

SCIENCE WORKSHEET (December 2022)

Class IX

PHYSICS

WORK AND ENERGY

1. Find the energy in kWh consumed in 10 hours by a machine of power 500 W.
2. A lamp consumes 1000 J of electrical energy in 10 s. What is its power?
3. When an arrow is shot from its bow, it has kinetic energy. From where does it get the kinetic energy?
4. Distinguish between work, energy and power. State the SI units for each of these quantities.
5. Illustrate the law of conservation of energy by discussing the energy changes which occur when we draw a pendulum bob to one side and allow it to oscillate. Why does the bob eventually come to rest? What happens to its energy eventually? Is it a violation of the law of conservation of energy?
- 6 a) Derive an expression for kinetic energy of a body having mass m and moving with a velocity v .
(b) When velocity of a body is increased 5 times, what is the change in its kinetic energy?
(c) Two masses m and $2m$ are dropped from heights h and $2h$. On reaching the ground, which will have greater kinetic energy and why?
- 7(a) State the law of conservation of energy.
(b) What is the work done to increase the velocity of a car from 36 km h^{-1} to 72 km h^{-1} if the mass of the car is 1500 kg.
(c) Where does an oscillating pendulum have maximum PE and KE?
8. Justify giving proper reasoning whether the work done in the following cases is positive or negative :
(a) Work done by a man in lifting a bucket out of a well by means of a rope tied to the bucket.
(b) Work done by gravitational force in the above case.
(c) Work done by friction on a body sliding down an inclined plane.
(d) Work done by an applied force on a body moving on a rough horizontal plane with uniform velocity.
(e) Work done by resistive force of air on a vibrating pendulum in bringing it to rest.
9. Define Positive, negative and zero work with an example.
10. What is the work done by a coolie walking on a horizontal platform with a load on his head?

SOUND

1. What are mechanical waves?
2. Where is the density of air higher—at compressions or at rarefactions?
3. On what factor does the pitch of a sound depend?
4. What is intensity of sound?
5. Draw a graph for a wave representing wave disturbance and time for a sound changing from low pitch to high pitch, keeping the amplitude of the sound same.
6. What are longitudinal waves? Give two examples.
7. What are transverse waves? Give two examples.
8. Prove that $v = v\lambda$, where the symbols have their usual meanings.
9. Which wave characteristics determine the (a) loudness (b) pitch of sound? Draw two different waveforms and mark these characteristics on it.
10. In a ripple tank, 12 full ripples are produced in one second. If the distance between a crest and next trough is 10 cm, find
(a) wavelength,
(b) frequency and
(c) velocity of the wave.
11. The wavelength of waves produced on the surface of water is 20 cm. If the wave velocity is 24 ms^{-1} , calculate (a) the number of waves produced in one second (b) the time required to produce one wave.

CHEMISTRY

ATOMS AND MOLECULES

Q 1. Calculate the formula unit mass of Na_2SO_4

Q 2. What is meant by the term chemical formula? Write the chemical formula of calcium oxide.

Q 3. If the law of constant proportion is true, what weights of these elements will be present in 1.5 g of another sample of calcium carbonate?

Q 4. An element has valency 3. Write the formula of its oxide.

Q 5. Write the chemical formulae of the following:

(a) Magnesium sulphate

(b) Calcium oxide

(c) Sodium sulphide

(d) Aluminium phosphate

(e) Potassium chloride

(f) Calcium carbonate.

Q 6. A compound XH is formed by the combination of an element X with hydrogen. Find the valency of the element. State the formula of the compound formed by the combination of-

(a) X with nitrogen

(b) X with oxygen.

Q 7. Write the formula and names of the compounds formed by the following ions.

(a) Potassium ion and iodide ion.

(b) Sodium ion and sulphide ion.

(c) Aluminium ion and phosphate ion.

Q 8. Calculate formula unit mass of $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$.

Q 9. What is the percentage composition of the elements in ammonia, NH_3 ?

Q 10. The valency of an element Z is 3. Write the formula of its oxide.

Q 11. Write Law of Constant Proportion and Law of conservation of mass.

Q 12. Give difference between 2H and H_2 .

Q 13. Give two examples of triatomic molecules.

Q 14. Give the chemical name, chemical formulae for the following: Washing soda, blue vitriol, baking soda, green vitriol, oil of vitriol, soda ash, marble chips and lime water.

