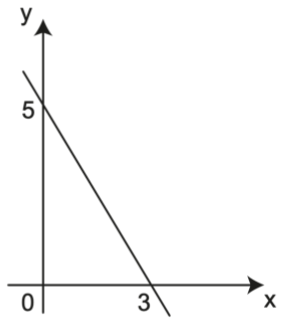
   How many pounds will a customer pay if they buy 8 units of a product with a tag price of £15 in this store?

   A. 85
   B. 81
   C. 88
   D. 87
   E. 83

2. How many days does it take for a worker to produce the same amount of product that they would produce in 10 days at 72% capacity and working 15 hours a day, if they are working at 90% capacity and 6 hours a day?

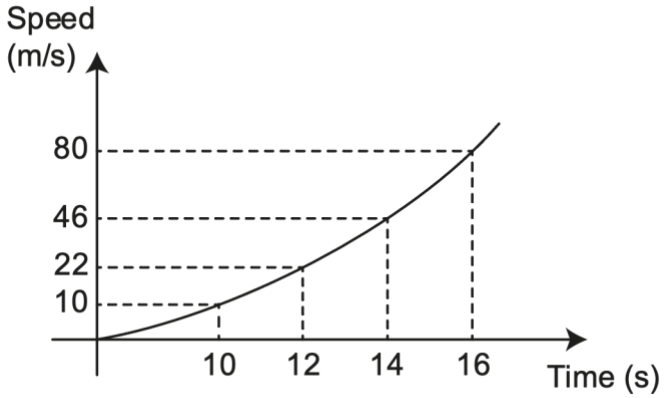
   A. 25
   B. 20
   C. 9
   D. 15
   E. 10

3. Given the graph of the function y=f(x) below, what is $f(4).f^{-1}(2)$ equal to?



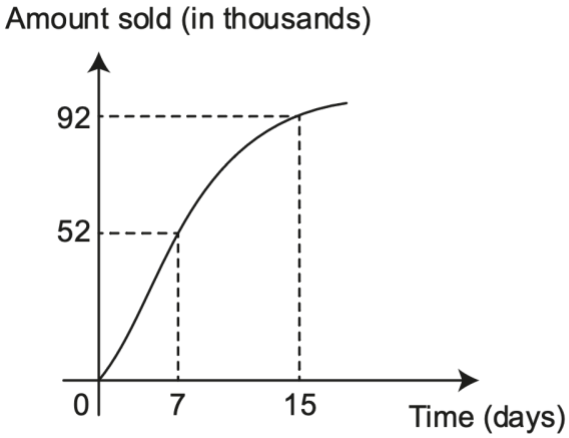
   A. 1
   B. -1
   C. 3
   D. -3
   E. ⅓

4. The graph below shows the speed of a motorcycle over time. Which of the following can be an estimate for the distance the motorcycle travelled in the first 16 seconds?



A. 155
B. 276
C. 315
D. 443
E. 645

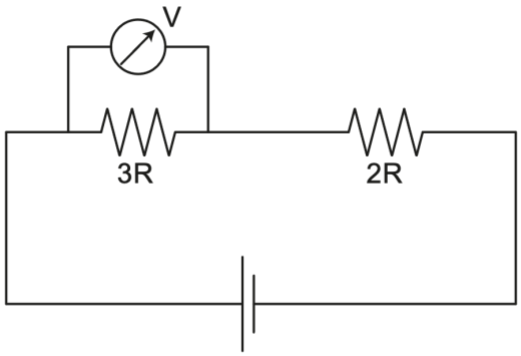
5. The graph below illustrates the amount that sales change during the launch period of a new product. Based on the graph, what is the average number of sales of this product between days 7 and 15?



A. 15
B. 12
C. 10
D. 9
E. 8

Physics

1. In the circuit shown in the figure, if the voltage reader attached to the 3R resistor measures a potential difference of V, what is the potential difference across the battery?



