

Class9 Science Sample Question Paper 2017-18 - 4(Solved)

Time allowed: 03 Hours

Science Class – IX

Maximum Marks: 80

Section-A

Question numbers 1 and 2 in Section-A are one mark question

1. State the chemical nature of the thickening of the walls of sclerenchyma tissue.

Ans. Lignin

2. Distinguish between intervarietal and interspecific hybridization of crop plants

Ans. Intervarietal means hybridization between two varieties of crops while interspecific means hybridization between two species of the same genus.

Question numbers 3 to 5 in Section- A are two marks questions

3. How is heating of sugar and heating of ammonium chloride different from each other? Explain your answer.

Ans. Heating of sugar is kind of chemical change where else heating of Ammonium Chloride is a kind of physical change.

4. Name and define the mechanism responsible for release of water on adding salt to the vegetables.

Ans. On adding salt, vegetables release water due to osmosis. Osmosis is a process of transfer of substance from higher concentration to lower concentration through semipermeable membrane.

5. An observer standing at a seacoast observes 60 waves reaching the coast per minute. If the wavelength of a wave is 10 m., find the velocity of the wave.

Ans. wavelength of wave = 10 m

Wavelength of 60 waves = $60 \times 10 = 600$ m

Time = 1 min = 60 sec

Speed = distance / time = $600 / 60 = 10$ m / sec

Question numbers 6 to 15 in Section-A are three marks questions

6. Rahul was a good player, but his sports teacher observed that he takes drugs. Rahul denied this. Then the sports teacher asked him to go for blood test. Answer the following questions.

(a) Name the technique that can be used to detect the presence of drugs in blood.

(b) Write any other application of this technique. (c) Which values in Rahul's personality are reflected in his behavior? How will these values affect his reputation and future prospectus in sports and as an individual?

Ans. (a) Chromatography is the technique that is used to detect the presence of drugs in blood.

(b)It is also used in the separation of colours, separation of amino acids etc.

(c) By taking drugs, Rahul is expressing his weakness and his incapability. His cheating nature shows that, he lacks sportsmanship.

(d) Drugs are unethical for any sportsman. It does not give an equal and fair opportunity to all. Drugs have a long-term affect on the physical and mental conditions of a person.

7. Identify the type of tissues in the following:-

(a) Eye-lid (b) Inner lining of the intestine (c) Lining of the kidney tubule

Ans. (a) Iris of the eye-Smooth muscles or tissue.

(b) Inner lining of intestine-Columnar epithelium.

(c) Lining of kidney tubule-Cuboidal epithelium

8. Answer these questions:

(a) Why is the cell called the structural and functional unit of life?

(b) Why is the plasma membrane called a selective permeable membrane?

(c) Name the factor which decides the movement of water across the plasma membrane.

Ans: (a) all living body is made up of cell and cell perform every functions in the living body that's why cell is called basic structural and functional unit of Living body.

(b) plasma membrane only allow some substance to enter and exit through the cell that that is why it is called selectively permeable membrane

(c) the concentration of water inside the cell and outside the cell decide movement of water across the plasma membrane.

9. A black and a red suitcase were tied to the car roof. It takes 5 ropes to keep a black suitcase from falling down a car while turning and only two ropes to keep the red suitcase from falling down. What do you conclude about the relative weight of the two suitcases? Justify your answer on the basis of Newton's Law of motion. Also state the Law.

Ans. It is given that the black suitcase requires five ropes while the red suitcase requires only two to prevent it from falling down. This means more force is required to prevent the black suitcase from falling down. This indicates that inertia of black suitcase is more than the inertia red suitcase. We know that heavier objects have more inertia. Hence, the weight of black suitcase is more than the red one.

It is based on Newton's first law of motion that states that an external force is required to change the state of motion of a body.

10. "Excessive use of chemicals such as insecticides and pesticides causes a threat to Ecology". Explain with reason.

OR,

Mention two points of difference between compost and vermi compost. (b) State the meaning of green manure.

Ans. Yes, excessive use of chemicals such as insecticides and pesticides causes a threat to ecology. This is because these chemicals are non-biodegradable. They get washed away because of irrigation. Hence, they are a cause of water pollution. Continuous use of these chemicals causes harm to useful or symbiotic microorganisms living in soil. They can also result in the reduction of soil fertility and increase in soil acidity when used in excessive amount. They cannot replenish the organic matter of soil.

