KOTHARI INTERNATIONAL SCHOOL, NOIDA
ANNUAL EXAMINATION, SESSION: 2024-25
GRADE: 9   SUBJECT: SCIENCE (086)
SET A

DAY & DATE: MONDAY, 17th FEBRUARY' 25
MAXIMUM MARKS: 80   **TIME ALLOTTED: 3 HRS**
**NAME: _____**   **ROLL NO:_ _____**

GENERAL INSTRUCTIONS:
 i.   *This question paper consists of 39 questions in 5 sections.*
 ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
 iii. *Section A consists of 20 objective type questions carrying 1 mark each.*
 iv. *Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.*
 v.   *Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.*
 vi. *Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
 vii. *Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

SECTION – A

Select and write the most appropriate option out of the four options given for each of the questions 1 – 20

1. A student did an activity where he put a drop of ink in water. He noticed that as soon as the drop falls in water, the blue ink spreads throughout. **(1)**
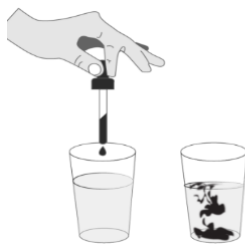
   Why does diffusion happen in liquids?
   (a) because liquids have a fixed volume
   (b) because liquids do not have a fixed shape
   (c) because the particles of liquids can move around
   (d) because the particles of liquids are closely spaced

2. Two chemical species X and Y combine together to form a product P which contains both X and Y **(1)**
   X + Y→ P
   X and Y cannot be broken down into simpler substances by simple chemical reactions.
   Which of the following concerning the species X, Y and P are correct?
   (i) P is a compound
   (ii) X and Y are compound
   (iii) X and Y are elements
   (iv) P has a fixed composition

(a) (i), (ii) and (iii)   (b) (i), (ii) and (iv)

(c) (ii), (iii) and (iv)   (d) (i), (iii) and (iv)

3. The given figure shows an important cell organelle. This organelle is regarded as the: **(1)**

(a) Suicide bag   (b) Powerhouse

(c) Food factory   (d) Storage bag

**4.** The image shows a bacterial cell and an animal cell. **(1)**

Which of the following statements is correct?

(a) Cytoplasmic content of the bacterial cell is not enclosed in a thick cell wall as in case of an animal cell.

(b) Nuclear material of the bacterial cell is not enclosed in a nuclear envelope as in case of an animal cell.

(c) Animal cell contains flagella that aids in locomotion that is absent in case of a bacterial cell.

(d) Animal cell contains ribosomes spread across the cell whereas in case of bacterial cell they are clumped together.

5. 18 gram of water is electrolysed. The weight of oxygen obtained is: **(1)**

(a) 16 g   (b) 8 g   (c) 4 g   (d) 1 g

6. What part of Bohr's model of atomic structure explains why electrons do not crash into the nucleus? **(1)**

(a) Electrons are always repelled by the nucleus

(b) Electrons are much farther from the nucleus

(c) Electrons keep gaining energy while revolving

(d) Electrons revolve in orbits that have specific energy

7. Chemical changes are: **(1)**

(a) temporary, reversible and a new substance is produced

(b) always accompanied by exchange of light

(c) permanent, irreversible and a new substance is produced

(d) never accompanied by exchange of light and heat energy

8. The acceleration due to gravity at three point A, B and C above the surface of the earth are 9.8 m/s^2 ,10m/s^2 and 5 m/s^2 respectively. Which of the following is incorrect? **(1)**

(a) B is at least distance out of three point from the centre of the earth

(b) C is at farthest distance out of three point from the centre of the earth

(c) Weight of the object is lowest at point C out of three point

(d) The weight of the object varies as $W_A > W_B > W_C$

9. What is the process of growing two or more crops in a definite pattern? **(1)**

(a) Inter-cropping   (b) Crop rotation   (c) Mixed cropping   (d) Organic cropping

10. If a body moves with uniform velocity, then the acceleration is : **(1)**
(a) zero   (b) constant   (c) negative   (d) infinite