Q 15. Give one example each of (i) Monovalent cation (ii) Bivalent cation (iii) Monovalent anion (iv) Bivalent anion.

Q 16. An element ${}_{12}\text{X}^{24}$ loses two electrons to form a cation which combines with the anion of element ${}_{17}\text{Y}^{35}$ formed by gaining an electron.

(a) Write the electronic configuration of element X .

(b) Write the electronic configuration of the anion of element Y .

(c) Write the formula for the compound formed by combination of X and Y .

Q 17. What is the mass percentage of different elements in calcium carbonate?

Q 18. Calculate the number of electrons in Ca^{2+} ion?

Q 19. Calculate the atomicity of Na_2SO_4 ?

Q 20. What are polyatomic ions? Write formula with any polyatomic ion.

BIOLOGY

Plant Tissue

Q1 FILL IN THE BLANKS.

(a) _____ and _____ are forms of complex tissue.

(b) _____ have guard cells.

(c) cells of cork contain a chemical called _____

(d) Husk of coconut is made of _____ tissue.

- (e) _____ gives flexibility in plants.
- (f) _____ and _____ are both conducting tissues.
- (g) Xylem transports _____ and _____ from soil.
- (h) Phloem transport from _____ and _____ to other parts of the plant.

Q2 ASSERTION REASON

Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

- (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) If Assertion is true but Reason is false.
- (d) If both Assertion and Reason are false.

1.Assertion: Apical and intercalary meristems contribute to the growth in length, while the lateral meristems cause increase in girth in maize.

Reason: Apical and intercalary meristems always increase the height of plants.

2.Assertion: Collenchyma forms the hypodermis of dicotyledon stems.

Reason : This is the reason for flexibility of dicotyledonous stems.

3.Assertion : Aerenchyma help in buoyancy to hydrophyte plants.

Reason : The large air chambers are present in aerenchyma.

4.Assertion: A simple tissue is made of only one type of cells.

Reason: Various simple tissues in plants are parenchyma, collenchyma and sclerenchyma.

5.Assertion: Higher plants have meristematic regions for indefinite growth.

Reason: Higher plants have root and shoot apices.

Q3 NAME THE FOLLOWING /GIVE ONE WORD FOR THE FOLLOWING:

- a) Name the dead part of phloem.
- b) Name the tissue that helps the leaves of lotus plant to float on water.
- c) Name any two types of simple permanent plant tissues.
- d) In which of the simple plant tissue, deposition of lignin is found?
- e) Name the meristem that is present at growing tips of stems and roots?
- f) Name the tissue which replaces the epidermal tissue in older stem and is rich in suberin.
- g) Name the permanent tissue that give flexibility to the plants .

Q4 DIFFERENTIATE BETWEEN THE FOLLOWING IN ATLEAST 2 POINTS :

- a) Differentiate between chlorenchyma and aerenchyma.
- b) Differentiate between meristematic and permanent tissues in plants.
- c) Differentiate between Xylem and phloem
- d) Differentiate diagrammatically between xylem vessel and xylem Tracheids.

Q5 GIVE REASON FOR THE FOLLOWING STATEMENTS :

- a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.
- b) We get a crunchy and granular feeling, when we chew pear fruit.
- c) Branches of a tree move and bend freely in high wind velocity.
- d) It is difficult to pull out the husk of a coconut tree.
- e) What is the role of large air cavities in the leaves of such plants?
- f) Intercellular spaces are absent in sclerenchymatous tissues.

Q6 EXPLAIN THE SIGNIFICANCE OF THE FOLLOWING:

- a) Hair-like structures on epidermal cells.
- b) Epidermis has thick waxy coating of Cutin in desert plants.
- c) Small pores in epidermis of leaf.
- d) Numerous layers of epidermis in cactus.

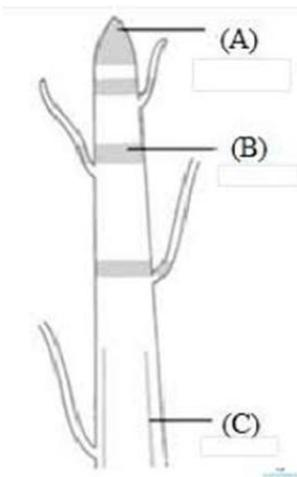
- e) Presence of a chemical suberin in cork cells.