A. 8V/3
B. 5V
C. 5V/3
D. 4V/5
E. 2V

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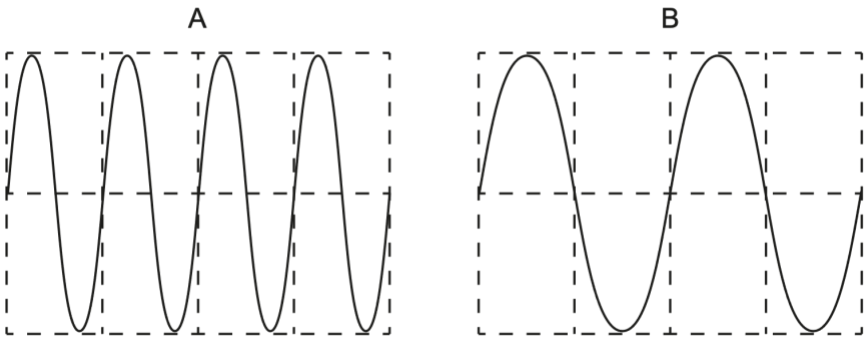
2. The representation of sound waves A and B propagating in the same medium is shown in the figure. According to this:

   I. The intensity of the A wave is greater than the intensity of the B wave.
   II. The A wave is heard as having a higher pitch (thinner) than the B wave.
   III. The propagation speed of the A wave is greater than the propagation speed of the B wave.

   Which of these statements is correct? (Dashed lines are equally spaced)



   A. Only I
   B. Only II
   C. Only III
   D. I and II
   E. II and III

3. Given two objects A and B with the specific heat capacities c and 3c and masses 2m and m respectively, and assuming they are heated from temperature T to 2T, if the amount of heat received by object A is Q, what is the amount of heat received by object B?

   A. Q
   B. 2Q/3
   C. 3Q/2
   D. 2Q
   E. 3Q

4. An $^{244}_{92}X$ nucleus emits alpha, beta, and gamma rays sequentially, which of the following statements are correct?

   I It turns in to $^{240}_{90}X$ nucleus.
   II Electromagnetic waves are emitted.
   III The energy of the nucleus decreases.
   IV During gamma ray emission, the radiation was the greatest range in the air.

   A. III and IV
   B. I and III
   C. I, II and III
   D. II, III and IV
   E. I, II, III and IV

5. One night, a careless driver crashes into a lamppost while driving at a speed of 108 km/h. As a result of the collision, the car comes to a stop after the front parts are compressed by 0.45 m. What is the deceleration of the car? (Assume the car's deceleration is constant.)

   A. $-1000\ \mathrm{m/s^2}$
   B. $-100\ \mathrm{m/s^2}$
   C. $-10\ \mathrm{m/s^2}$
   D. $-900\ \mathrm{m/s^2}$
   E. $-90\ \mathrm{m/s^2}$

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Chemistry

1. Which of the following statements about atom $^{35}_{17}Z$ and $^{37}_{17}Z^{-1}$ ion is correct?

   A. They have an equal number of neutrons.
   B. $^{37}_{17}Z^{-1}$ has a larger mass number than $^{35}_{17}Z$.
   C. They have a different number of protons.
   D. $^{35}_{17}Z$ has a greater number of electrons than $^{37}_{17}Z^{-1}$.
   E. They have a different atomic number.

2. The equilibrium reaction of I2, H2 and HI gases at a fixed volume at a certain temperature is H2 (g) + I2 (g) $\underset{2}{\overset{1}{\rightleftharpoons}}$ 2HI (g)

   Which of the following processes gives the wrong result when applied to this system in equilibrium at the same temperature?

   A. The addition of H2 gas shifts the equilibrium towards 1.
   B. The addition of HI gas shifts the equilibrium towards 2.
   C. The withdrawal of HI gas shifts the equilibrium towards 2.
   D. The withdrawal of H2 gas shifts the equilibrium towards 2.
   E. The withdrawal of I2 gas shifts the equilibrium towards 2.

