BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
MID TERM EXAMINATION 2024-25
SCIENCE (086)
MARKING SCHEME

Class: IX   **Duration: 3 Hrs.**
DATE: 25.09.24   **Max. Marks: 80**

Section–A

1. (c) Osmosis	1
2. (d) Endoplasmic reticulum	1
3. (d) They are actively dividing cells.	1
4. (b) Sclerenchyma	1
5. (b) cardiac muscle	1
6. (c)High compressibility	1
7. (b) remains same	1
8. (d) sublimation	1
9. (b) Malleability	1
10. (c) Mercury, bromine	1
11. (b) It is permanent and Irreversible	1
12. (c) Digesting food	1
13. (a) 40 km/h	1
14. (c) Nm2/kg2	1
15. (b) Inertia of motion	1
16. (d) mv	1

Assertion and Reason Questions:

17. (a) Both assertion and reason are true and reason is the correct explanation of assertion.	1
18. (a) Both assertion and reason are true and reason is the correct explanation of assertion.	1
19. (c) Assertion is true but reason is false.	1
20. (c) Assertion is true but reason is false.	1

Section–B

21. Mitosis is the cell division is required for growth and repair of body and Meiosis is involved in formation of gametes. Mitosis- two daughter cells formed/Equational division. In Meiosis- four daughter cells formed/ Reductional division.   1+1
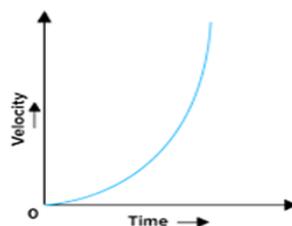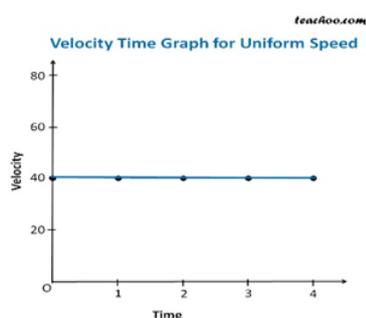
22. a) Collenchyma
   b) Elongated and irregularly thickened at the corners.
   c) Flexibility/mechanical support
   d) leaf/stem   ½ x 4=2

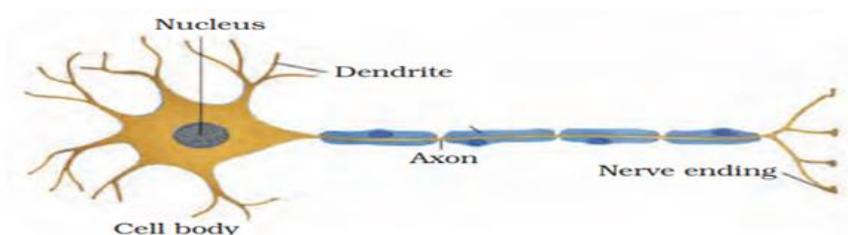23. Average speed = Total distance / Total Time. SI unit is m/sec   1+1

24.   1+1

Velocity Time Graph for Uniform Speed

25. (a) 54° C =273+ 54

$= 327$ K   1

   (b) 197° C =273+ 197
         $= 470$ K   1

26. Neuron

          1+1=2

OR

Identify the type of tissue in the following organs: ½ x4=2
   a)   Skin has Stratified squamous epithelial tissue.
   b) Vascular bundles have Xylem and Phloem tissues.
   c)   Bone : bone has skeletal connective tissue.
   d) Kidneys have cuboidal epithelial tissue.

Section– C

27.

Given : Mass of engine M = 8000 kg

Mass of each wagon m = 2000 kg

Frictional force acting in backward direction f = 5000 N

(a) : The net force acting on the train $F' = F - f = 40000 - 5000 = 35000$ N

(b) : Let the acceleration of the train be a

$\therefore F' = (5m + M)a$

$35000 = (5 \times 2000 + 8000)a \Rightarrow a = 1.944 \, ms^{-2}$

1+2=3

28.

