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# CLEP Science and Mathematics: Biology, Calculus, Chemistry, College Algebra & Mathematics, Precalculus, Natural Sciences

## Test Prep CLEP-Science-and-Mathematics

**Version Demo**

**Total Demo Questions: 20**

**Total Premium Questions: 500**

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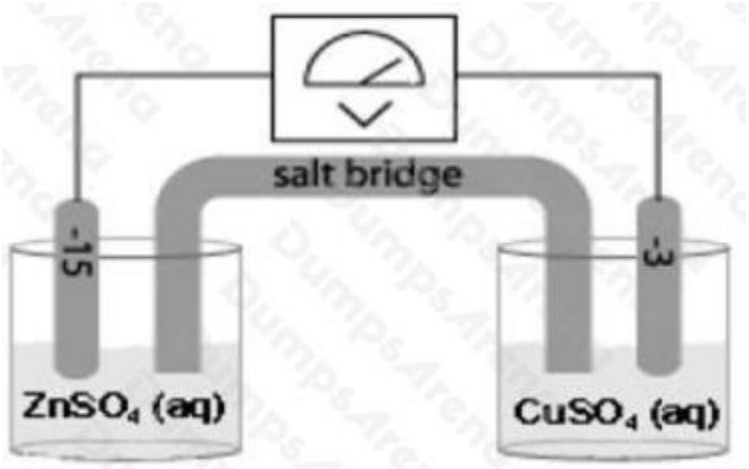
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# Topic Break Down

| Topic | No. of Questions |
|---|---|
| Topic 1, Biology | 111 |
| Topic 2, Chemistry | 80 |
| Topic 3, Natural Sciences | 120 |
| Topic 4, Mathematics | 94 |
| Topic 5, Physics | 95 |
| Total | 500 |

## QUESTION NO: 1




Given two solutions ZnSO4(1M) and CuSO4(1M) in an electrochemical cell, as shown above, answer question.

The salt bridge in the cell docs which of the following?

**A.** The salt bridge is where reduction takes place.

**B.** The salt bridge is where oxidation takes place.

**C.** The salt bridge allows neutral ions to interact with ions in solution.

**D.** The salt bridge allows the two solutions to mix.

**E.** The salt bridge allows positive and negative ions to flow freely.

## ANSWER: E

**Explanation:**

The salt bridge allows for the migration of ions from one half-cell to the other. The salt bridge contains inherently inert salts, so no reactions would take place within the salt bridge.

## QUESTION NO: 2

Which of the following has an atomic number of 12 and has 2 electrons in its valence shell?

**A.** Be

**B.** Mg

**C.** C

**D.** Na

**E.** F

**ANSWER: B**

**Explanation:**

Magnesium has an atomic number of 12 and its electron configuration is [Ne]3s2.

**QUESTION NO: 3**

Stacks of grana can be found in this organelle for the purpose of providing increased surface area for chemical reactions.

**A.** Chloroplast

**B.** Mitochondria

**C.** Nucleus

**D.** Ribosome

**E.** Endoplasmic reticulum

**ANSWER: A**

**Explanation:**

The chloroplast has grana, stacks of thylakoids, for photosynthesis.

**QUESTION NO: 4**

For the function f(x) =log5x, which of the following must be true?

I. f(x) decreases with decreasing values of x

II. The domain is (−∞, 0)

III. The range is (−∞,∞)

**A.** I only

**B.** I and II only

**C.** II and III only

**D.** I and III only

**E.** I, II, and III

**F.** f(x) decreases with decreasing values of x
II. The domain is (−∞, 0)
III. The range is (−∞,∞)

**ANSWER: D**

**Explanation:**

II is not true because the domain cannot be equal to 0, since 5y can never be equal to 0.

## QUESTION NO: 5

Which of the following terms describes as a frozen mass of gas and dust with a definite orbit through the solar system?

