Indian School Al Wadi Al Kabir

Final Examination (2025-2026)

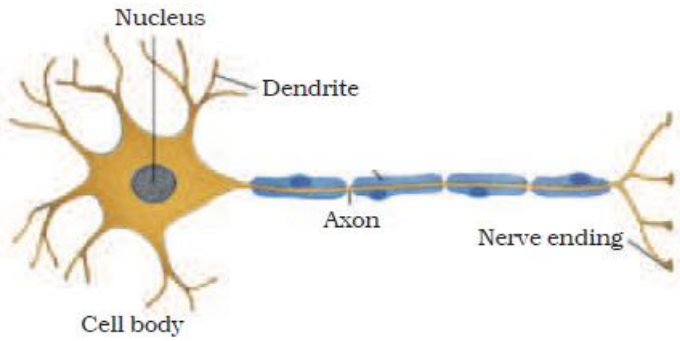
Marking scheme

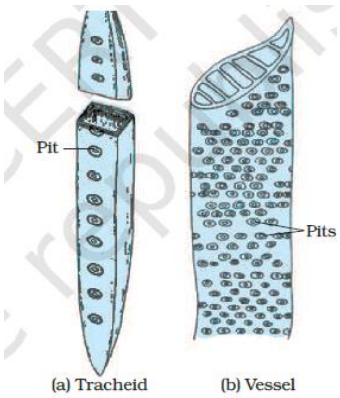
Class: IX | Subject: SCIENCE (086) | Max. marks: 80

Date:24/02/2026 | Set- I | Time: 3 hours

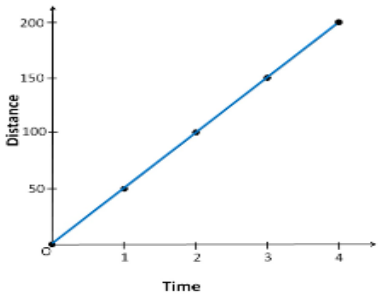
	Section – A	MARKS
1	A. it is flexible.	1
2	A. Movement of water molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane.	1
3	D. Developing varieties adaptable to different climatic conditions.	1
4	B. epithelium arranged in many layers	1
5	C. *Apis mellifera* – Higher honey yield and better breeding capacity	1
6	B. Columnar epithelium	1
7	A. Tissue (I)	1
8	A. Both A and R are true, and R is the correct explanation of A.	1
9	C. A is true, but R is false.	1
10	i) Antonie van Leeuwenhoek-First to observe and describe living cells and microorganisms (such as bacteria and protozoa) using a simple microscope. ii) Purkinje coined the term "protoplasm" for the living substance of the cell.	2
11	**Students to attempt either option A or B.** A. (i) Inter-cropping is growing two or more crops simultaneously on the same field in a definite pattern. A few rows of one crop alternate with a few rows of a second crop, for example, soybean + maize, or finger millet (bajra) + cowpea (lobia). (ii) The crops are selected such that their nutrient requirements are different. This ensures maximum utilisation of the nutrients supplied, and also prevents pests and diseases from spreading to all the plants belonging to one crop in a field. This way, both crops can give better returns. **OR** B. The composite fish culture system is a method of intensive fish farming in which 5–6 compatible fish species having different feeding habits and living zones are reared together in the same pond. This ensures maximum utilization of all natural food resources of the pond without competition. Catlas are	2

	surface feeders, Rohus feed in the middle-zone of the pond, Mrigals and Common Carps are bottom feeders, and Grass Carps feed on the weeds.	
12	(i). The epidermis is important because it gives protection against water loss. Epidermal cells present on the aerial parts of the plant often secrete a waxy, water-resistant layer on their outer surface. This provides protection against loss of water, mechanical injury, and invasion by parasitic fungi. (ii) Water doesn't stick to the leaves because there is a waxy coating layer on the surface of the leaf.	2
13	(i) Gases → diffusion, Water → osmosis Diffusion – Gases (O_2, CO_2) move down their concentration gradient directly or through pores in the membrane. Osmosis – Water moves from a region of higher water potential to lower water potential through a semipermeable membrane (ii) The type of cell division is meiosis. It occurs in the reproductive organs tissues in animals and plants divide to form gametes	3
14	(i)1. The shelter should be ventilated 2. The shelter should be sloped at the edge so that the leakage problem into the shed will be avoided. 3. Hygienic management of animals and animal products. (ii)After giving birth to a calf, the period of time during which the mother lactates through its mammary glands to feed their young ones is called the lactation period. Jersey cows and Brown Swiss cows (iii)Broilers are raised for fast meat production and require protein-rich feed. Layers are raised for egg production and require balanced feed with high calcium.	3
15	<u>Attempt either subpart A or B.</u> A. Organic farming is a farming system with minimal or no use of chemicals as fertilizers, herbicides, pesticides, etc., and with a maximum input of organic manures, recycled farm-wastes (straw and livestock excreta), use of bio-agents such as culture of blue green algae in preparation of biofertilizers, neem leaves or turmeric specifically in grain storage as bio-pesticides, with healthy cropping systems. These cropping systems are beneficial in insect, pest and wheat control, besides providing nutrients **OR** B. vermicompost Sometimes, organic substances are decomposed by earthworms and are converted into humus. This is called vermicompost green manure	4