11. Leghorn is an exotic breed of: **(1)**
(a) Marine prawn   (b) Milch animal   (c) Poultry   (d) Drought animal

12. A car is moving along a straight road with uniform velocity. It is shown in the graph **(1)**
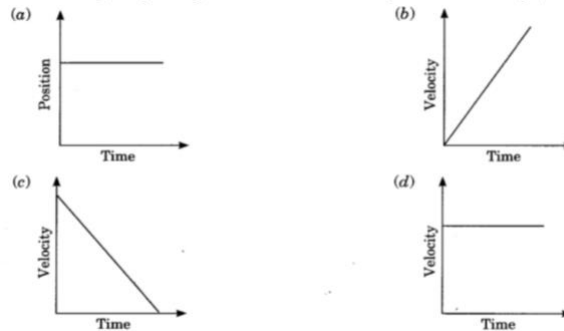

13. Which of the following statements accurately describe pure substances? **(1)**
I. Pure substances consist of only one type of particles
II. Pure substances can be compounds or mixtures
III. Pure substances maintain a consistent composition throughout
IV. Pure substances are exemplified by all elements except nickel

(a) I and II   (b) I and III   (c) III and IV   (d) II and III

14. The image shows a set-up of an experiment. **(1)**
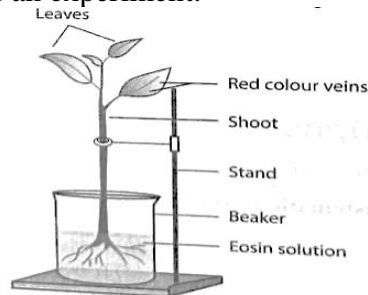
A student takes a leafy green Balsam plant and places it in Eosin solution. The solution is a red coloured dye. After 4 hours, the student observes that the red colour appears on the parts of the plant body. Which type of tissue is responsible for these types of changes?

(a) Xylem as it helps in the movement of water from roots to stem and leaves.
(b) Phloem as it helps in the movement of water from leaves to roots and stem.
(c) Xylem as it helps in the movement of water from leaves to roots and stem.
(d) Phloem as it helps in the movement of water from roots to stem and leaves.

15. The image shows the use of ultrasound waves in treatment of kidney **(1)**
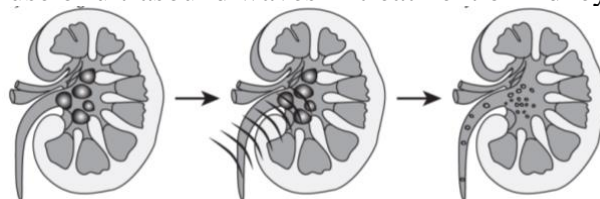
Based on the image, what is the advantage of using ultrasound waves to break the kidney stones?
(a) It prepares the kidney for removal of stones by surgery

(b) It prevents the stones from forming again in the kidneys

(c) It helps remove stones from the kidney without any surgery

(d) It softens the tissues in the kidneys to allow for removal of stones

16. A part of longitudinal wave in which particles of medium are farther away than the normal particles is called: **(1)**

(a) Rarefaction   (b) Trough   (c) Compression   (d) Crest

The following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

     a) Both A and R are true, and R is the correct explanation of A.

     b) Both A and R are true, and R is not the correct explanation of A.

     c) A is true but R is false.

     d) A is false but R is true.

17. **Assertion (A):** Watt-hour is the unit of energy. **(1)**
Reason (R): Kilowatt hour (kWh) is the unit of electric power.

18. **Assertion (A):** Ribosomes are present in both prokaryotes and eukaryotes. **(1)**
Reason (R): Ribosomes are the site of protein synthesis.

19. **Assertion (A):** Athletes jump on a cushion in a high jump event to avoid getting hurt. **(1)**
Reason (R): Time to come to rest is increased to reduce force.

20. **Assertion (A):** Parenchyma cells help in storage of food. **(1)**
Reason (R): Parenchyma cells are the main seats of photosynthesis.

SECTION – B
(Question No. 21 to 26 are very short answer questions)

21. (a) State one difference between gas and vapour. **(2)**
(b) Convert the boiling point of water into Kelvin temperature.