Q7 Answer the given questions (2M)

- a) List any four salient features of meristematic tissue.
- b) Describe the structure and two functions of stomata.
- c) Write the four elements of xylem.
- d) Name the elements of phloem.

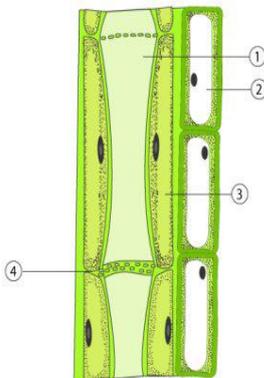
Q8 Answer the given questions (3M)

- a) Write three roles of Epidermis in a plants.
 - b) Draw a well labelled diagram of Parenchyma, Collenchyma and Sclerenchyma.
- OR**
- c) Give location of Parenchyma, Collenchyma and Sclerenchyma.
 - d) Differentiate between Parenchyma , Collenchyma and sclerenchyma tissues on the basis of their function.
 - e) Label A, Band C with their **respective functions**.

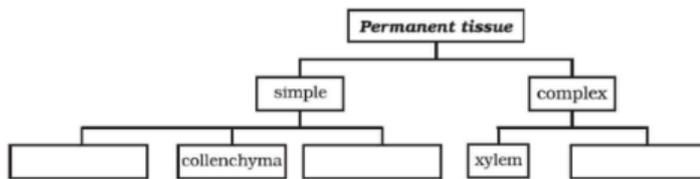


Q9 Answer the given questions (4M)

- a) List the characteristics of cork. How are they formed? Mention their role.
- b) What is the difference between simple permanent tissues and complex permanent tissue.
- c) Why are xylem and phloem called complex tissues? How are they different from one other (4points)?
- d) Name the different components of xylem and draw a living component.
- e) Identify different elements of phloem labelled as 1,2,3 and 4.



- f) Complete the following chart.



Q10 Draw and label :

- Meristematic tissues (location)
- Parenchyma
- Collenchyma
- Sclerenchyma
- Xylem
- Phloem

Animal Tissue

Q1. Differentiate between Ligament and Tendon.

Q2 Write short note on Cartilage.

Q3 Differentiate between Areolar and Adipose tissue.

Q4 Write the function and location of the following tissue:

- a) Stratified squamous epithelium
- b) Ciliated columnar epithelium
- c) Glandular epithelium
- d) Squamous epithelium
- e) Cuboidal epithelium
- f) Areolar tissue
- g) Adipose tissue

Q6 Name the protein present in the muscles which is responsible for movement. Why are skeletal muscles known as striated muscles?

Q7 Name the tissue present under the skin and arranged in a pattern of layers.

Q8 (a) Mention different types of blood cells.

(b) Which substances are transported by blood?

Q9 Name the connective tissue which helps in the repair of tissues. State where this tissue is found. Mention one more function of it.

Q10. Draw diagram of a neuron showing nucleus and cell body/dendrite, axon, nerve endings. Identify the tissue which is made of these cells Name one organ which is made of this tissue.

Q11 (a) In which connective tissue, matrix contains salts of calcium and phosphorus ?

(b) Which connective tissue is present in ear pinna ?

(c) Which connective tissue connects two bones ?

(d) Which connective tissue is found in bone marrow ?

(e) Which smoothens bone surfaces at the joints?

(f) Which carries signals from various parts of the body to brain?

(g) Which tissue gives protection to our body from temperature and external jerks?

(h) Which tissue forms inner lining of alveoli?

(i) Which tissue is found between skin and muscles?

(j) Which tissue connects two bones?

(k) Which epithelium tissue forms lining of kidney tubules?

Q12 What are the two components of blood ? Why is blood considered a type of connective tissue ?

Q13 Compare amongst Striated muscle, Smooth muscle and Cardiac muscle.

Q14 Differentiate between: a) Bone and cartilage b) Ligament and tendon c) Blood and lymph.

d) Areolar and Adipose tissue

Q15 (i) Define tissue. What is utility of tissues in multicellular organisms ?

(ii) Are plants and animals made of same types of tissues? If no, then write the points of differences.

Q16 (a) Uma started walking fast when she noticed that some unknown faces are following her. Name the type of tissues which facilitated the movement of her leg bones in response to the stimulus.

(b) Draw diagram of any of the above mentioned two tissues and label any two parts.