3. Which of the following statements is incorrect for the balanced reaction shown below?

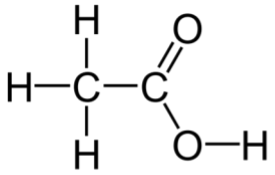
   $3P + 5HNO_3 + 2H_2O \Rightarrow 3X + 5NO$

   A. X is H_3PO_4
   B. It is a redox reaction.
   C. HNO_3 is an oxidizing agent.
   D. P atom is oxidized.
   E. P atom in X has the oxidation state of +4.

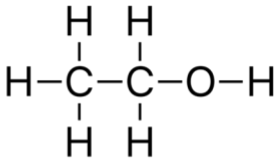
4. Which of the following statements is true about the molecules listed below?

I- B is a carboxylic acid.
II- Reaction of A with NaOH produces water and C2H4COONa.
III- A is a weak acid.
IV- In the presence of an acid, A and B react to produce ester.

A has a higher boiling point than B.



A



B

A. II, IV and V
B. I, II and IV
C. III, IV and V
D. I, II, IV and V
E. II, III, IV and V

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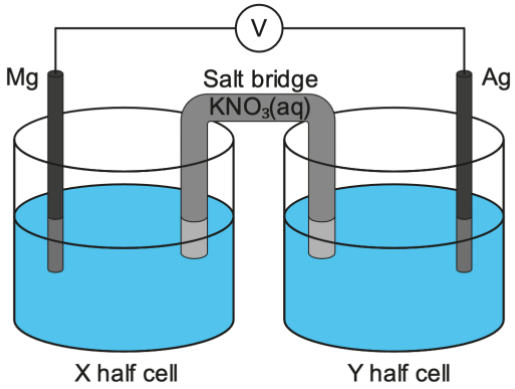
5. A diagram of a galvanic cell with its reaction is given below. Which of the following statements is true about this galvanic cell?

$2Ag^{+}$ (aq) + Mg (k) $\rightleftharpoons$ 2Ag (k) + Mg^{2+} (aq)

I- In the Y half-cell, there is a solution containing Ag^{+} ions.
II- The mass of the Mg electrode in the X half-cell decreases over time.
III- Ag is the cathode and therefore reduction occurs in the Y half-cell.
IV- Electrons are given to the external circuit from the Mg electrode.



A. I and II
B. II and III
C. II, III and IV
D. I, II and III
E. I, II, III and IV

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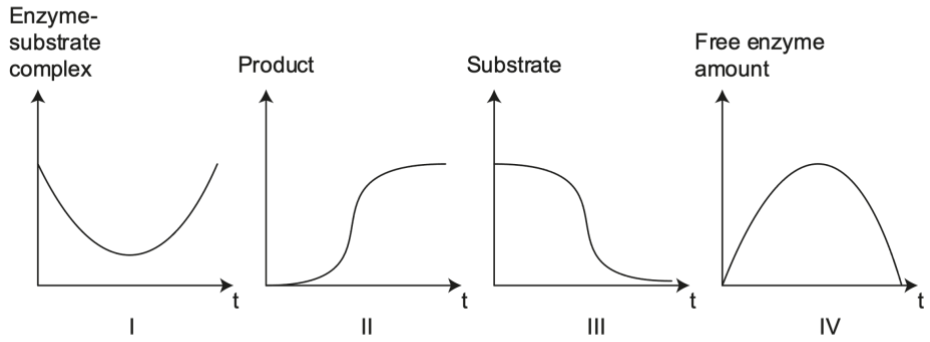
Biology

1. Which of the changes in the graphs below occur during the progression of an enzymatic reaction from its initiation to the formation of the final product?



