



विद्या सर्वार्थ साधिका

ANANDALAYA ANNUAL EXAMINATION

Class: IX

Subject: Science (086)

Date : 23-02-2024

MM: 80

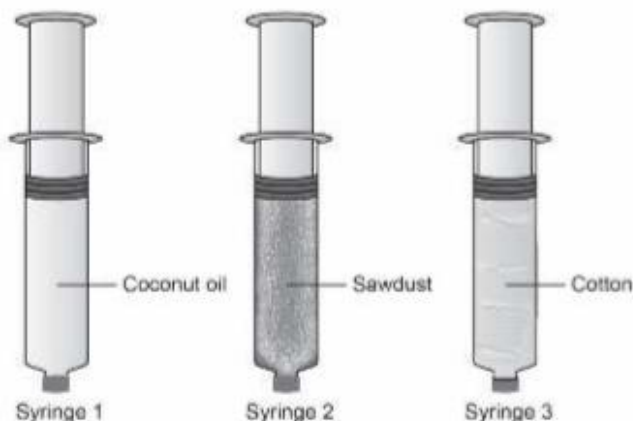
Time: 3 hours

General Instructions:

- This question paper consists of 39 questions in 5 sections.
- All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- Section A consists of 20 objective type questions carrying 1 mark each.
- 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.
- 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.
- Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
- Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A

1. Perna found three syringes of the same size with rubber cork. She took the piston out of each syringe and filled them with coconut oil, saw dust and cotton. Perna closed the end of each syringe with piston. She then tried to press the piston of each syringe as much as possible. (1)



Arrange the syringes in increasing order of difficulty of pressing the piston.

Key: less difficult → more difficult

- (A) Syringe 1 → Syringe 2 → Syringe 3
(B) Syringe 3 → Syringe 2 → Syringe 1
(C) Syringe 1 → Syringe 3 → Syringe 2
(D) Syringe 2 → Syringe 3 → Syringe 1
2. In which of the following conditions, the distance between the molecules of hydrogen gas would increase? (1)
- Increasing pressure on hydrogen contained in a closed container
 - Some hydrogen gas leaking out of the container
 - Increasing the volume of the container of hydrogen gas
 - Adding more hydrogen gas to the container without increasing the volume of the container
- (A) (i) and (iii) (B) (i) and (iv) (C) (ii) and (iii) (D) (ii) and (iv)

3. Which of these is common for all chemical changes? (1)
(A) Change in shape
(B) Absorption of heat
(C) Increase in volume
(D) Formation of a new substance.
4. Which of the following is true for compounds? (1)
(A) It shows properties of its components.
(B) It may be homogenous or heterogeneous.
(C) It can be separated by physical methods
(D) It has a fixed melting point and boiling point.
5. Which of the following statements is not true about an atom? (1)
(A) Atoms are not able to exist independently.
(B) Atoms are the basic units from which molecules and ions are formed.
(C) Atoms are always neutral in nature.
(D) Atoms aggregate in large numbers to form the matter that we can see, feel or touch.
6. Ultrastructure of the cell organelles can be studied using _____. (1)
(A) simple microscope
(B) electron microscope
(C) compound microscope
(D) dissection microscope
7. The main organelle, involved in packaging of newly synthesized proteins to their destination is _____. (1)
(A) chloroplast (B) mitochondria (C) lysosome (D) golgi body
8. Which of the following are present in plant cell and animal cell? (1)
(A) Mitochondria and lysosomes
(B) Mitochondria and cell wall
(C) Cell wall and lysosomes
(D) Cell wall and plastids
9. What will happen if the RER of the cells are destroyed? (1)
(A) respiration will stop
(B) protein synthesis will stop
(C) carbon assimilation will stop
(D) fats will not be stored
10. The tissue that is flexible and joins two bones is _____. (1)
(A) tendon (B) ligament (C) collagen (D) elastin
11. In human beings, cardiac muscles occur in _____. (1)
(A) vena cava (B) heart wall (C) pulmonary vein (D) lungs
12. All animal cells respond to stimuli due to the _____. (1)
(A) muscle tissue (B) nervous tissue (C) epithelial tissue (D) connective tissue
13. Which has more momentum? (1)
(A) A road roller of mass 8000 kg parked.
(B) A bicycle of 8 kg moving with a speed of 10 m/s.
(C) A car of 600 kg moving with a speed of 10 m/s.
(D) A bullet of mass 0.020 kg fired with a speed of 1400 m/s.