Therefore, we should use such chemicals in sustainable manner.

OR, Ans.(a) Compost is the end product formed by the biodegradation of organic matter, such as yard waste and food waste. This is done by microorganisms, such as bacteria. Yeast too helps in the process.

Vermicompost is the end product formed by the degradation of organic matter. This process is done only by worms, such as red wigglers, white worms and earthworms.

(b) The manure which is prepared by decomposing green plants in field itself is called green manure. For example — sun hemp is grown in fields, mulched by ploughing and allowed to decompose in field for the preparation of green manure.

11. (i) The value of 'G' on the surface of earth is $6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$. What will be its value on the surface of moon?

(ii) A stone is allowed to fall from the top of a tower 100m high and at the same time another stone is projected vertically upwards from the ground with a velocity of 2.5 m/s. Calculate when and where the two stones will meet ($g = 10 \text{ m/s}^2$)

Ans. (a) Value of G is same everywhere in the universe.

(b) let "t" = time after which both stones meet

S = distance travelled by the stone dropped from the top of tower

Then, (100-S) = distance travelled by the projected stone.

(i) For stone dropped from the top of tower $S = 0 + \frac{1}{2} (-10) t^2$ or, $S = 5t^2$

(ii) For stone projected upward

$(100 - S) = 25t + \frac{1}{2} (-10) t^2 = 25t - 5t^2$

Adding i) and ii) , We get $100 = 25t$ or $t = 4 \text{ s}$

Therefore, Two stones will meet after 4 s.

iii) Put value of $t = 4 \text{ s}$ in Equation i) , we get $S = 5 \times 16 = 80 \text{ m}$.

Thus , both the stone will meet at a distance of 80 m from the top of tower.

12. (a) How many neutrons are present in C-14 isotope of Carbon ?

(b) How many protons do He⁺² ions possess?

(c) How many electrons can be filled in the third orbit of an atom at a maximum?

Ans. (a) No of neutron = $14 - 6 = 8$ (b) No of proton = 2 (c) 18

13. In a water tank, on throwing a stone 20 full ripples are produced in 1 sec. The distance between a crest and trough is 10 cm. calculate (a) the wavelength of ripple (b) frequency of ripple (c) velocity of the ripples.

Ans. (a) Distance between crest and trough = half of the wavelength

$\Rightarrow 10 \text{ cm} = \text{Half the wavelength}$ So, Wavelength = $10 \times 2 = 20 \text{ cm}$

(b) We know that frequency of a wave is the number of waves produced in 1 second. So here frequency will be 20 Hz.

(c) Velocity = Frequency \times Wavelength = $10 \times .2 \text{ m} = 2.0 \text{ m/s}$

14. A man whose mass is 50 kg moves up 15 steps each of height 15 cm in 45 seconds of time. Calculate the power used in climbing those stairs. (g = 10 m/s²)

Ans. Power used in climbing stair = work done/time = PE/t = mgh/t

= $(50 \text{ kg} \times 15 \times .15 \text{ m} \times 10 \text{ m/s}^2) \div 45 \text{ sec} = 1115 \div 45 = 25 \text{ watt}$

15. Describe the postulates of Neils Bohr's model of an atom. Write the various rules formulated for the distribution of electrons to the various shells. What is the name given to this arrangement?

Ans. Bohr's postulates

(i) only certain special orbits known as discrete orbits of electrons are allowed inside the atom

(ii) while revolving the electrons do not radiate energy

Rules

(i) maximum no. of electrons present in the shell is given by the formula $2n^2$

(ii) the max. no. of electrons that can be accommodated in the outermost orbit is 8

(iii) the shells are filled in a step-wise order

Question numbers 16 to 21 in Section- A are 5 marks questions

16. (a) List three characteristics of particles of matter. When we add some sugar or salt in a beaker containing water, after sometime the sugar or salt becomes invisible. Where does it go? What property of particle of matter does it show?

(b) How will you justify that ice water and steam are the three states of a substance and not different substances?