A. I and IV
B. II and III
C. II, III and IV
D. I, II and III
E. I, II, III and IV

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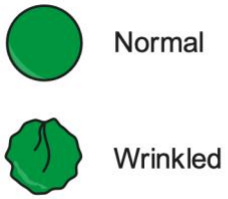
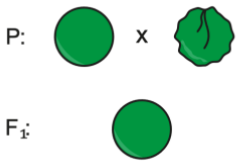
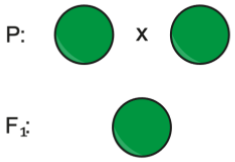
2. The phenotypes of normal and wrinkled peas are illustrated below. Given that the wrinkled phenotype in peas is due to a recessive homozygous genotype, which of the following crosses **cannot** produce a pea with the specified phenotype?



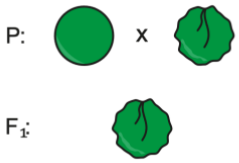
A.



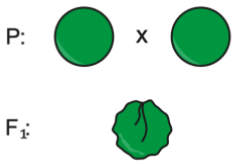
B.



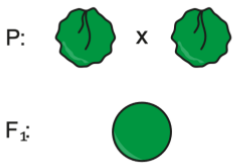
C.



D.

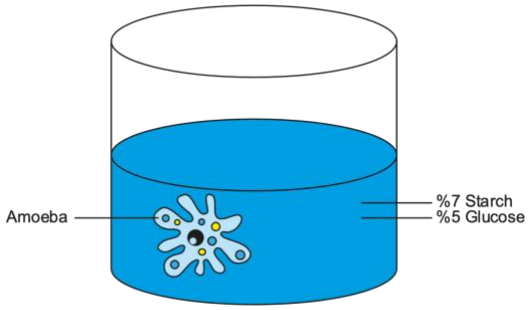


E.



3. An amoeba with a glucose concentration of 3% was placed in the solution as shown below. Given that no glucose or starch molecules were detected in the container after a while, which of the below statements are correct?

I- The amoeba absorbed all the glucose molecules through active transport.
II- The amoeba ingested the starch molecules consuming energy in the process.
III- The amoeba is definitely alive.



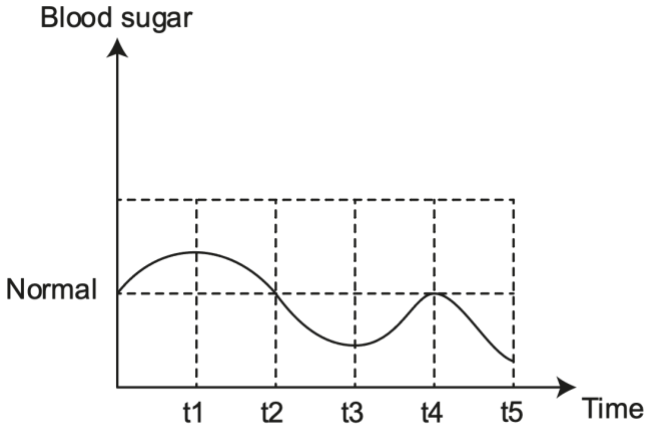
A. Only I
B. Only II
C. II and III
D. I and III
E. I, II and III

4. The excretory system plays a crucial role in maintaining homeostasis in humans. Which of the following functions are part of its responsibilities?

I adjusting blood volume and pressure
II removal of digestive wastes from blood
II regulation of red blood cell production
IV maintaining minerals in blood plasma at specific threshold values

A. I and II
B. II and IV
C. I, II and III
D. I, III and IV
E. I, II, III and IV

5. The change in blood sugar levels of a healthy person over time, along with the indication of the normal amount, is shown below. Accordingly, which of the following statements cannot be made about the time intervals?



A. At t1, the person had sugary food.
B. At t2, insulin is being effective.
C. At t3, blood sugar decreased due to excessive insulin secretion.
D. At t4, glucagon might be effective.
E. At t5, the person is hungry.