विद्या सर्वार्थि साधिका

ANANDALAYA
ANNUAL EXAMINATION
Class : IX

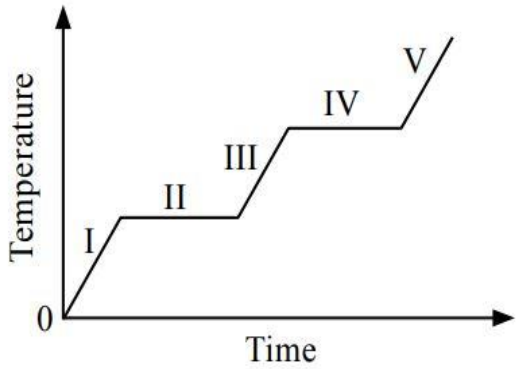
Subject: Science MM :80
Date : 25-02-2023 Time: 3 hours

General Instructions:
1. This question paper consists of 39 questions in 5 sections.
2. All the questions are compulsory. However, internal choice is provided in certain questions. Students are expected to attempt only one of these questions.
3. Section A consists of 20 Objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer questions carrying 5 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/ case based units of assessment of 4 marks each with sub-parts.

Section A

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

1. The given diagram shows the changes in temperature when a substance is heated. (1)

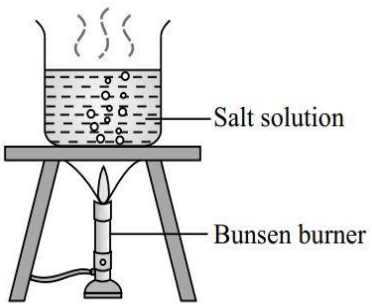


The regions in which particles of the substance have maximum interparticle distance, maximum interparticle forces and maximum kinetic energy are respectively

(A) II, IV and V (B) V, I and V (C) V, I and III (D) I, III and V

2. Geetika poured 20 g of salt into 200 mL of water in a beaker. She stirred the water to dissolve the salt completely. Then she heated the solution until it reduced to half. (1)

How many grams of salt can be recovered from the remaining solution?



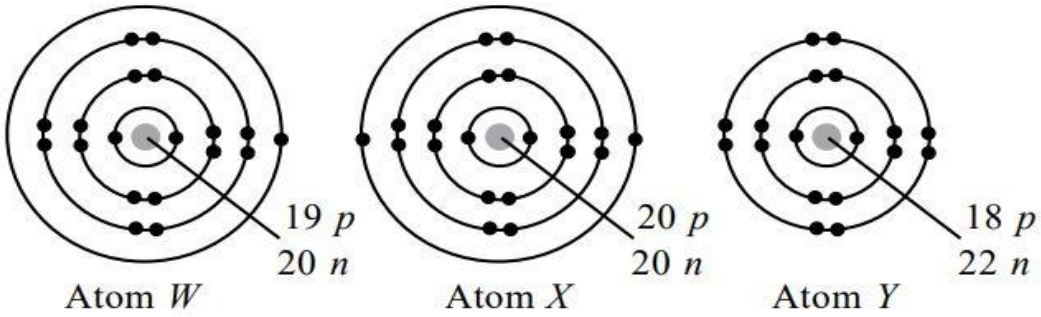
(A) 0 g (B) 10 g (C) 20 g (D) 40 g

3. A sample of pure water, irrespective of its source, contains 11.1% hydrogen and 88.9% oxygen. The data supports (1)
(A) law of constant proportions (B) law of conservation of mass
(C) law of reciprocal proportions (D) law of multiple proportions

4. The formula of chloride of a metal M is MCl_3, then the formula of the phosphate of metal M will be _____. (1)
(A) MPO_4 (B) $M_2(PO_4)_2$ (C) M_3PO_4 (D) $M_2(PO_4)_3$

5. The freezing and boiling points of a substance 'P' are –220°C and –185°C respectively. At which of the following range of temperatures will 'P' exist as a liquid? (1)
(A) Between –175°C and –210°C (C) Between –200°C and –160°C
(B) Between –190°C and –225°C (D) Between –195°C and –215°C

6. The electronic structures of atoms W, X and Y are shown in the figure given below. (1)



Study the structures carefully and select the correct statement(s) about the atoms.
(I) Atom X and Y will have same valency.
(II) Atoms W and X are different isotopes of same element.
(III) W and Y will react to form W_2Y.
(IV) Atoms X and Y are isobars.

(A) I and II Only (B) IV only (C) II and III only (D) II, III and IV only

7. The scientist who discovered the cell was _____. (1)
(A) Robert Hooke (B) Leven Hooke (C) Schleiden (D) Schwann

8. If a blood cell is placed in hypertonic solution, the cell will _____. (1)
(A) shrink (B) not change at all (C) burst and form ghost cell (D) plasmolyse

9. Anika was feeling feverish and shivering and went to consult a doctor. After her blood check, the doctor kept her in an isolation room. The possible reason could be _____ (1)
(A) she may have viral infection.
(B) she may have malaria and to protect others.
(C) she may catch infections from the hospital.
(D) she needs to get complete rest.

