Class: IX (CBSE)   **Total Marks: 80**

Date…………….   **SUBJECT - SCIENCE**   **Time: 3 hrs.**

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General Instructions:

(i)   The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.

(ii)   **SECTION–A** - question no. 1 to 20 - all questions and parts thereof are of one mark each.

These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.

(iii) **SECTION–B** - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.

(iv) **SECTION–C** - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.

(v)   **SECTION–D** – question no. - 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.

(vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION A

1.   Differentiate between speed and velocity.   (1)

2.   Which law of motion gives the measure of force? Write an expression for force.   (1)

3.   Name the principle on which a rocket works.   (1)
       OR
       Why does a boat tend to leave the shore, when passengers are alighting from it?

4.   (1)
       If the small and big stones are dropped from the roof of a house simultaneously, they will reach the ground at the same time. Why?

5.   The distance between two objects is decreased. Will the gravitational force between them increase   (1)
       or decrease ?

6.   What is the SI unit of acceleration due to gravity (g) ?   (1)

              OR

       What is the SI unit of gravitational constant G?

7.   Read the following and answer any **four** questions from 7 (i) to 7 (v)   (4)

Newton's second law of motion pertains to the behavior of objects for which all existing forces are not balanced. The second law states that the acceleration of an object is dependent upon two variables - the net force acting upon the object and the mass of the object. The acceleration of an object depends directly upon the net force acting upon the object, and inversely upon the mass of the object. As the force acting upon an object is increased, the acceleration of the object is increased. As the mass of an object is increased, the acceleration of the object is decreased.

The First Law of Motion indicates that when an unbalanced external force acts on an object, its velocity changes, ie., the object is accelerated. Now, let's study how the acceleration of an object depends on the force applied. Consider the example. A car at rest does not require much attention when parked along a road side. But the moving car, even at a low speed, may kill a person standing in its path. A small mass, such as a bullet may kill a person when fired from a gun. From these examples it is clear that the impact produced by the objects depends on their mass and velocity. When we combine the mass and velocity of an object, we get another quantity called momentum, which was introduced by Newton.
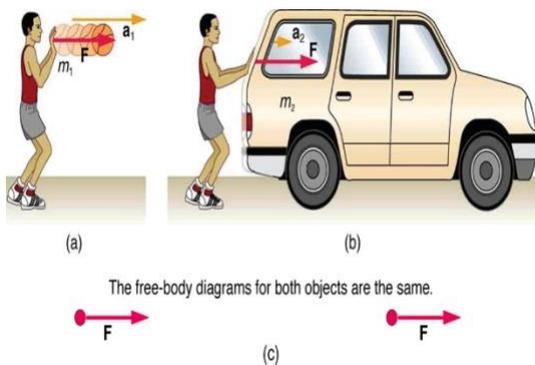
i) Which units can be used to express force?

a. N

b. kg/s2

c. kg • m/s2

d. two of the above

ii) Newton's second law of motion relates an object's acceleration to

a. its mass.

b. its velocity.

c. the net force acting on it.

d. two of the above

iii) An object is accelerating when it

a. speeds up.

b. slows down.

c. changes direction.

d. any of the above

iv) Doubling the net force acting on an object

a. doubles its acceleration.

b. decreases it acceleration.

c. cuts its acceleration in half.

d. does not affect its acceleration.

v) If you push a 20-kilogram mass with a force of 40 N, what will be the object's acceleration?

a. 40 m/s^2

b. 20 m/s^2

c. 10 m/s^2

d. 2 m/s

(4)

8. Read the following and answer any **four** questions from 8 (i) to 8 (v)

Energy is conserved. What does this really mean, and why is it true?

Water in a reservoir is more or less conserved. So the amount of water can always be calculated from the amount that was there some time ago, plus the amount that has come in, minus the amount that has gone out (you may have to take account of evaporation as well as water drawn off).

Energy is similar. If you take any volume of space, then the total energy inside that volume at a given time is always the amount that was there earlier, plus the total amount that has come in through the surface, minus the total amount that has gone out through the surface. The swinging pendulum can either possess the kinetic energy or potential energy. When the bob is at position B it possesses only the potential energy and not the kinetic energy. When it moves towards the point A its potential energy goes on decreasing. And kinetic energy goes on increasing.

When it reaches at point A it possesses only kinetic energy.

When it again tends to move towards the point C kinetic energy starts getting converted to potential energy.

Thus at extreme positions B and C, the potential energy is maximum. While at mean position kinetic energy is maximum.

Thus the total energy at every instant of a time is constant. This proves the law of conservation of energy.