	The growing of green manure cover crops provides additional nutrients and organic matter to the soil. When incorporated into the soil, these plants break down, releasing important nutrients, such as nitrogen, that are necessary for adequate plant growth. It also increases soil drainage and water retention capabilities. NITROGEN AND PHOSPHORUS C. Loss of soil fertility: Excessive chemical fertilisers can alter the nutrient balance, reducing the natural fertility of the soil. Soil pollution: Pesticides and chemicals can accumulate, leading to toxic soils that harm microorganisms. (ANY ONE) D. Hybridization Definition: Hybridisation is the process of crossing two genetically dissimilar plants to combine desirable traits from both parents into the offspring	
16	**<u>Attempt either option A or B.</u>** A. (i) Tissue responsible: Aerenchyma (a specialised parenchyma tissue). Characters of Aerenchyma: any one 1. Cells are loosely packed with large intercellular spaces. 2. Helps in buoyancy, allowing aquatic plants like Lotus to float. 3. Facilitates gaseous exchange in submerged parts of the plant. 4. Cells are usually thin-walled and parenchymatous. (ii) Sclerenchyma → support and hardness due to lignin deposition. Made up of dead cells with thick, lignified walls. Cells are usually elongated (fibres) or stone cells (sclereids). Intercellular spaces are minimal; cells are tightly packed.  (iii) **OR** B. (i)) As plants grow older, the outer protective tissue undergoes certain changes. A strip of secondary meristem located in the cortex forms layers of cells which constitute the cork. Cells of cork are dead and compactly	5

	arranged without intercellular spaces. They also have a substance called suberin in their walls that makes them impervious to gases and water.  (ii) Tracheids and vessels have thick walls, and many are dead cells when mature. Tracheids and vessels are tubular structures. This allows them to transport water and minerals vertically. (iii) Fat-storing adipose tissue is found below the skin and between internal organs. The cells of this tissue are filled with fat globules. Storage of fats also lets it act as an insulator.	
	Section – B	
17	D. Its rate decreases with a decrease in humidity.	1
18	B. Metalloid and non-metal, respectively	1
19	D. I and IV	1
20	D. I and III	1
21	A. Na_2S is Sodium sulphide, Na_2SO_3 is Sodium sulphite, and Na_2SO_4 is Sodium sulphate.	1
22	B. II and III	1
23	C. It contains 12 neutrons.	1
24	A. Both A and R are true, and R is the correct explanation of A.	1
25	Definition of melting point. Solid state.	1 1
26	**<u>Attempt either option A or B.</u>** A.(i) 2,8,7 (ii) Valency-1 Valence electrons-7 (iii) Atomic structure of Chlorine. **OR** B. (i) Atoms of different elements with the same mass number but different atomic numbers.	 1 ½ ½ 1 ½ ½

	D and E. (ii) Electrons-7 Neutrons-7 Name- Nitrogen	 ½ ½ 1
27	A. Emulsion is a liquid-liquid colloid. Eg-Milk, face cream etc Gel is a liquid-solid colloid. Eg- Jelly, cheese, butter etc B. Salt solution is a solution in which particles are very small. Milk solution is a colloid. So, particles scatter the beam of light.	1 1 1
28	A. 2,8,5 K, L, M B. Neon Valency-0 Atomic structure of Ne **OR** The atomic numbers are different. Fluoride ion has an atomic number of 9, and neon has an atomic number of 10 (or number of protons). 2,8 is the electronic configuration. C. (a) 2,8,8,2	 ½ ½ ½ ½ 1 1 1
29	**Attempt either option A or B.** A. (a) valency-1 (b) X_3N X_2O (c) Na_2CO_3 NH_4Cl, (d) Formula unit mass of $CaCO_3$ = mass of Ca + mass of C + mass of 3O = 40 u + 12 u + 3 × 16 u = 40 + 12 + 48 = **100 u** **OR** B. (a) A group of atoms carrying a charge. Any eg. (b) Al- 3 valence electrons Al^{3+} -8 valence electrons (c) Definition of amu. (d) Atomic number 12. Mg^{2+}	 1 ½ ½ ½ ½ 2 1 2 1 1

	Section – C	
30	B. 5m	1
31	B. By virtue of their positions, the energy possessed by body A is twice the energy possessed by body B.	1
32	C. A is true, but R is false.	1
33	(i) inertia (ii) inertia of motion(explanation)	2
34	**Attempt either option A or B.** A. (i)Pressure is defined as the thrust (or force) acting per unit area. Mathematically, Pressure = Thrust/Area. Its SI unit is N/m² or pascal (Pa). (1 mark) (ii)The pointed tip has a very small area, so when force is applied, the pressure becomes very large, making it easier to pierce or penetrate surfaces. (1 mark) OR B. (i)When a body is immersed fully or partially in a fluid, it experiences an upward force (buoyant force) that is equal to the weight of the fluid displaced by it. (1 mark) (ii)The density of the material determines whether an object will float or sink in a liquid. Objects of density less than that of a liquid float on the liquid, while objects of density greater than that of a liquid sink in the liquid. (1 mark)	2
35	(i) Uniform motion/ constant velocity (ii) Zero (iii) 	3
36	**(i)** Newton's second law of motion states that the rate of change of momentum of an object is directly proportional to the applied unbalanced force and takes place in the direction in which the force acts. (1 mark)	3