**A.** A moon

**B.** A comet

**C.** An asteroid

**D.** A meteorite

**E.** A nebula

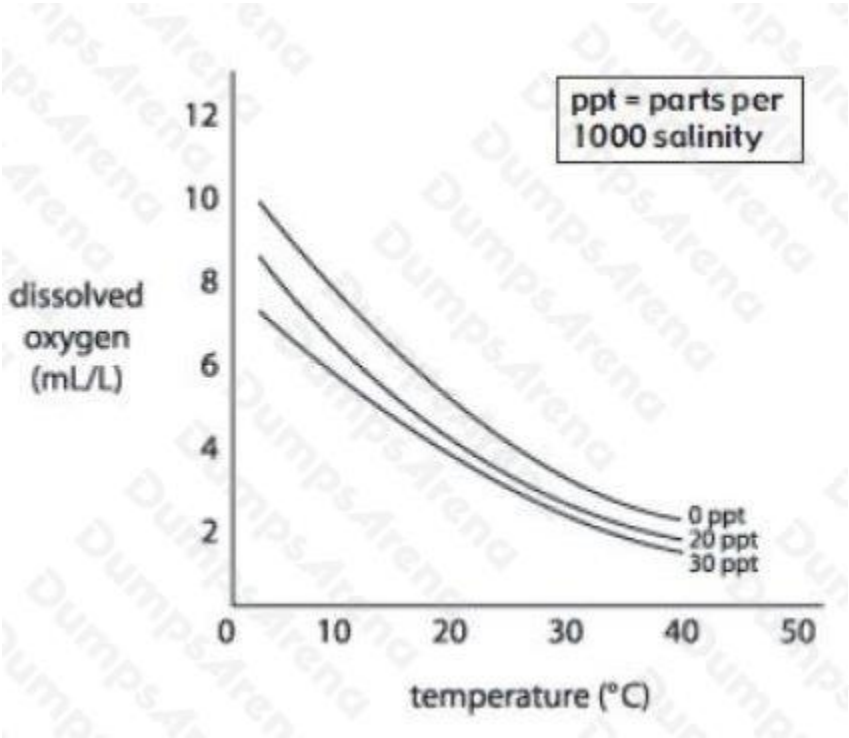
**ANSWER: B**

**Explanation:**

A comet is a frozen mass of gas and dust with a definite orbit through the solar system.

## QUESTION NO: 6

In an aquatic environment, oxygen concentration depends on chemical and physical factors and is greatly affected by many biological processes. These is much less dissolved oxygen (DO) in aquatic environments than in dry air. In most aquatic environments, there are only 5 to 10 mL of dissolved oxygen in a liter of water. Chemical and physical factors, such as salinity, pH, and especially temperature, can affect the DO concentration and distribution. An experiment was done to study the effect of different salinity levels on DO in water of varying temperatures. The results are below. Salinity is expressed in parts per thousand (ppt) and is the content of dissolved salt in water.




The term "Dissolved Oxygen" refers to the oxygen that is dissolved in which of the following substances before it can be used by aquatic plants and animals?

**A.** water

**B.** ammonia

**C.** salt

**D.** blood

**E.** carbon dioxide

**ANSWER: A**

**Explanation:**

The experiment is about measuring the oxygen content in the water. Oxygen must be dissolved in water to be used by plants and animals. It cannot be bound to other molecules, and must exist in its free state (as O2) to be utilized.

**QUESTION NO: 7**

A 5 kg block of ice, kept at some height, has the potential energy of 1000 Joules. What is the height at which the block has been kept?