Distance = Speed x Time

1) When it's average speed is 20 km/hr

$x = v_1 \times t_1 = 20 \times t_1$

2) When it's average speed is 30 km/hr

$x = v_2 \times t_2 = 30 \times t_2$

$V_{average} = \dfrac{\text{total distance travelled}}{\text{total time taken}}$

$V_{average} = \dfrac{x + x}{\frac{x}{v_1} + \frac{x}{v_2}} = \dfrac{2x}{\frac{x}{20} + \frac{x}{30}} = 24 \, km \, h^{-1}$

1+2=3

29.

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.
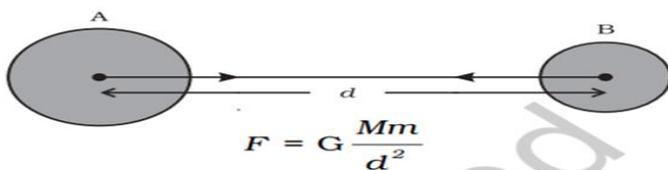

$$F = G \frac{Mm}{d^2}$$

Fig. 9.2: The gravitational force between two uniform objects is directed along the line joining their centres.

$$F \propto M \times m \qquad (9.1)$$

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

$$F \propto \frac{1}{d^2} \qquad (9.2)$$

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

$$F \propto \frac{M \times m}{d^2} \qquad (9.3)$$

or, $\quad F = G \dfrac{M \times m}{d^2} \qquad (9.4)$

1+2=3

30. a) Vacuoles store amino acids, sugars, various organic acids and some proteins.   1

  b) Lysosomes contain powerful digestive enzymes capable of breaking down all organic material.   1

  c) Transpiration: loss of water   1

31.

Striated muscle	Unstriated muscle	cardiac muscle
The cells of this tissue are long, cylindrical, unbranched and multinucleate (having many nuclei).	The cells are long with pointed ends (spindle-shaped) and uninucleate (having a single nucleus)	Heart muscle cells are cylindrical, branched and uninucleate.
bones	Alimentary canal/blood vessels	Heart

1+1+1=3

32. (a) nitrogen < water < sugar   1

  (b) i) Water is a liquid at room temperature (27°C) because it has a melting point of 0°C, which is below room temperature, and a boiling point of 100°C, which is above room temperature

  ii) Yes, an iron almirah is a solid at room temperature because it has the properties of a solid, like a definite shape and volume, and is rigid.   2

33. (a)the amount of solute that has dissolved in a given amount of solvent or solution.   1

  (b) Mass of sugar(solute)=20g

→Mass of solvent(water)=220g

To find:-

→Concentration of solution (mass/mass %)

Solution:-

Here,we can see that the mass of solute and solvent is given. So,firstly let us find the total mass of the solution. It can be calculated as follows:-

Mass of solution:-

=Mass of solute+Mass of solvent

=(20+220)g

=240g   20/240X 100 =8.333%\   2

<div align="center">OR</div>

A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium. A suspension is a heterogeneous mixture. The size of solute particles in a suspension is quite large. The particles of a suspension can be seen easily. The particles of a suspension do not pass through a filter paper. So a suspension can be separated by filtration.   3

Section– D

34. a) RBC,WBC, Plasma and platelets.   1
   b) Bone cells are embedded in a hard matrix that is composed of calcium and phosphorus compounds. Function: It forms the framework that supports the body
   Cartilage: The solid matrix is composed of proteins and sugars. Function: Cartilage smoothens bone surfaces at joints.   2
   c) Adipose tissue is found below the skin. It acts as an insulator.   2

<div align="center">OR</div>

   a) The outer layer of our skin (the epidermis) is made of stratified squamous epithelial cells. Protection against microorganisms from invading underlying tissue and protection against water loss.   1
   b)   Simple cuboidal epithelium: This type of epithelium is typically found in glandular (secreting) tissue and kidney tubules. This type of epithelium is specialized often for absorption and usually has apical cilia or microvilli.   2
   c)   Tendons are dense, white, fibrous connective tissues that connect muscles to bones Areolar tissue is tough connective tissue but flexible, and surrounds blood vessels, nerve bundles, muscles, and organs.   2