10. The enzymes present in lysosomes are made by _____ . (1)
(A) Mitochondria (B) Golgi apparatus (C) Rough ER (D) Vacuole

11. The presence of cambium in the dicot stem is responsible for _____ . (1)
(A) formation of xylem (B) formation of phloem (C) secondary growth (D) apical growth

12. A mass moves in a circular path of radius 'R' starting from a point A. If it reaches the same point after a time 't', what will be the net displacement? (1)
(A) zero (B) $2\pi R$ (C) 2R (D) R

13. According to the third law of motion, action and reaction _____. (1)
(A) always act on the same body.
(B) always act on different bodies in opposite directions.
(C) have same magnitude and direction
(D) act on either body as normal to each other.

14. The acceleration due to gravity on moon is $\left(\frac{1}{6}\right)^{th}$ of that on Earth. What will be the weight of an object whose weight on earth is 600 N? (1)
(A) 600 N only (B) 6000 N (C) 100 N (D) 1000 N

15. From the following points select the example where the work done is negative. (1)
(A) Work done by a child when she pulls a toy car.
(B) Work done against gravity when a crane is lifting a mass.
(C) Work done by a man when he is holding a mass over his head.
(D) Work done by friction.

16. What will be the kinetic energy of a freely falling body from a height of 20 m when it just reaches the ground? The mass of the body is 5 kg. Take acceleration due to gravity as 10 m/s^2. (1)
(A) 1000 J (B) 100 J (C) 200 J (D) 50 J

For question numbers 17 to 20, two statements are given-one labelled Assertion and the other labelled Reason. Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.
(A) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(B) Both Assertion and Reason are true but Reason is NOT the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false and Reason is also false.

17. Assertion: Sugar and Salt are easily dissolved in water. (1)
Reason: Sugar and salt are solid in nature.

18. Assertion: The molecular mass of the Ozone molecule is 48 u. (1)
Reason: Relative atomic mass of Oxygen is 16 u.

19. Assertion: Tissue is a group of cells similar in structure and function. (1)
Reason: Tissues have a common origin.

20. Assertion: When 1 J of work is done in 1 s, we say the power is 1 watt (1)
Reason: Power is defined as work done per unit time.

Section B

Q. No. 21 to 26 are very short answer questions.

21. (a) Write the correct symbolic representation of Iron (III) ion. (2)
(b) What is the cation and anion present in $(NH_4)_2CO_3$

22. Contraction of blood vessels and movement of food in the alimentary canal are said to be involuntary actions. Mention the scientific reason. (2)

23. Identify the type of tissue in the following: (2)
(a) skin (b) bark of tree (c) kidney tubule (d) heart

24. (a) State the law of conservation of energy. (2)
(b) What kind of energy transformation takes place in (a) an electric fan and (b) a loudspeaker?

25. Describe with the help of a diagram, how compressions and rarefactions are produced in air near a source of sound. (2)

OR

What is frequency? The frequency of a source of sound is 100 Hz. How many times does it vibrate in a minute?

26. What is relative density? A boat sinks by 1 cm displacing 0.06 m^3 of water when a man boards it. What is the mass of the man? (2)

Section C

Q. No. 27 to 33 are short answer questions.

27. (a) State the reason: Temperature of a substance remains constant during its melting or boiling? (3)
(b) Relate the rate of evaporation with Humidity in atmosphere
(c) Define: Diffusion

28. (a) Define: Solution (3)
(b) The 'sea-water' can be classified as a homogeneous as well as heterogeneous mixture. Comment.
(c) Smoke and fog both are aerosols. In what way are they different?

29. (a) Write the chemical formula of Copper (I) Oxide (3)
(b) State: Law of conservation of mass
(c) How many atoms are present in a molecule of Phosphorous?

OR

(a) Write the chemical formula of Zinc chloride
(b) State Dalton's postulate which supports the law of conservation of mass
(c) How many atoms are present in H_2S

30. (a) Draw the electronic distribution in Aluminium atom. (3)
(b) If K and L shells of an atom are full, then what would be the atomic no. of the atom?
(c) Write the example of Mono-valent diatomic anion

31. Differentiate among the types of muscle tissues only through labelled diagrams. (3)

OR

Differentiate among simple permanent tissues only through labelled diagrams.

32. (a) Name the quantity that represents the rate of change of velocity? (3)
(b) Give the SI unit of the physical quantity which is obtained by finding the slope of a velocity - time graph.
(c) Draw a v-t graph of a uniform motion.

33. (a) State Newton's second law of motion. (3)
(b) A bullet of 10g strikes a sandbag at a speed of 1000 m/s and gets embedded after travelling 5 cm inside the sandbag. Calculate the resistive force exerted by the sand on the bullet.

Section D

Q. No. 34 to 36 are Long answer questions.

34. (a) Give examples of any two isotopes with their uses. (5)
(b) An element X contains two naturally occurring isotopes $_{35}X^{17}$ and $_{37}X^{17}$.If the average atomic mass of this element is 35.5 u, calculate the percentage of two isotopes.

OR

(a) The given table shows the number of protons, neutrons, and electrons in atoms or ions.

