CHAROTAR ENGLISH MEDIUM SCHOOL

Std : 9   **Second Terminal Exam**   **Marks:** 50

Date : 31-01-19   **Sub : Science**   **Time:** 2 hours

ANSWER KEY

Section A

- **Do as directed (Q. No. 1 to 10)**   **(Each 1 mark)**   **[10]**

    1) Define valency.

        It is the ability of an atom to gain or lose electron in order to achieve the noble gas configuration. It refers to the ability of an element to combine with other element. It is obtained by determining the number of electrons in the outermost shell (also called valence shell) of each atom of an element.

        Or

        The combining capacity of an element is known as its valency

    2) Define molecules.

        A group of two or more than two atoms of the same or different elements that are chemically bonded together is called a **molecule**.

    3) Who suggested five kingdom classification system?

        The five-kingdom system was developed by Robert H. Whittaker in 1969 and was built on the work of previous biologists such as Carolus Linnaeus.

    4) What do you mean by buoyancy?

        The upward force exerted by fluids (liquid and gas) on objects when they are immersed in them is called buoyant force and the phenomenon is called buoyancy.

    5) What is the value of G?

        $G = 6.673 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

    6) What is centripetal force?

        If the object travels in a uniform speed in a circular path is called centripetal force.

    7) Define Work.

        Work is defined as a force acting upon an object to cause a displacement.

    8) What is kinetic energy?

        Kinetic energy is the **energy** possessed by a body by virtue of its motion.

    9) Define 1 J of work.

        One joule is **defined** as the amount of energy exerted when a force of **one** newton is applied over a displacement of **one** meter. **One joule** is the equivalent of **one** watt of power radiated or dissipated for **one** second.

    10) Which method is used for improving cattle breed?

        Cross breeding method is commonly used for improving cattle breeds.

        OR

        Define macronutrients.

They are the plant nutrients which are required in large quantities and are specially meant for providing energy and for supporting

Section B

- **Answer the following questions in short.**   **(Each 2 mark)**   **[16]**

11. Write down the difference between Evaporation and Boiling.

Differences between Evaporation and Boiling	
Evaporation	Boiling
Evaporation is a normal process that occurs when the liquid form changes into the gaseous form; while causing an increase in the pressure or temperature.	Boiling is an unnatural process where the liquid gets heated up and vapourized due to continuous heating of the liquid.
Evaporation usually occurs on the surface of the liquid being heated up.	Boiling usually occurs on the entire mass of the liquid that gets heated up.
Bubbling effect is not visible in Evaporation.	Bubbling effect is visible during the process of Boiling.
The process of Evaporation is usually a slow and carried out process when compared to Boiling.	The process of Boiling is usually much quicker and the process happens quite rapidly as well.

OR

Distinguish between Liquid state and Gaseous State.

Liquids	Gases
The intermolecular forces are stronger than gases but weaker than solids.	The intermolecular forces are practically non existent. Thus, there is no definite volume.
Liquids do not have a definite shape.	Gases do not have a definite shape.
The intermolecular space is moderate but present.	The intermolecular space is free flowing and plenty.
The force of attraction between molecules is pretty moderate.	There is no intermolecular force of attraction between the molecules.
Liquids cannot be compressed.	Gases can be compressed quite easily.

12. Write the difference between aves & mammals.

Aves	Mammals
i. Body is covered externally with feathers. ii. They lay eggs. iii. No mammary glands are present.	i. Hair covers the body. ii. They give birth to live young ones. iii. They have mammary glands with the help of which they feed their young ones.

13. Write Chemical formula for the following:

a) Magnesium Chloride : $MgCl_2$ b) Calcium oxide : CaO d) Copper nitrate : $Cu(NO_3)_2$ d) Calcium carbonate : CaCO3

OR

List the points of difference between homogeneous and heterogeneous mixture.

Homogeneous Mixtures	Heterogeneous Mixtures
1. Homogeneous mixtures have uniform composition.	1. Heterogeneous mixtures have non uniform composition
2. It has no visible boundaries of separation between its constituents.	2. It has visible boundaries of separation between its constituents.
3. Some examples of homogeneous mixtures are: salt in water, sugar in water.	3. Some examples of heterogeneous mixtures are: water and sand, oil and water.

