

CREST Olympiads – A digital initiative to enhance practical knowledge

2. Identify the following protozoa and select the correct option that completes the following sentences:



- i. They reproduce asexually by ___P___ and are prey to many organisms, especially the ___Q___.
- ii. During reproduction, the macronucleus splits by a type of ___R___, and the micronuclei undergo ___S___.
- iii. They can reproduce ___T___ times a day.

a)

(i)	(ii)	(iii)
P-budding Q-bacteria	R-osmosis S-reverse osmosis	T- only one

b)

(i)	(ii)	(iii)
P-binary fission Q- <i>didinium</i>	R-amitosis S-mitosis	T- multiple

c)

(i)	(ii)	(iii)
P-budding Q- <i>didinium</i>	R-amitosis S-mitosis	T- only one

d)

(i)	(ii)	(iii)
P-binary fission Q-Virus	R-amitosis S-mitosis	T- multiple

3. A gardener holds a hosepipe through which water is gushing out at a rate of 4 kg/s with speed 2 m/s. The moment the speed of the water is increased to 3 m/s, the gardener will experience a jerk of how much force and in which direction?

- a) 4 N in the backward direction
- b) 8 N in forward direction
- c) 8 N in backward direction
- d) 4 N in forward direction

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4. Carefully look at the following data.

Cities	W	X	Y	Z
Pressure in N/m^2	1.1×10^5	1.2×10^5	1.01×10^5	1.23×10^5

P. At W, the boiling point of a liquid will be maximum.

Q. At X, the boiling point of a liquid will be greater than at W and smaller than at Z.

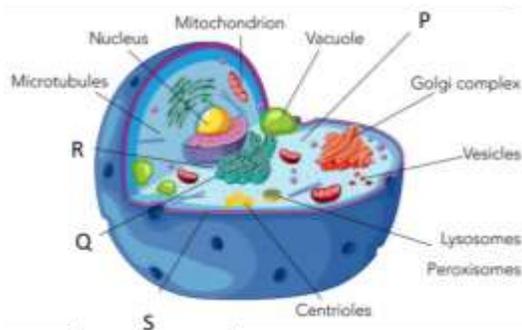
R. At Y, the boiling point of a liquid will be least.

S. At Z, the boiling point of a liquid will be lesser than at X.

Which of the above statements is/are correct regarding the boiling point of a liquid?

- a) Only P
b) Both Q and R
c) Both P and S
d) P, R and S

5. Refer to the given figure and select the incorrect statements:



- (i) The part labelled 'P' is the gel like substance that contains all the organelles. It is made up of water and salt.
(ii) The part labelled 'Q' consists of a system of membrane-bound vesicles (flattened sacs) arranged approximately parallel to each other in stacks.
(iii) The part labelled 'R' are cell structure that makes iron.
(iv) The part labelled 'S' protects the cell from external surroundings. It allows the entry and exit of materials in and out of the cell.

- a) Only (i)
b) Only (ii)
c) Both (i) and (iv)
d) Both (ii) and (iii)

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6. Correct the given statements by replacing the underlined words and select the correct option:

- (i) Kerosene oil can be separated from the olive oil by the method of centrifugation.
- (ii) The drugs from the blood are separated by distillation.
- (iii) Pyrolysis is the separation of dissolved crystalloids from colloidal macromolecule by means of a partially permeable membrane.
- (iv) Filtration technique is used to separate dirt particles from clothes in a washing machine.

(i)	(ii)	(iii)	(iv)
Fractional distillation	Chromatography	Dialysis	Centrifugation

a)

(i)	(ii)	(iii)	(iv)
Filtration	Sublimation	Peptization	Magnetic separation

b)

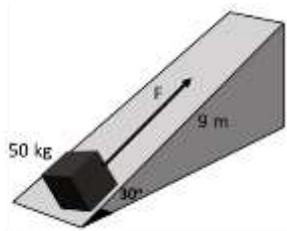
(i)	(ii)	(iii)	(iv)
Fractional distillation	Separating funnel	Photolysis	Centrifugation

c)

(i)	(ii)	(iii)	(iv)
Fractional distillation	Sublimation	Dialysis	Filtration

d)

7. Kenny pulled a block of mass 50 kg over a smooth inclined plane through 9 m as shown in the figure below. The plane makes an angle of 30° with the base. The force is applied parallel to the base. Assuming that no energy is lost otherwise, what is the gain in the potential energy of the block? ($g = 9.8 \text{ m/s}^2$)



- a) 225 J
- c) 2200 J

- b) 2205 J
- d) 2205 J

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8. Refer to the given group of diseases:

- (i) Cholera, tetanus, tuberculosis, typhoid
- (ii) Measles, small pox, polio, influenza
- (iii) Malaria, kalaazar, sleeping sickness

Select the options that correctly classify these group of diseases:

- a) (i)-Bacterial diseases, (ii)-Protozoan diseases, (iii)-Viral diseases
- b) (i)-Protozoan diseases, (ii)-Bacterial diseases, (iii)-Viral diseases
- c) (i)-Viral diseases, (ii)-Bacterial diseases, (iii)-Protozoan diseases
- d) (i)-Bacterial diseases, (ii)-Protozoan diseases, (iii)-Viral diseases

Achiever's Section

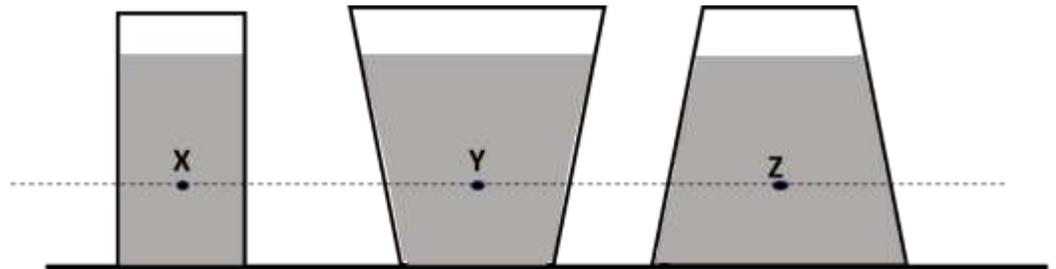
9. Match the column I with the column II:

	Column I		Column II
1.	The number of molecules present in 1 mole of magnesium oxide	P.	6.02×10^{22}
2.	The number of iron atoms in a piece of iron weighing 5.6 g	Q.	6.023×10^{23}
3.	The number of atoms present in 60 g of Cl_2	R.	1.204×10^{24}
4.	The number of atoms of Sulphur present in 1 mole of $\text{Na}_2\text{S}_2\text{O}_3$	S.	1.017×10^{24}

- a) 1-P, 2-Q, 3-R, 4-S
- b) 1-Q, 2-P, 3-S, 4-R
- c) 1-P, 2-S, 3-R, 4-Q
- d) 1-P, 2-Q, 3-S, 4-R

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10. Consider the three flasks filled with water as shown below.



Which of the following statements is true?

- a) Point X has a higher pressure than point Y.
- b) Point Z has a higher pressure than point Y.
- c) Point Y has the highest pressure as compared to point X and point Z.
- d) Point X, point Y and point Z have the same pressure.

Answers

1. (c), 2. (b), 3. (c), 4. (c) 5. (d), 6. (a), 7. (b), 8. (d), 9. (b), 10. (d)