Ans. (a) Three characteristics of particles of nature:

- i) Particles of matter are continuously moving
- ii) Particles of matter have space in between them
- iii) Particles of matter attract each other.

(b) When we add some sugar or salt in a beaker containing water, after sometime the sugar or salt becomes invisible. This is because the sugar or salt particles get arranged in between water molecules. This shows that there is space in between the particle.

b) Ice can be converted to water by giving heat. Water can be freeze to ice by reducing temperature so the starting ice is obtained only by change in temperature. Similarly water is also converted to steam by increase of temperature and get back again by decrease of temperature. In all the case starting is get back by change in physical condition. Therefore these are 3 states of matter.

17. (a) List six factors for which the variety improvement of crops is aimed at ?

(b) Explain two advantages of mixed cropping.

Ans. (a) **six factors for which the variety improvement of crops is aimed at are:**

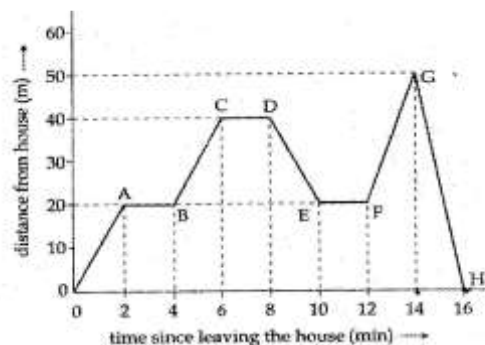
- I. higher yield
- II. improved quality
- III. biotic and abiotic resistance
- IV. change in maturity duration
- V. wilder adaptability
- VI. desirable agronomic characteristic

(b) Advantages of mixed cropping are

- Farmers can keep their fields under continuous production.
- There is reduction in the need of artificial fertilizers which can otherwise be expensive.
- There is geographic mixing of crops; this can help slow the spread of pest and other diseases in the growing season.

18. The following graph describes the motion a girl going to meet her friend who stays 50 m from her house.

- (a) How much time she takes to reach her friend's house?
- (b) What is the distance travelled by the girl during the time interval 0 to 12 min?
- (c) During which time interval she is moving towards her house?
- (d) For how many minutes she was at rest, during the entire journey?
- (e) Calculate the speed by which she returned home.



OR,

(a) Draw a velocity-time graph for an object in uniform motion. Show that the slope of the velocity-time graph gives the acceleration of the object.

(b) An aeroplane starts from rest with an acceleration of 3 m/s^2 and takes a run for 35 s before taking off. What is the minimum length of the runway and with what velocity the plane took off?

Ans. (a) 14 min (b) 60 m (c) 8 to 10 min or 12 or 14 min (d) 6 min (e) 25 m/min

OR,

$$(b) v = u + at = 0 + 3 \times 35 = 105 \text{ m/s}$$

$$S = ut + \frac{1}{2}at^2 = 0(35) + \frac{1}{2}(3)(35)^2 = 612.5 \text{ m}$$

19. (i) Who introduced the system of scientific naming of organisms? What are the conventions followed while writing scientific names?

(ii) Name the phylum to which the following organisms belong:

Ascaris (b) Leech (c) Sea urchin (d) Liver fluke (e) Sycon

Ans. (i) Binomial nomenclature, introduced by Carolus Linnaeus is the method of naming an organism with the genus name first and species name later.

Conventions followed while writing scientific names

*Name of the genus begins with a capital letter.

*Name of the species should begin with a small letter.

*Scientific name should be in Italics when printed.

*Genus name and the species name should be underlined separately while handwritten.

(ii) a. nematode b. Annelida c. Platyhelminthes d. Porifera

20. (i) Define 1 watt of power. (ii) Express 1 kilowatt in terms of joule per second.

(iii) Five bulbs each rated 100W are used for 4 hours, a heater rated 1500W is used for 2 hours and an electric iron rated 1000 W is used for 5 hours. Calculate the total energy consumed by them in terms of the commercial unit of energy. Convert the energy into Joules.