**A.** 20.4 m

**B.** 21.2 m

**C.** 10.5 m

**D.** 11.4 m

**E.** 24.3 m

**ANSWER: A**

**Explanation:**

Potential energy is given as PE = mgh (1)

Putting the values in equation 1 we get 1000 = 5 × 9.8 × h h = 20.4 m

## QUESTION NO: 8

Exists as a liquid at SIR

**A.** H2O

**B.** H2S

**C.** H2Se

**D.** H2Te

**E.** HCl

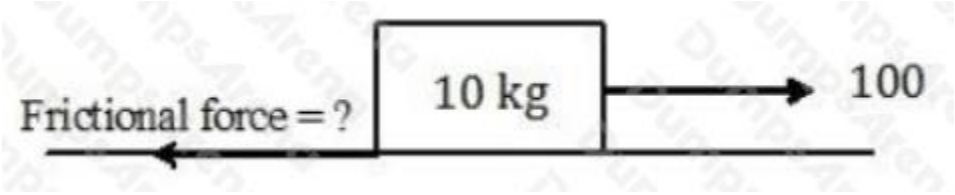
**ANSWER: A**

**Explanation:**

Water has the highest boiling point as a result of hydrogen bonding. All other species listed are gases at STP.

## QUESTION NO: 9

Consider the figure given below.




A block of wood of mass 10 kg is kept on a rough surface. Which of the following statements is true in respect of the frictional force that will develop such that the block moves in the direction of a force of 100 N as shown in the figure below?

**A.** Frictional force < 100 N

**B.** Frictional force > 100 N

**C.** Frictional force = 100 N

**D.** Frictional force = 0 N

**E.** Not enough data is provided.

**ANSWER: A**

**Explanation:**

Frictional force develops due to the actual motion of a block on a surface. As the surface is rough, some frictional force will develop against the force of 100 N. Hence, [Frictional force = 0 N] is an incorrect option. If the applied force is greater than the frictional force then only will the block of wood move. Hence, [Frictional force < 100 N] is the correct answer option and [Frictional force > 100 N] is an incorrect option. Also, if the frictional force is the same as the applied force, then the block of wood is at the verge of moving but it will show no physical motion. Therefore, [Frictional force = 100 N] is an incorrect option. In view of the above discussion, [Not enough data is provided.] is an incorrect option.

**QUESTION NO: 10**

Which of the followings has an affect on the value of the equilibrium constant?