14. What are Polyatomic Ions? Give two example of it.
Polyatomic ions:
Those ions which are formed from groups of joined atoms are called polyatomic ions.
Compound ions are also called polyatomic ions.
Ammonium ion NH_4^+, is a compound ion which is made up of two types of atoms joined together nitrogen and hydrogen.
Carbonate ion CO_3^{-2} , is a compound ions which is made up of two types of atoms joined together carbon and oxygen.

15. What is the importance of Universal law of Gravitation.
It is the force that is responsible for binding us to Earth.
It is responsible for the motion of moon around the earth
It is responsible for the motion of planets around the sun
The tides formed by rising and falling of water level in the ocean are due to the gravitational force exerted by both sunand moon on the earth

16. What is the work done by the force of gravity on a satellite moving around the earth justify your answer.

When a satellite moves around the Earth, the displacement in short interval is along the tangential direction and the force (gravitational force) is towards the centre of the Earth. Since, the force and displacement are perpendicular to each other, the work done by gravitational force is zero.

17. What is the difference between Manure & fertilizers& why we used it in the field?

BASIS FOR COMPARISON	MANURE	FERTILIZER
Meaning	Manure is a natural material, obtained by decaying plant and animal waste, that can applied to the soil to enhance its fertility.	Fertilizer is a human-made or natural substance, that can be added to the soil to improve its fertility and increase the productivity.
Preparation	Prepared in fields	Prepared in factories
Humus	It provides humus to the soil.	It does not provide humus to the soil.
Nutrients	Comparatively less rich in plant nutrients.	Rich in plant nutrients.
Absorption	Slowly absorbed by plants	Quickly absorbed by plants
Cost	It is economical	It is costly
Side effect	There is no side effect, in fact it improves the physical condition of soil.	It causes harm to the living organism present in the soil.

OR

Write benefits of cattle farming.

1. Dung of the animal can be used to manure crops
2. Get fresh milk from the dairy animals
3. Thety feed on grass which will reduce the cost of artificial feeds
4. The draught cattle can be used in agricultural fields

18. Calculate the force of gravitation between the earth & the sun , given that the mass of the sun $= 2 \times 10^{30}$ kg. the average distance between the two is 1.5×10^{11}m.

Given,

Mass of the earth, $M_e = 6 \times 10^{24}$ kg

Mass of the Sun, $M_s = 2 \times 10^{30}$ kg

Radius of the Earth, $r_E = 1.5 \times 10^{11}$ m

Force of gravitation is given by,

$$F = G\frac{M_e M_s}{r^2}$$

$$= \frac{6.67 \times 10^{-11} \times 6 \times 10^{24} \times 2 \times 10^{30}}{(1.5 \times 10^{11})^2} \text{ N}$$

$$= \frac{6.67 \times 12 \times 10^{21}}{1.5 \times 1.5}$$

$$= 3.56 \times 10^{22} \text{ N.}$$

Section C

- **Answers of following questions in brief.**   **(Each 3marks)**   **[12]**

  19. How storage grain losses occur?

There are various biotic and abiotic factors that act on stored grains and result in degradation, poor germinability, discolouration, etc. Biotic factors include insects or pests that cause direct damage by feeding on seeds. They also deteriorate and contaminate the grain, making it unfit for further consumption. Abiotic factors such as temperature, light, moisture, etc., also affect the seed. They decrease the germinating ability of the seeds and make them unfit for future use by farmers. Unpredictable occurrence of natural calamities such as droughts and floods also causes destruction of crops.

OR

Calculate the work required to be done to stop a car of 1500kg moving at velocity of 60km h^{-1}.

Solution :
Here, $m = 1500$ kg;
$v = 60$ km h^{-1} = $60 \times \frac{5}{18}$ m s^{-1} = $\frac{50}{3}$ m s^{-1};
final velocity is zero.
$\therefore$ Work required to stop the car
= change in K. E. of the car

$= \frac{1}{2}mv^2 - \frac{1}{2}m(0)^2$

$= \frac{1}{2}mv^2$

$= \frac{1}{2} \times 1500 \times \left(\frac{50}{3}\right)^2$ J

$= \frac{1}{2} \times 1500 \times \frac{50}{3} \times \frac{50}{3}$ J

≈ 208333.3 J

Ans. The work required to be done to stop the car is **208333.3 J**, which is done by the braking force.