Conservation of Energy
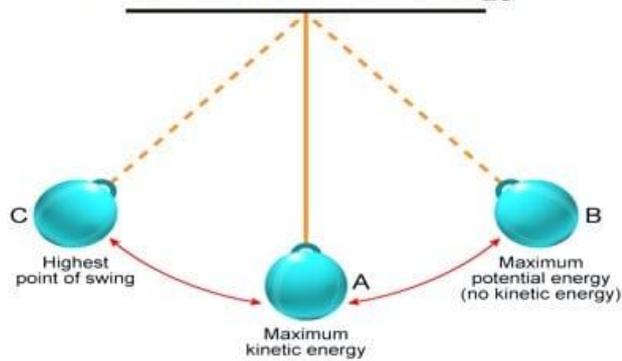
The law of conservation of energy is a law of science that states that energy cannot be created or destroyed, but only changed from one form into another or transferred from one object to another.

i) The energy stored in wound watch spring is

a) K.E

b) P.E

c) Heat Energy

d) Chemical Energy

ii) If the stone is thrown up vertically and return to the ground, its potential energy is maximum

a) During the upward journey

b) At the maximum height

c) During the return journey

d) At the bottom

iii) The potential energy of a simple pendulum will be maximum when it is-

a)At the turning point of oscillation

b)At equilibrium

c)In between above two cases

d)Any time

iv) SI unit Of energy

a) Joules

b) Newton

c)m/s

d)metre

v) Kinetic energy of the bob of a simple pendulum is maximum

a) at the mean position

b) at the extreme left position

c) at the extreme right position

d) none of these

9. The nucleons are   (1)
    a. Protons and electrons
    b. Neutrons and electrons
    c. Protons and electrons
    d. Protons and neutrons

10. Name the isotope of hydrogen having no neutron.   (1)
    a. Proton
    b. Protium
    c. Deuterium
    d. Tritium

11. The electrons present in the outermost shell are called   (1)
    a. Valence electron
    b. Valency electron
    c. Duplet electrons
    d. Octet electrons

12. The isotope used in the treatment of cancer   (1)
    a. CO-60
    b. C-14
    c. Co-60
    d. U-235

13. Water is formed from hydrogen and oxygen.   (4)
    a. What is the correct chemical formula of water?
    b. What is the ratio by mass of hydrogen and oxygen in water?
    c. Why is water considered as compound?
    d. What is the gaseous form of water?

14. Plasma membrane is called a selectively permeable membrane. Justify (1)

15. What are genes? Where are they located?

    OR (1)

    Why is nuclear region in prokaryotes poorly defined?

16. A person suffering from HIV-AIDS cannot fight even minor infections. Why? (1)

    OR

    Who discovered vaccine for the first time? Name two diseases which can be prevented by using vaccines.

17. A person met with an accident in which two long bones of the hand were dislocated. What could be the reason? (1)

    For question number 18 and 19, two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

    a) Both A and R are true, and R is correct explanation of the assertion.
    b) Both A and R are true, but R is not the correct explanation of the assertion.
    c) A is true, but R is false.
    d) A is false, but R is true.

18. **ASSERTION (A):** Viruses lack any membranes (1)
    REASON (R): Viruses do not show characteristics of life until they enter a living body and use its cell machinery to multiply.
    OR
    ASSERTION (A): Mitochondria are strange organelles
    REASON (R): The energy required for various chemical activities needed for life is released by mitochondria in the form of ATP (Adenosine triphopshate) molecules.

19. **ASSERTION (A):** *Salmonella typhi*, causes peptic ulcers (1)
    REASON (R): Patients could be cured of peptic ulcer only when the bacteria were killed off from the stomach.

20. **Read the following and answer any four questions from 20 (i) to 20 (v)** (4)
    A group of cells that are similar in structure and/or work together to achieve a particular function forms a tissue. The growth in plants is limited to certain regions, while this is not so in animals. There are some tissues in plants that divide throughout their life. Cell growth in animals is more uniform.
    I) Select the correct statement regarding meristematic tissues?
    a. They are found at specific locations in the animal body
    b. They have cells with thick secondary walls
    c. They perform the function of growth and division
    d. Both a and c

II) Match column 1 with column 2 and select the correct option from the given codes.

Column 1	Column 2
A. Food storage	i. Phloem
B. Food conduction	ii. Xylem
C. Mechanical strength	iii. Parenchyma
D. Water conduction	iv. Sclerenchyma

III) Which of the following statement is correct about the cell shown in the figure?
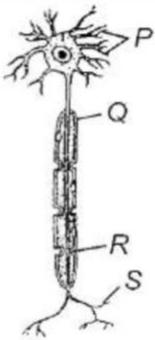
a. Cells of this tissue are highly specialised for being stimulated and then transmitting the stimulus very rapidly
b. It consists of a cell body with a nucleus and cytoplasm, from which long thin hair-like parts arise
c. Each of this tissue has a single long part, called the dendrite, and many short, branched parts called axons.
d. P receives nerve impulse from Q and conveys it to other cells

IV) The tissue shown here is:
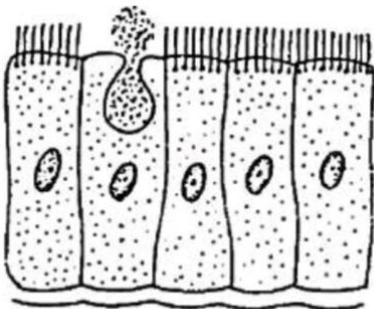
a. Simple squamous epithelial tissue
b. Striated muscle tissue
c. Areolar tissue
d. Ciliated columnar tissue