35. (a) 2

Type	Dispersed phase	Dispersing medium
i) Gel	Liquid	Solid
ii) Milk of magnesia	Solid	Liquid

(b) Alloys are defined as homogeneous mixtures of two or more metals or a metal and a non-metal in specific proportions. Brass is an alloy of copper and zinc 2

(c) Tincture of iodine is a mixture of two materials iodine and alcohol. 1

OR

(a) *In a physical change, no new substance is formed.
*A chemical change is always accompanied by one or more new substance(s).
* Physical change is easily reversible i.e original substance can be recovered.

*Chemical changes are irreversible i.e. original substance cannot be recovered. 3

(b) There are two main types of mixtures: homogeneous and heterogeneous.
Homogeneous mixtures

Have a uniform composition and phase throughout, no matter where you sample them. For example, salt and water is a homogeneous mixture because the taste of the water is the same no matter where you take a sip. Another example is air, which is a mixture of gases like nitrogen, oxygen, and carbon dioxide.

Heterogeneous mixtures

Do not have a uniform composition. For example, a mixture of soil and sand, oil and water, or sulfur and iron filings are all heterogeneous mixtures. In a heterogeneous mixture like oil and water, the liquids form separate layers in the container because oil is denser than water. 2

36. (i)To every action ,there is an equal and opposite reaction. Bouncing a ball: when a ball hits the ground, the ball applies an action force on the ground. The ground applies a reaction force and the ball bounces back. Flight motion of a bird: the wings of the bird push air downwards as action force, and the air pushes the bird upwards as reaction force. 3

(ii). For every action (force) in nature there is an equal and opposite reaction. If object A exerts a force on object B, object B also exerts an equal and opposite force on object A. In other words, forces result from interactions 2

OR

(i) The second law of motion states that the rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of force. Player lowers his hands while catching the ball. Karate player breaking tiles. 3

(ii) Suppose an object of mass m is moving along a straight line with an initial velocity, u. It is uniformly accelerated to velocity, v in time, t by the application of a constant force, F throughout the time, t. The initial and final momentum of the object will be, p1 = mu and p2 = mv respectively.

The change in momentum $\propto$ p2 − p1 $\propto$ mv − mu $\propto$ m × (v − u).

The rate of change of momentum $\propto$ m (v− u)/t Or, the applied force, F $\propto$ m(v − u) /t = km (v− u)/ t

F = kma Here a [= (v − u)/t] is the acceleration, which is the rate of change of velocity. The quantity k is a constant of proportionality. The SI units of mass and acceleration are kg and m s^{-2} respectively. The unit of force is so chosen that the value of the constant, k becomes one. For this, one unit of force is defined as the amount that produces an acceleration of 1 m s^{-2} in an object of 1 kg mass.   2

Section–E

37. (a) DNA-Deoxy ribonucleic acid.   1
    (b) Gene- Functional segment of DNA.   1
    (c) Robert Brown. Protein and DNA   2

OR
    (c) Prokaryotic –No membrane bound organelles. Eukaryotic cell-membrane bound
        organelles.   2

38. (a) 3(A, B, D)   1
     (b) Evaporation   1
     (c) D -As speed of wind increases the rate of evaporation   2
                                          OR
     (c) Beaker C will show no change as there is no connectivity with surrounding air as it is
          covered.   2

39. (a) Mass remains the same i.e 45 kg   1
     (b)Mass is the measure of the amount of matter in a body. Weight is the measure of the mount
         of force acting on a mass due to the acceleration due to gravity.   1
     (c) Weight, W = m x g = 10 x 9.8 =98 N   2
                              OR
     (c) w_m = ⅙ x w_e 2

        w_m = ⅙ x 10 = 1.67 N

BEST 0F LUCK