**A.** Addition of a catalyst

**B.** Increasing the volume

**C.** Introducing a solid to the reaction

**D.** Changing the temperature

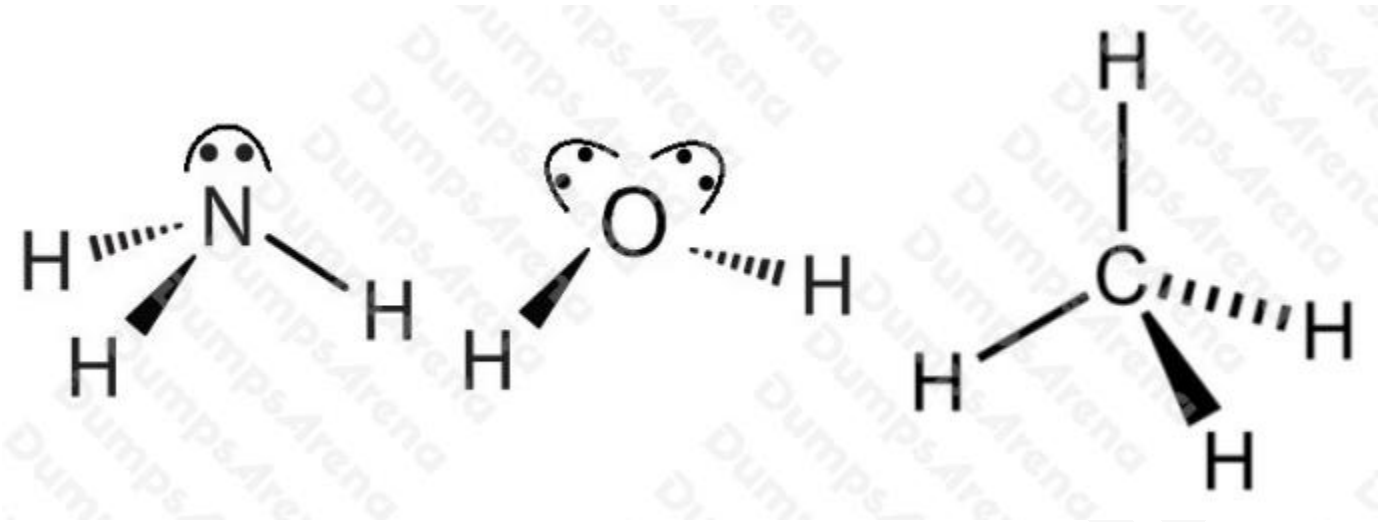
**E.** Doubling the pressure

**ANSWER: D**

**Explanation:**

Changing the temperature is the only thing that will affect the value of an equilibrium constant.

**QUESTION NO: 11**




For the molecules above, the resultant dipole moments are oriented (from left to right):

**A.** ↑, ○, ↓

**B.** ↑, →, ↓

**C.** ↓, ↓, ○

**D.** ↑, ↑, ○

**E.** ↑, ○, ↑

**ANSWER: D**

## QUESTION NO: 12

Photosynthesis is a process in which plants convert:

**A.** sugar into energy

**B.** ADP into ATP

**C.** fructose into glucose

**D.** carbon dioxide and water into sugar

**E.** water into peroxide

**ANSWER: D**

**Explanation:**

Photosynthesis is the process used by plants to make food. Sunlight is used as the energy source to convert carbon dioxide and water into glucose.

## QUESTION NO: 13

Complete ionization of a sodium sulfate molecule yields

**A.** Na+, SO42−

**B.** 2Na+, SO42−

**C.** Na+, 2SO42−

**D.** 2Na+, 2SO42−

**E.** 2Na+, 3SO42−

## ANSWER: B

**Explanation:**

The formula of sodium sulfate is (Na)2SO4. Thus, complete ionization yields two sodium ions and one sulfate ion.

## QUESTION NO: 14

A decrease in the amount of carbon dioxide present in the air surrounding most plants would most likely result in

**A.** the death of the plants

**B.** an increase in the production of sugars through photosynthesis

**C.** a decrease in the output of the Calvin cycle

**D.** the breakdown of chlorophyll molecules in the mesophyll layer

**E.** more nitrogen released into the air from the soil

## ANSWER: C

**Explanation:**

Carbon dioxide is needed in the Calvin cycle to produce sugars, and there is no connection between the Calvin cycle and the building of nitrogen-producing compounds by a plant. The decrease in carbon dioxide would most likely not result in the plant's death, but it might hurt the plant by decreasing its ability to produce sugars. Chlorophyll molecules should be unaffected.

## QUESTION NO: 15

Which two planets do not have any moons?

**A.** Mercury and Venus

**B.** Mercury and Mars

**C.** Mars and Venus

**D.** Pluto and Venus

**E.** Pluto and Mars

**ANSWER: A**

**Explanation:**

Mercury and Venus do not have any moons.

## QUESTION NO: 16

The earth's early atmosphere is thought to have been composed of mostly carbon dioxide with less than a percent of molecular oxygen present. Life first evolved in this atmosphere. Where did the molecular oxygen in Earth's atmosphere come from?

**A.** Hydrolysis of water

**B.** Photosynthesis

**C.** Cellular respiration

**D.** Lightning strikes

**E.** Nuclear reactions

**ANSWER: B**

**Explanation:**

The first life forms were photosynthetic plants. In the process of photosynthesis water and carbon dioxide are consumed and glucose and molecular oxygen are created.

## QUESTION NO: 17

Which of the following numbers is a composite?