Ans. (i) 1 watt is the power of an appliance which does the work at the rate of 1 joule per second.

$$1 \text{ watt} = 1 \text{ joule/1 second.}$$

$$(ii) 1 \text{ kilowatt} = 1000 \text{ w} \Rightarrow 1000 \text{ joule/sec}$$

$$(iii) \text{ Total energy consumed} = (5 \times 100 \text{ w} \times 4) + (1500 \text{ w} \times 2) + (1000 \text{ w} \times 5) = 2000 \text{ wh} + 3000 \text{ wh} + 5000 \text{ wh} \\ = 10000 \text{ wh} \div 1000 = 10 \text{ kWh} = 10 \text{ unit} = 10 \times 3.6 \times 10^6 \text{ joule} = 3.6 \times 10^7 \text{ joule}$$

21. (i) Derive an expression for kinetic energy of an object of mass m moving with a uniform velocity v .

(ii) What happens to the kinetic energy of a body if its velocity is halved?

(iii) A force acting on a 10 kg mass changes its velocity from 54km/h to 90km/h. Calculate the work done by the force

Ans. (i) The energy possessed by an object due to its motion is called as kinetic Energy.

Derivation:

Let us consider an object of mass " m " which is at rest on smooth horizontal plane.

Let a Force, F acts on the object and let the object from rest moves from point A to point B and covers a displacement S.

The WORK Done by Force on the object is :

Work done = Force x displacement. $\Rightarrow W = F \times S$ _____(i).

From third equation of motion;

$$V^2 - U^2 = 2aS \Rightarrow S = \frac{V^2 - U^2}{2a} \text{ _____(ii)}$$

By Newton's second law of motion: F= ma

From equation (i) and (ii)

$$W = m \times a \times \frac{V^2 - U^2}{2a}$$

As we have assumed object is at rest, u = 0 then, $W = m \times \frac{V^2}{2}$

The Work Done appears as kinetic energy of the body. Therefore, K.E = $\frac{1}{2}mv^2$

(ii) as we know that $\frac{KE_1}{KE_2} = \frac{\frac{1}{2}m_1v_1^2}{\frac{1}{2}m_2v_2^2} = \frac{v^2}{(\frac{v}{2})^2} = \frac{4v^2}{v^2} = \frac{4}{1}$

Hence , the new kinetic energy must be $\frac{1}{4}$ th of the previous kinetic energy.

(iii) Final velocity= V = 90 x 5/18=25 m/ sec initial velocity= u =54x 5/18=15m/s

$$\text{Work done} = \frac{1}{2m(v^2 - u^2)} = \frac{1}{2} \times 10 \times \{(25)^2 - (15)^2\} = 5 \times 400 = 2000j$$

Section-B

Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question

22. State the method by which we can prepare colloid of starch.

Ans. Dissolve 2-3 gram of starch in 50ml of water. Add this paste into 150ml of boiling water with constant stirring. Boil the solution for a few minute and filter it once it cools to room temperature. The filtrate obtain is a colloidal solution of starch.

23. While doing an experiment to determine the boiling point of water, a student heated water in a beaker and observed that when water starts boiling the temperature remains constant. State reason. Where does the heat energy go?

OR, In an experiment to determine the boiling point of water, mention two important precautions to be taken.

Ans. The heat being supplied to water gets used up in breaking up the intermolecular forces of attraction, so it gets converted into gaseous state.

OR, (i) The bulb of thermometer should not touch the sides of beaker.

(ii) Pieces of pumice stone are added to water before heating to avoid bumping of liquid during the temperature increase.

24. Classify the following elements as macro or micro nutrients in plants. (i) Nitrogen (ii) Zinc (iii) Copper (iv) Potassium

Ans. Micronutrients= N and K Micronutrients=Zn and Cu

25. An object weighing 10 N in air, weighs 8 N in a liquid A and 9 N in liquid B. In which liquid the buoyant force experienced by the liquid is more and why?

Ans. In liquid A because its weight loss is more in liquid A and weight loss of the body is equal to upthrust acting on it by liquid.

26. While conducting the experiment to measure the weight of water displaced by the body precaution should be taken to immerse the solid in water without touching the walls or bottom of the container.

Why?

Ans. The buoyant force should act on the body from all directions. If it is touching the walls, the observation will be wrong.

27. (a) How are bird modified to reduce weight for flying? (b) Which part of body is modified for flight?

Ans.(i) Streamlined body shape and hollow bones of bird help them to reduce weight for flying. (ii)Forelimbs are modified into wings for flight.