22. How is the cell division taking place in skin cell different from that taking place in ovary during ovum formation?   (2 points) **(2)**

23. We make a pile of carrom coins on carrom board and hit it with a striker. We see that the bottom coin moves away but the remaining coins do not move. **(2)**
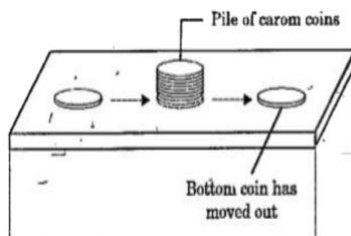

(a) Give reason for the above observation.

(b) Why is the recoil of a heavy gun, on firing, not so strong as that of a light gun using the same cartridge?

24. If cells of onion peel and RBC are separately kept in hypotonic solution, what will happen to each of them? Explain the reason for your answer. **(2)**

25. (a) Name the following: **(2)**
     (i) Tissues that connect muscles to bones
     (ii) Tissues that help aquatic plants to float in water.

    (b) List the role of cork in plants.

26. (a) When 3.0 g of carbon is burnt in 8.00 g oxygen, 11.00 g of carbon dioxide is produced.   **(2)**
     What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g
     of oxygen ? Which law of chemical combination will govern your answer?
   (b) Why do noble gases have zero valency? Explain giving one example.

SECTION – C
(Question No. 27 to 33 are short answer questions)

27. Iron filings and Sulphur were mixed together and divided into two parts 'A' and 'B'. Part   **(3)**
'A' was heated strongly while Part 'B' was not heated. Observe the figure and answer the
following questions:
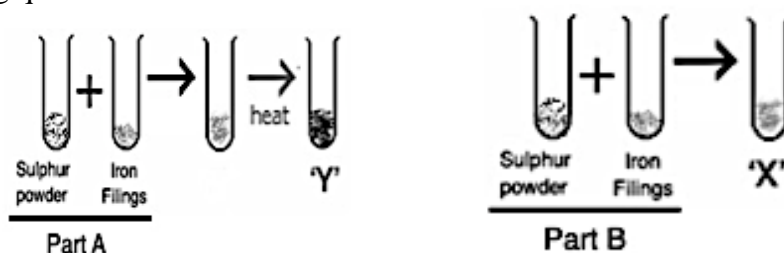

    (a) What will be formed in 'Y' and 'X'?
    (b) A bar magnet was brought close to both 'Y' and 'X'. Explain their behaviour
       towards magnet.
    (c) Differentiate between a mixture and a compound.

28. (a) Write the chemical formulae for the following compounds using criss-cross method: **(3)**
     (i) Calcium phosphate
     (ii) Magnesium chloride

    (b) An element forms an oxide A_2O_3. What is the valency of A? What is the formula of
      the chloride of A?

29. The diagram shows an animal cell with some of its organelles. X is also a cell organelle.   **(3)**
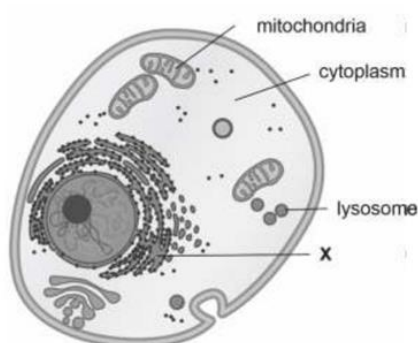
    (a) What does X represent in the diagram?
    (b) Write the function of X.
    (c) Secretory cells have a greater number of Golgi bodies. Give reason.
    (d) Which two cell organelles found only in a plant cell are **not** shown in the diagram?

**30.** The graph given shows how the speed of a car changes with time :   **(3)**
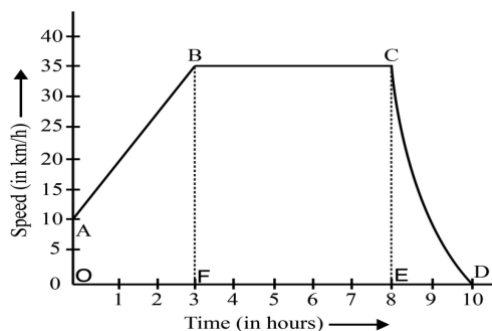
(a) What is the initial speed of the car?

(b) What is the maximum speed attained by the car?

(c) Which part of the graph shows zero acceleration?

(d) Which part of the graph shows varying retardation?

(e) Find the distance travelled in first 8 hours.