**A.** 7

**B.** 31

**C.** 103

**D.** none of the above

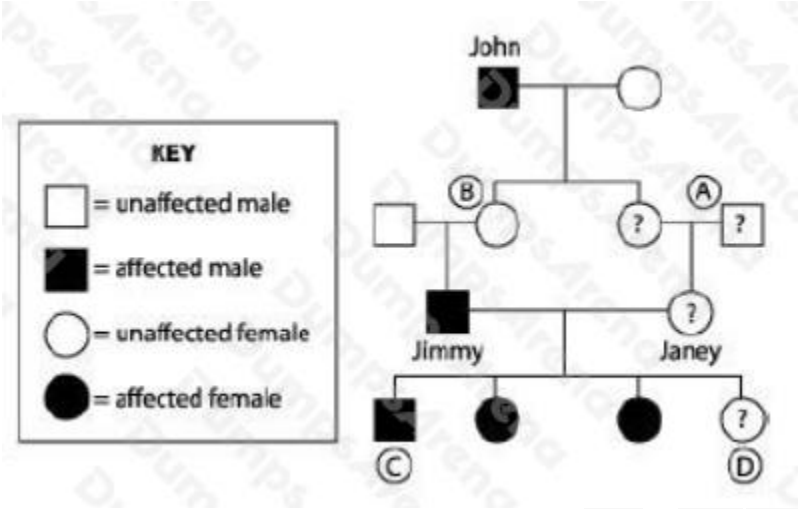
**ANSWER: D**

**Explanation:**

A composite is a number that is not prime.

## QUESTION NO: 18

Duchenne muscular dystrophy (DMD) is a sex-linked recessive disorder that results in a degenerative disease of the muscles of the body. As muscles gradually deteriorate, patients lose the ability to control the muscles and eventually die as breathing muscles are rendered useless. An extended family was studied over several generations and the incidence of DMD was followed as indicated in the pedigree below.




Males are more likely to express the DMD allele than females because

**A.** muscles are generally larger and stronger in males than in females

**B.** males have two X chromosomes and can get twice as many DMD alleles

**C.** males have only one X chromosome and if passed even one DMD allele, they will express it

**D.** sex-linked traits are not expressed in females

**E.** the DMD allele is carried on the Y chromosome

## ANSWER: C

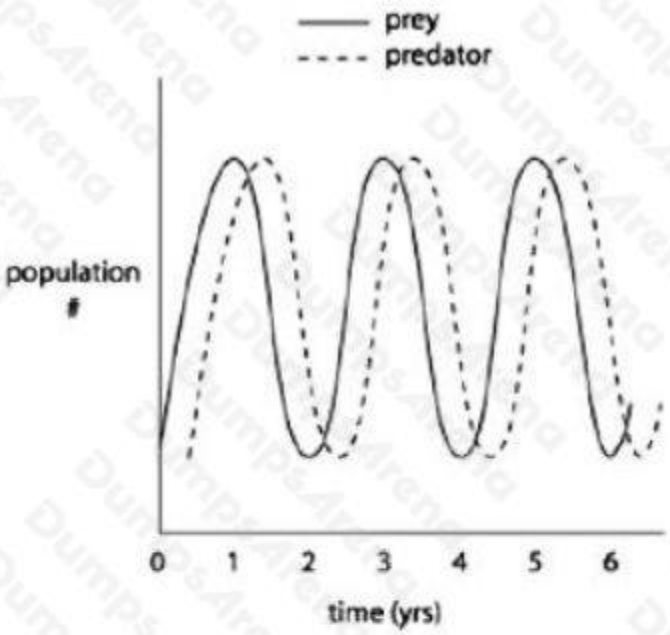
**Explanation:**

Males have only one X; therefore, if they get passed a defective X, they can only express those alleles. In contrast, females have two X's and can have a dominant, "normal" gene to override a defective one (e.g., one for DMD) on their other X.