	Initial momentum $p_1 = mu$ Final momentum $P_2 = mv$ Change in momentum = $P_2 - P_1$ $= m_v - m_u$ $= m (v - u)$ According to the second law of motion, force change in momentum $F \propto \frac{\text{change in momentum}}{\text{time}}$ $F \propto \frac{P_2 - P_1}{t}$ $F \propto \frac{m(v-u)}{t}$ $F = \frac{km(v-u)}{t}$ $F = kma$ $F = ma$ (2 marks)	
37	(i) The acceleration due to gravity is the uniform acceleration produced in a freely falling body due to the gravitational pull of the Earth. It is denoted by 'g' and its value on the surface of Earth is 9.8 m/s² (or approximately 10 m/s²).(1 mark) (ii) Answer: Given: • Mass of first object, $m_1 = 100$ kg • Mass of second object, $m_2 = 200$ kg • Distance between them, $r = 1$ m • $G = 6.7 \times 10^{-11}$ N m² kg⁻² (a) Force of gravitation (F): Using $F = G(m_1m_2)/r^2$ $F = (6.7 \times 10^{-11} \times 100 \times 200)/(1)^2$ $F = (6.7 \times 10^{-11} \times 20000)/1$ $F = 134 \times 10^{-8}$ N $F = 1.34 \times 10^{-6}$ N The force of gravitation is 1.34×10^{-6} N. (1 mark) (b) When distance is doubled: New distance, $r' = 2r = 2$ m $F' = G(m_1m_2)/(r')^2$ $F' = G(m_1m_2)/(2r)^2$ $F' = G(m_1m_2)/(4r^2)$ $F' = F/4$ $F' = (1.34 \times 10^{-6})/4$ $F' = 0.335 \times 10^{-6}$ N $= 3.35 \times 10^{-7}$ N The new force of gravitation will be 3.35×10^{-7} N (or F/4). (1 mark)	3
38	A. Ultrasound refers to sound waves with a frequency greater than 20,000 Hz (above the upper limit of the audible range). B. Humans cannot hear ultrasonic waves because their frequency (27,000 Hz) is above the upper limit of human hearing range (20,000 Hz). **Attempt either subpart C or D.** C. (a) Ultrasound has a higher frequency than audible sound, which means higher energy. This high-energy ultrasound can be focused precisely on kidney stones to create intense vibrations needed to break them,	4

	whereas audible sound waves don't have sufficient energy for this purpose. (1.5 marks) (b) No (0.5 mark) **OR** D. Two medical applications of ultrasound: • Echocardiography - to examine the heart (1 mark) Ultrasonography - to monitor fetal development during pregnancy / to detect abnormalities in internal organs (any two) (1 mark)	
39	**<u>Attempt either option A or B.</u>** A. (i)According to the law of conservation of energy, energy can only be converted from one form to another; it can neither be created nor destroyed. The total energy before and after the transformation remains the same. (ii)*Let an object of mass 'm' be initially at rest (u = 0). A constant force F acts on it and displaces it through distance 's', giving it a final velocity 'v'.* *Using the equation of motion:* $v^2 - u^2 = 2as$ *Since u = 0:* $v^2 = 2as$ *Therefore:* $s = v^2/2a$ *Work done by force F = Force × displacement* $W = F \times s = ma \times (v^2/2a) = \frac{1}{2}mv^2$ *Since work done equals kinetic energy gained,* *Kinetic Energy (Ek)* $= \frac{1}{2}mv^2$ *(iii)* Potential energy = mgh Kinetic energy = $\frac{1}{2}mv^2$ **OR** B. (i) One joule (1 J) is the work done when a force of 1 newton displaces an object by 1 metre along the line of action of the force. OR 1 J = 1 N m. (1 mark) (ii) Consider an object of mass 'm' raised through a height 'h' from the ground. The minimum force required to raise the object = Weight of object = mg Displacement of the object = h (in the direction of applied force) Work done on the object against gravity: W = Force × displacement W = mg × h W = mgh This work done is stored as gravitational potential energy. Therefore, Potential Energy (Ep) = mgh (2 marks) (iii) Given: m = 40 kg,	5

	number of steps = 30, height of each step = 20 cm = 0.2 m, time t = 10 s, g = 10 m s^{-2} (a) Total height climbed: h = 30 × 0.2 = 6 m Work done against gravity = mgh W = 40 × 10 × 6 = 2400 J (1 mark) (b) Power developed: Power = Work done/Time taken P = 2400/10 = 240 W (1 mark)	