Atoms/ Ions	Number of protons (*p*)	Number of electrons (*e*)	Number of neutrons (*n*)
P	11	11	12
Q	18	18	22
R	15	18	16
S	11	10	14

(i) Which atom/ion in the table is an isotope of the atom with the composition of 11p, 11e and 14 n?
(ii) Predict the name of element "P" considering its number of protons.
(iii) Which one of the above represents an ion?

(b) Define: Isobars

(c) State the possible valencies of element Phosphorous.

35. (a) Which are the physical processes that a cell utilises for transportation of materials across it? Explain the processes with examples. (5)

(b) How does the structure of the plasma membrane contribute towards smooth conduct of materials across it?

OR

(a) Which are the two methods of cell division that occur in plants and animals? Write any four differences between them.

(b) How is chromosome number maintained in every species?

36. In the table given below v is the velocity in m/s and t is the time in seconds. (5)

v (m/s)	0	4	8	12	16
t (s)	0	1	2	3	4

(a) Draw the v-t graph using the data given.

(b) Is the motion a uniform motion?

(c) From the graph calculate the displacement from 0 seconds to 4 seconds.

Section E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. In India, as in many other agriculture-based countries, farming ranges from small to very large farms. Different farmers thus have more or less land, money and access to information and technologies. In short, it is the money or financial conditions that allow farmers to take up different farming practices and agricultural technologies. (4)

There is a correlation between higher inputs and yields. Thus, the farmer's purchasing capacity for inputs decides cropping system and production practices. Therefore, production practices can be at different levels. They include 'no cost' production, 'low cost' production and 'high cost' production practices.

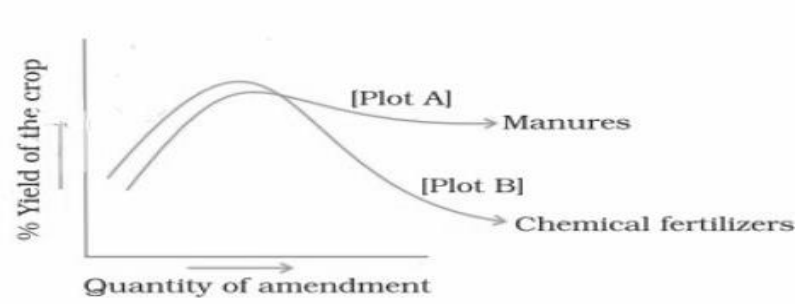
This mainly depends on knowledge of Nutrient management, irrigation and cropping patterns.

(a) Growing different crops on a piece of land in pre-planned succession is known as ____.

(b) Give one example of mixed cropping.

(c) Why is organic matter important for crop production?

(d) The below figure shows the two crop fields [Plots A and B] have been treated by manures and chemical fertilizers respectively, keeping other environmental factors the same. Observe the graph and answer the following question.



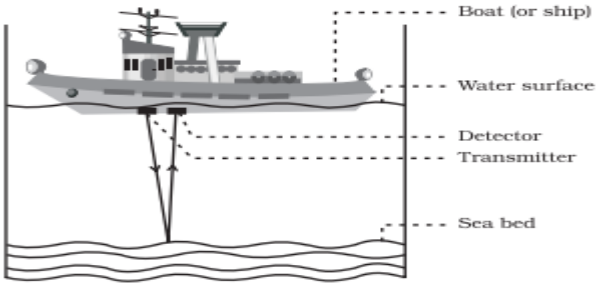
Why does plot B show sudden increase and then gradual decrease in yield?

38. Cell is the structural and functional unit of life. Cells cannot be observed with our naked eye. Yet we are now aware of the functions that take place at cellular level. Microscopy and other biotechnologies have helped us to understand the structure and functions of various cell organelles. There is division of labour among the various organelles which contribute towards the coordinated functions in a cell making it meaningful to identify the cell as the structural and functional unit. (4)
    (a) Name the nuclear region containing only nucleic acid.
    (b) When do we identify chromatin materials in the form of chromosomes in a cell?
    (c) In which chemical form does mitochondrion store energy in it?
    (d) How do leucoplasts act as storage organs?

    OR

    (e) A diploid cell in a rat has 36 chromosomes. What is the chromosome number in its gamete?

39. Sonar is a device that uses ultrasonic waves to measure the distance, direction and speed of underwater objects. Sonar consists of a transmitter and a detector and is installed in a boat or a ship, as shown in figure. The transmitter produces and transmits ultrasonic waves. These waves travel through water and after striking the object on the seabed, get reflected back and are sensed by the detector. The detector converts the ultrasonic waves into electrical signals which are appropriately interpreted. The distance of the object that reflected the sound wave can be calculated by knowing the speed of sound in water and the time interval between transmission and reception of the ultrasound. (4)



    (a) What does the acronym SONAR stand for?
    (b) What is the frequency range of audible sound?
    (c) A person clapped his hands near a cliff and heard the echo after 5 s. What is the distance of the cliff from the person? The speed of sound is 346 m/s.

    OR

    (d) What are ultrasonic waves? Give any two other applications of ultrasound.