OR

An electron moving with a velocity of 5×10^4 m/s enters into a uniform electric field and acquires a uniform acceleration of 10^4 m/s^2 in the direction of its initial motion.

(a) Calculate the time in which electron would acquire a velocity double of its initial velocity.

(b) How much distance the electron would cover in this time?

(c) Observe following diagram. Find the distance and displacement when particle moves from point A to C through A-B-C?
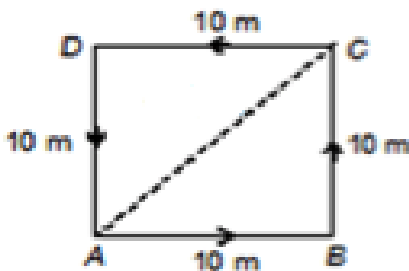
**31.** (a) Define momentum and state its SI unit.   **(3)**

(b) A force produces an acceleration of 8m/sec^2 when applied on a body of mass 2 kg. Find the magnitude of force. How much acceleration will the same force produce when applied to a body of mass 4 kg?

32. The growth of plants occurs only in certain specific regions. This is because the dividing **(3)** tissue also called the meristematic tissue is located only at these points. Cells of Meristematic tissue are very active, have dense cytoplasm and lack vacuoles.

(a) Why are vacuoles absent in the Meristematic tissue?

(b) Label A and B in the following figure and state its one function of each.
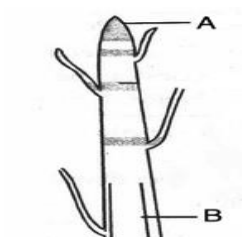
33. (a) Represent graphically by two separate diagrams: Two sound waves having the same amplitude but different frequencies. **(3)**

(b) The given graph (Fig.) shows the displacement versus time relation for a disturbance travelling with velocity 1500 ms^{-1}. Calculate the wavelength of the disturbance.
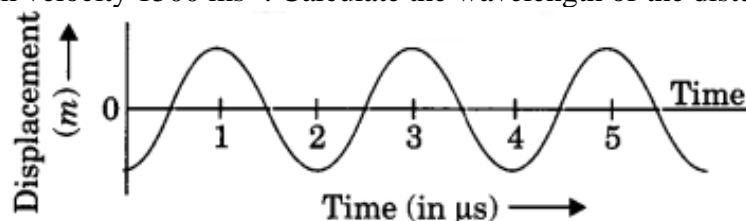
## SECTION – D
(Question No. 34 to 36 are long answer questions)

34. (a) Observe the given table and answer the questions that follow: **(5)**

Element	Atomic number	Number of neutrons
X	16	16
Y	12	12

(i) Give the symbolic representation of X and Y.

(ii) Give the formula of the compound formed between X and Y by showing steps.

(b) An element has 3 valence electrons and has 3 shells in its atom.

(i) Identify the element and write its electronic configuration.

(ii) Draw its structure according to Bohr Model.

OR

(a) From Rutherford's alpha particle scattering experiment, give the experimental evidence for deriving the conclusion that most of the space inside the atom is empty.

(b) What is the difference between isotope and isobar? Name the element whose isotope is used:

(i) as a fuel in nuclear reactor

(ii) in the treatment of goitre.

(c) If bromine atom is available in the form of, say, two isotopes $_{35}Br^{79}$ (49.7%) and $_{35}Br^{81}$ (50.3%), calculate the average atomic mass of bromine atom.

35. The picture shows three types of epithelial tissue in human body: **(5)**
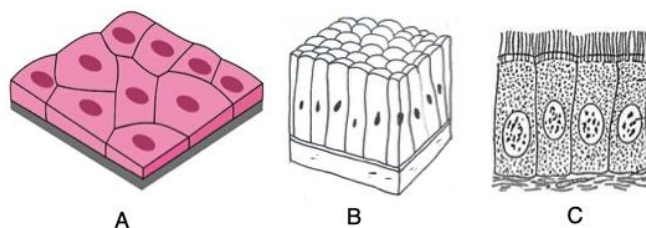
(a) Identify 'A', 'B' and 'C'. Where are tissue 'A', 'B' and 'C' most likely to be found in human body?

(b) What type of epithelium forms the skin? Justify its role in forming skin.