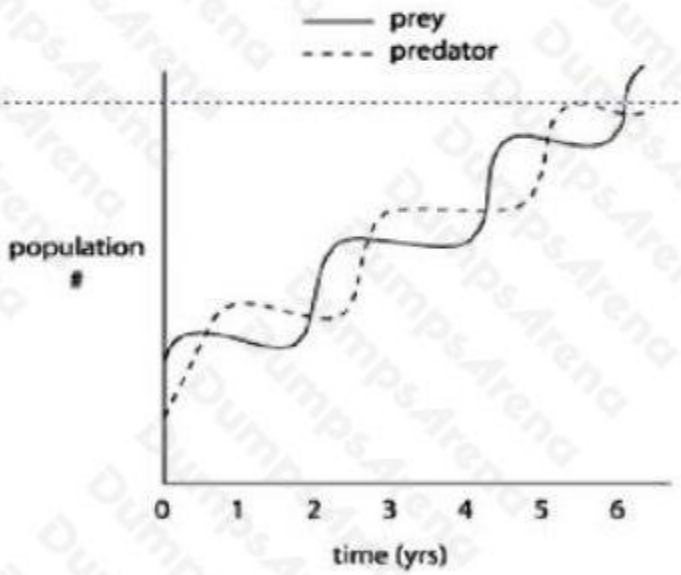
## QUESTION NO: 19

Which graph shows the likely relationship between a predator species and its prey over a six year cycle?

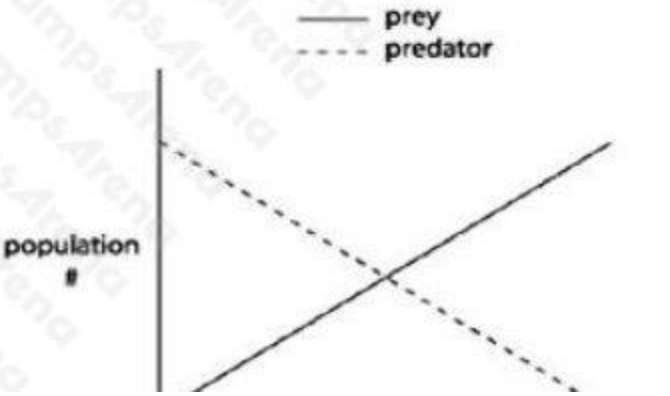
(A)

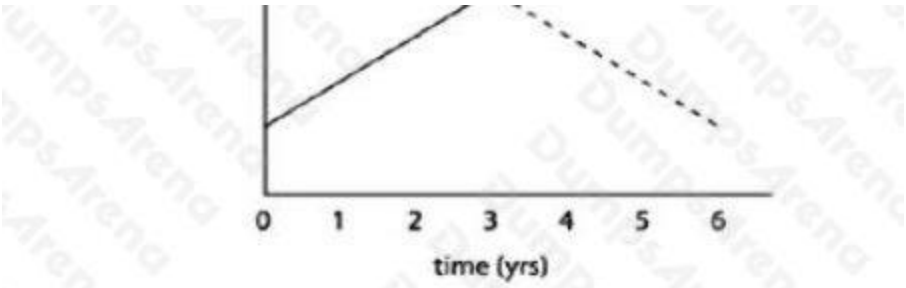

prey
predator
population #
0 1 2 3 4 5 6
time (yrs)

(B)