20. *Explain the basis for grouping organism into five kingdom.*

Ans. The basis for grouping organisms into five kingdoms are as follows :

(1) Number of cells present in the body, whether unicellular or multicellular.

(2) Mode of nutrition, whether autotrophic, heterotrophic or saprotrophic.

(3) Complexity of cell structure, whether the organism is prokaryotic or eukaryotic.

(4) Presence or absence of cell wall.

(5) Level of organization.

21. Convert this into mole:

a) 12g of O_2 : Given mass = 12 g

Molar mass of oxygen gas (O_2) = 2 x 16 = 32 g

No: of moles = given mass / molar mass

= 12/32 = 0.375 moles

b) 20g of H_2O : Given mass = 20 g

Molar mass of water (H_2O) = 2 x 1 + 16 = 18 g

No: of moles = given mass / molar mass

= 20/18 = 1.11 moles

c) 22g of CO_2. : Given mass = 22 g

Molar mass of carbon dioxide (CO_2) = 12 + 2 x 16 = 44 g

No: of moles = given mass / molar mass

= 22/44 = 0.5 moles

22. The volume of a 500g sealed packet is 350 cm^3 will the packet float or sink ,in water if the density of water is 1g cm^3,what will be the mass of the water displaced by this packet?

$$\text{Density of the 500 g sealed packet} = \frac{\text{Mass of the packet}}{\text{Volume of the packet}}$$

$$= \frac{500}{350} = 1.428 \text{ g cm}^{-3}$$

The density of the substance is more than the density of water (1 g cm^3). Hence, it will sink in water.

As the packet is fully submerged in water,

Mass of water displaced by the packet = volume of the packet x density of water

= 350 cm^3 × 1 g/cm^3 = 350 g

OR

Derive F = ma.

Ans. Let a force F act on a body of mass m and change it velocity from u to v in t second.

Initial momentum of the body $p_1 = mu$

Final momentum of the body $p_2 = mv$

Change in momentum $= p_2 - p_1$

$$= mv - mu$$

$$= m(v - u)$$

Rate of change of momentum

$$= \frac{\text{Change in momentum}}{\text{time taken}}$$

$$= \frac{m(v - u)}{t}$$

$$= ma$$

According to Newton's second law of motion, the rate of change of momentum is directly proportional to the applied force.

$\therefore ma \propto F$

$\therefore F = kma$

Where, k is a constant of proportionality.

1 unit force $= k \times (1 \text{ kg}) \times (1 \text{ m s}^{-2})$. So the value of k becomes 1.

$\therefore F = ma$

Section D

- **Answer the question in detailed. (Each 4 marks)** **[12]**

  23. Write the difference between Amphibians & Reptiles.

Amphibians	Reptiles
1. Amphibians have double mode of life.	1. Reptiles are largely terrestrial.
2. Amphibians show metamorphosis, i.e., there are larval stages called tadpoles.	2. Reptiles do not show metamorphosis, i.e., there are no larval stages.
3. Amphibians do not have exoskeletal structures. Their skin is smooth and slimy.	3. Reptiles have scales on the body. Larger plates and scutes are seen in some reptiles like crocodiles and tortoises.
4. Mucous glands are present in the skin.	4. Mucous glands are absent.
5. Heart is 3-chambered with 2 auricles and a single ventricle.	5. Heart is imperfectly 4-chambered. 2 auricles and one incompletely divided ventricle. So it is neither 3-chambered, nor perfectly 4-chambered.
6. Respiration is by gills in larvae. In adults it is by skin when in water and by lungs when on land.	6. Respiration by lungs in all reptiles even in aquatic reptiles.
7. They require water for laying eggs.	7. They do not require water for laying eggs.
8. **Examples :** Frog, Toad, Salamander.	8. **Examples :** Snake, Crocodile, Lizard, Tortoise.

OR

Differentiate between three types of muscular tissue .