OR

Give reason:
  (a) It is difficult to pull out the husk of coconut.
  (b) Nerve cells are long and branched.
  (c) Branches of a tree move and bend freely in high wind velocity.
  (d) If the branches of a potted plant are covered with a polythene bag, water vapour appears on the inside of polythene bag.
  (e) We get a crunchy and granular feeling when we chew pear fruit.

36.   (a) What is meant by free fall?   **(5)**

  (b) On what factors does the gravitational force between two bodies depend? What happens to the gravitational force between two bodies if the distance between them is tripled?

  (c) A man weighs 600 N on earth. What is his mass? ($g = 10$ m/s^2). On moon his weight would be 100 N. What is the acceleration due to gravity on moon?

OR

  (a) A body is weighed first in air, then in liquid A and then in liquid B. The observations are 100N, 50 N and 60 N respectively. Which liquid is denser? Justify.

  (b) The volume of 100 g of a solid substance is 25cm^3 and the density of water is 1g/cm^3. Find the density of the substance. Will it float or sink in water?

 (c) Distinguish between mass and weight of an object. (2 points)

SECTION – E
(Question No. 37 to 39 are case-based/ data-based questions with 3-4 short sub parts. Internal choice is provided in one of these parts)
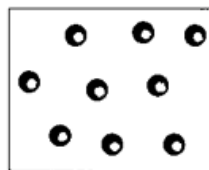
37.   Observe the diagram given below and answer the following questions: **(4)**

(a) Which of the following picture 'A' or 'B' given below represents the arrangement of particles at 'X' and 'Y'?
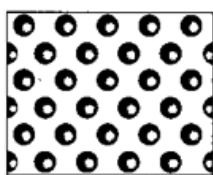

(b) What will be the difference in the kinetic energy and interparticle force of attraction at 'X' and 'Y'?

(c) Will there be a change in temperature during conversion of Y to X? Give reason.

OR

(c) Why does the volume of water not change when small amount of sugar or salt is dissolved in it. Which characteristic of matter is represented by this observation?

38. The figure given below shows two crop fields (plot A and plot B) that have been treated **(4)** by manures and chemical fertilizers respectively, keeping other environmental factors same. Answer the questions that follow:
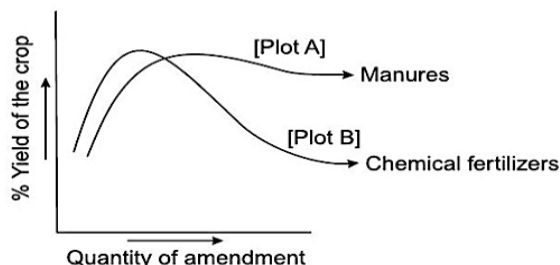

Read the given passage carefully and give the answer of the following questions:
(a) Why does plot B show sudden increase and then gradual decrease in yield?
(b) Why is the highest peak in plot A graph slightly delayed?
(c) Compare manure and fertilizers with respect to their nutrient content and effect on soil.

OR

(c) How is the use of manure particularly useful for sandy and clayey soils?

39. The following diagram shows that a simple pendulum consisting of a bob of mass 100 gm. **(4)** Initially the bob of the pendulum is at rest at 'O'. It is then displaced to one side at A. The height of 'A' above 'O' is 5 cm. (Take $g = 10$ m/s^2)
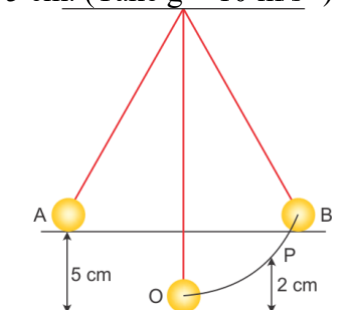
(a) What is the value of potential energy of bob at 'A' and where does it come from?

(b) Calculate kinetic energy and potential energy of the bob at its mean position 'O'.

(c) Certain force acting on a 20 kg mass changes its velocity from 5m/s to 2m/s. Calculate the work done by the force.

OR

(c) An object of mass 'm' moving with a uniform initial velocity 'u' was displaced through a distance 's' when a force 'F' was applied on the object. Final velocity changed to 'v'. Derive the mathematical expression for the kinetic energy of the object.