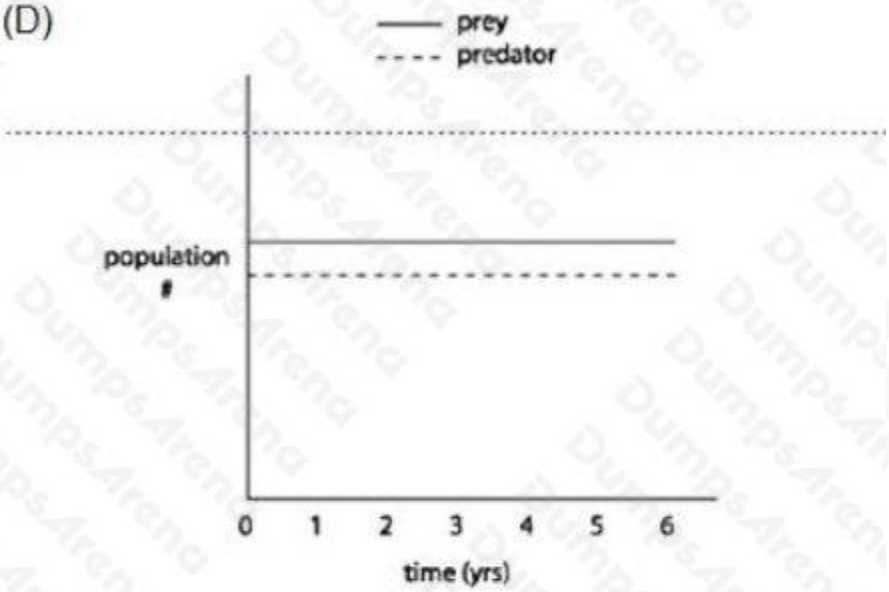

prey
predator
population #
0 1 2 3 4 5 6
time (yrs)

(C)

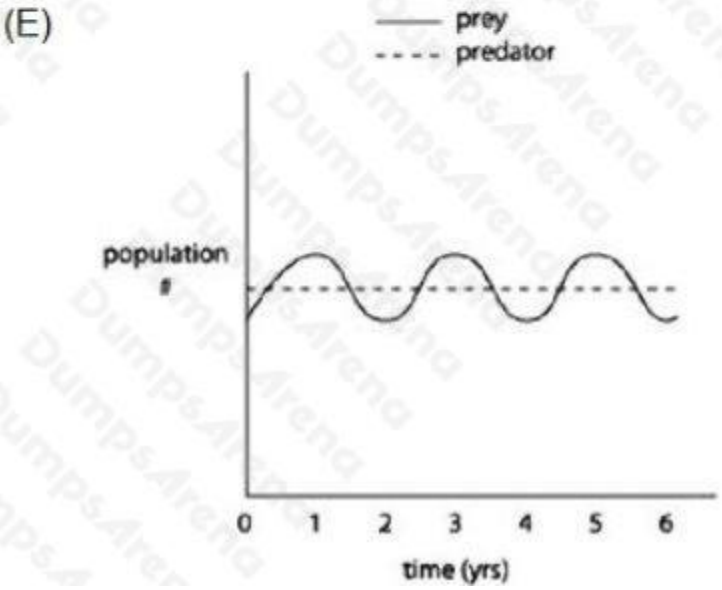

prey
predator
population #




(D)




(E)




**A.** Option A

**B.** Option B

**C.** Option C

**D.** Option D

**E.** Option E

**ANSWER: A**

**Explanation:**

The graph of a predator-prey interaction is usually depicted as a series of linked fluctuations. As the prey population rises, the predator population follows with a slight lag; as the predators eat too much prey, the predator population falls with a slight lag behind the fall in the prey population. This will continue as long as the survival of the prey population is linked to the size of the predator's population and vice-versa.

## QUESTION NO: 20

Which of the following combinations of forces can lead to a resultant unbalanced force of 10 N, if both the forces are acting orthogonally?

**A.** 4 N and 5 N

**B.** 6 N and 8 N

**C.** 5 N and 8 N

**D.** 8 N and 8 N

**E.** 5 N and 5 N

**ANSWER: B**

**Explanation:**

Resultant is given as

$$R = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos\theta} \quad (1)$$

As both the forces are acting orthogonally, θ = 90°. Modifying equation 1 we get

$$R = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos 90^\circ}$$

or,

$$R = \sqrt{F_1^2 + F_2^2} \quad (2)$$

If we take F1 = 6 N and F2 = 8 N and putting the values in equation 2 we get R = 10 N.

Putting the values as mentioned in options [4 N and 5 N, 5 N and 8 N, 8 N and 8 N, 5 N and 5 N], we get the value of the resultant force as 6.4 N, 9.43 N, 11.3 N and 7.07 N.

Thus, for only one combination i.e. 6 N and 8 N we have a resultant force of 10 N

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