Striated muscles	Unstriated muscles	Cardiac muscles
1. Striated muscles are also called skeletal muscles as they are attached to skeletal parts.	1. Unstriated muscles are also called smooth muscles as they are associated with all the vital organs located in the body.	1. Cardiac muscles are also called heart muscles as they are located in the heart wall.
2. They are voluntary in nature and act on our own will.	2. They are involuntary in nature and cannot act according to our will.	2. They are involuntary in nature and show continuous rhythmic contraction and relaxation throughout the life.
3. These are cylindrical, long, unbranched and multinucleate.	3. The cells are long with pointed ends, unbranched and uninucleate.	3. The cells are cylindrical, branched and uninucleate.
4. There are dark and light bands present on each muscle fibre.	4. They do not have dark and light bands.	4. They have alternate dark and light bands.
5. **Location :** Hands, legs, face, etc.	5. **Location :** Wall of the alimentary canal, ureter, trachea and bronchi, diaphragm.	5. **Location :** Heart

24. Explain the theory of Universal law of Gravitation.

10.1.1

Every object in the universe attracts every other object with a force which is proportional to the product of their masses and inversely proportional to the square of the distance between them. The force is along the line joining the centres of two objects.
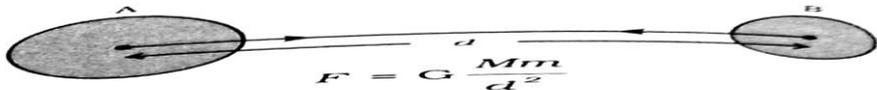

$$F = G\frac{Mm}{d^2}$$

Fig. 10.2: The gravitational force between two uniform objects is directed along the line joining their centres.

Let two objects A and B of masses M and m lie at a distance d from each other as shown in Fig. 10.2. Let the force of attraction between two objects be F. According to the universal law of gravitation, the force between two objects is directly proportional to the product of their masses. That is,

$$F \propto M \times m \tag{10.1}$$

And the force between two objects is inversely proportional to the square of the distance between them, that is,

$$F \propto \frac{1}{d^2} \tag{10.2}$$

Combining Eqs. (10.1) and (10.2), we get

$$F \propto \frac{M \times m}{d^2} \tag{10.3}$$

or, $F = G\dfrac{M \times m}{d^2}$ (10.4)

where G is the constant of proportionality and is called the universal gravitation constant. By multiplying crosswise, Eq. (10.4) gives

$$F \times d^2 = G\, M \times m$$

25. Write the advantages of inter cropping & crop rotation.

THE ADVANTAGES OF INTERCROPPING AND CROP ROTATION IS :

1. IT HELPS RESTORE SOIL FERTILITY , SO THERE'S A FERTILE SOIL FOR LONGER PERIOD OF TIME.
2.SOIL FERTILITY AND IMPORTANT NUTRITIENTS FROM SOIL DOES NOT DEGRADE.
3. IT ALSO HELPS TO CONTROL AND PREVENT SOIL EROSION WHICH IS VERY HARMFUL FOR SOIL FERTILITY.
4. IT ALSO PREVENTS THE GROWTH OF DISEASE CAUSING WEEDS AND OTHER INSECTS WHICH ARE HARMFUL FOR CROPS .

OR

What is the work to be done to increase the velocity of a car from 30km/h to 60km/h , if the mass of the car is 1500kg ?

Solution :

Mass of the car $m = 1500$ kg,

Initial velocity of car $u = 30$ km h^{-1}

$$= \frac{30 \times 1000 \text{ m}}{60 \times 60 \text{ s}}$$

$$= \frac{25}{3} \text{ m s}^{-1}$$

Similarly, the final velocity of the car,

$v = 60$ km h^{-1}

$$= \frac{50}{3} \text{ m s}^{-1}$$

Therefore, the initial kinetic energy of the car,

$$E_{ki} = \frac{1}{2} mu^2$$

$$= \frac{1}{2} \times 1500 \text{ kg} \times \left(\frac{25}{3} \text{ m s}^{-1}\right)^2$$

$$= \frac{156250}{3} \text{ J}$$

The final kinetic energy of the car,

$$E_{kf} = \frac{1}{2} \times 1500 \text{ kg} \times \left(\frac{50}{3} \text{ m s}^{-1}\right)^2$$

$$= \frac{625000}{3} \text{ J}$$

Thus, the work done = Change in kinetic energy

$$= E_{kf} - E_{ki}$$

$$= 156250 \text{ J}$$

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