V) Which of the following is incorrectly matched?

i.	Adipose tissue	Fat storage
ii.	Stratified epithelium	Skin
iii.	Areolar tissue	Packaging tissue
iv.	Squamous epithelium	Kidney tubules
v.	Cardiac muscle	Branched and multinucleate
vi.	Striated muscle	Unbranched and uninucleate

a. v and vi only
b. ii, iv and vi only
c. iii and iv only
d. iii and v only

SECTION B

21. i)Identify the type of motion in the following graph . (2)
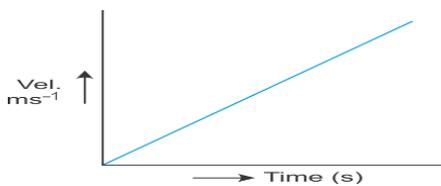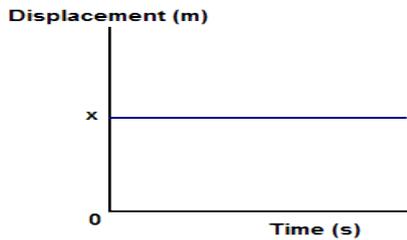
ii)What does the area under a velocity time graph represent?

22. i)Define kinetic energy with example.

ii)What is the Kinetic Energy of a 150 kg object that is moving with a speed of 15 m/s? (2)

23. What kind of mixture is solution? Name the different constituents of a solution. (2)

24. What are ions? Write the symbol of sodium ion and chlorine ion? (2)

25. a. Write two points of difference between rough endoplasmic reticulum and smooth endoplasmic reticulum.   (2)
     b. What is membrane biogenesis?

     OR

     Draw a diagram of an animal cell and label at least six organelles in it.

26. a. Identify the plant tissue shown below.   (2)
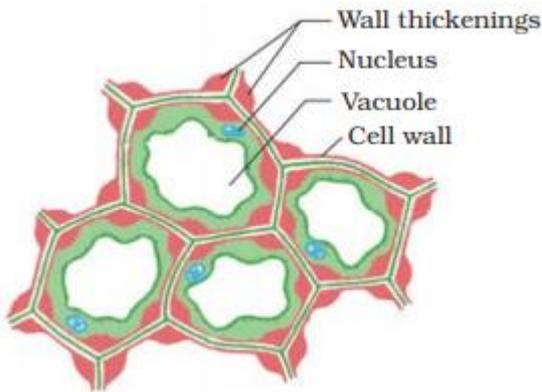
     b. What is its function?

SECTION C

27. i)Differentiate between mass and weight.   (3)

     ii)Determine the gravitational force if the mass of two bodies are 80 kg and 1200 kg and they are separated by a distance of 10m.($G = 6.67 \times 10^{-11}$ N m^2/kg^2.)

28. Write the correct symbol and charge of electron, proton and neutron?   (3)

29. Calculate the formula mass unit of   (3)
     i)NH_3
     ii)H_2SO_4
     iii)$CaCl_2$ (atomic mass of N=14, Cl=35.5, S=32, Ca=40, O=16)

30. (a) Identify the solute and solvent in tincture of iodine'   (3)
     (b) Name the technique to separate
        (i) Butter from curd
        (ii) Salt and sea water
        (iii) Camphor from salt

31. a. Aquatic plants have the ability to float rather than being submerged in water. How?   (3)
     b. List the different elements of xylem.
     c. Why do plants living in dry habitats have thicker epidermis?

     OR

     a. Why are voluntary muscles called striated muscles?
     b. Which type of muscles are found in the iris of eye, ureters and in the bronchi of the lungs
     c. In which part of the body cuboidal epithelium is found? What is its function?

32. In brief state explain what happens when:
    a. Dry apricots are left for some time in pure water and later transferred to sugar solution.
    b. Golgi apparatus is removed from cell (3)
    c. The plasma membrane of a cell breaks down

33. a. State two conditions essential for good health. (3)

    b. What is the principle of immunization?

SECTION D

34. i)Differentiate between uniform and non-uniform motion (5)
    ii)Derive velocity time relation graphically.
    iii)A body starts from rest accelerate to a velocity of 20 m/s in a time of 10 s. Determine the acceleration of the boy.

    OR

    i)Derive an expression for kinetic energy of an object.
    ii) If the velocity of an object is doubled. What will be change in its kinetic energy?

35. (a) Differentiate between isotope and isobar. Give one example of each (5)

    (b) Write any three important application of isotopes?

    OR

    From the symbol $_{18}^{40}Ar$, Write down the
    (i) Electrons, protons and neutrons
    (ii) Valence electrons and valency
    (iii) Electronic configuration
    (iv) Atomic number, Mass number and
    (v) Draw the structure of Argon.

36. Explain with examples the different means by which infectious diseases can spread? (5)

-END-