14. The unit for gravitational force is (1)
 (A) N (B) Nm^2/kg^2 (C) m/s^2 (D) Nm
15. A rectangular block of mass 10 kg is kept on the sand with area in contact ___ so that it exerts less pressure. (1)
 (A) 0.02 m^2 (B) 0.1 m^2 (C) 0.08 m^2 (D) 0.01 m^2
16. In which among the following are all the terms related to applications of ultrasound? (1)
 (A) echocardiography, megaphones, stethoscope, detecting flaws in metal blocks
 (B) cleaning spiral tubes, sonography, stethoscope, echocardiography
 (C) sonography, cleaning electronic components, detecting flaws in metal blocks, echocardiography
 (D) sonography, megaphones, echocardiography, stethoscope

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 true.
17. Assertion: Work done is a vector quantity. (1)
 Reason: Work done by force acting on an object is equal to the magnitude of the force multiplied by the distance moved in the direction of the force.
18. Assertion: In a pressure cooker the temperature of water becomes more than 100°C . (1)
 Reason: Boiling point is directly proportional to the pressure acting on liquid.
19. Assertion: If an element conducts electricity, it must be metal. (1)
 Reason: Graphite is a non-metal but it conducts electricity.
20. Assertion: Intercropping prevents attack of pests. (1)
 Reason: Plant pests can be biologically controlled by their natural parasites and predators

SECTION B

21. "A bicycle moving along a circular path with the speed of 36 km/h is an example for accelerated motion". Explain. (2)
22. a) Even though action and reaction are equal in magnitude, these forces may not produce accelerations of equal magnitudes. Why? (2)
 b) Name the law which talks about the above statement.
23. Smoke and fog are both aerosols. In what way smoke and fog are different? (2)
- OR**
- Why is a mixture of iron and sulphur attracted by a magnet whereas iron sulphide is not?
24. Write the chemical formula of the following compounds: (2)
 (i) Calcium Phosphate
 (ii) Aluminium Nitrate
25. (a) Why does a plant cell placed in hypotonic solution, not burst? (2)
 (b) What happens when a fully turgid plant cell is placed in hypertonic solution? Name the phenomenon.

26. Which chemical is found in the secondary wall of sclerenchyma tissue? Name the chemical that is found on cork cell wall that makes them impervious to gases and water? (2)

SECTION C

27. (i) Why does ice float on water? (3)
(ii) Why do particles of water at 0°C have more energy than particles of ice at 0 °C?
(iii) Why does a desert cooler cool better on a hot dry day?
28. Calculate the percentage of Carbon(C), Hydrogen (H) and Oxygen (O) in one molecule of glucose (C₆H₁₂O₆). Atomic mass of C=12u, H=1u, O=16u. (3)
29. A bicycle falls off a ledge and drops to the ground in 0.2 s. ($g = 10 \text{ m/s}^2$). (3)
(a) Find the speed of the bicycle on striking the ground.
(b) What is the average speed during the 0.2 s?
(c) How high is the ledge from the ground?

OR

- (a) What is free fall?
(b) Calculate the spaceship's gravitational acceleration, if it is at a distance which is equal to two earth's radii from the centre of the earth.
30. a) Draw a v-t graph of uniformly accelerated motion of an object starting with an initial velocity u. (3)
b) How will you find the displacement from this graph?
c) Write any one expression for the displacement for this graph.
31. Give reason for the following statements: (3)
(a) During sports, athletes keep running even after crossing the finish line.
(b) We fall backwards when a bus starts from rest.
(c) Boat moves backward when the sailor steps outside the boat
32. (a) Why is the cell called the structural and functional unit of life? (3)
(b) Draw the animal cell and label all its cell organelles.
33. Mention the structure and location of the following tissues. (3)
(a) Stomata
(b) Cork
(c) Collenchyma

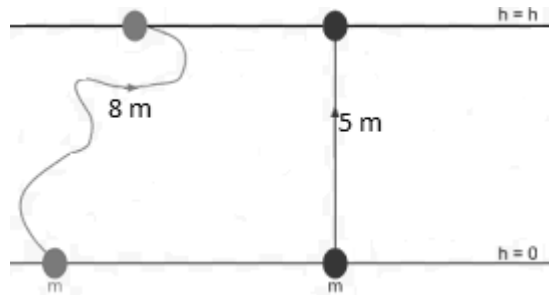
SECTION D

34. An element forms an ion which has 10 electrons. It has three positive charges. (5)
(a) Identify the element
(b) Write its electronic configuration
(c) What will be the formula of its sulphate?
(d) How many protons are there in its ions?
(e) What is the atomic number and mass number if it has 14 neutrons?

OR

- P (4), Q (19), R (17), S (8), T (18) are five elements with atomic numbers given in brackets.
(a) Write the electronic configuration of S.
(b) Which of them has the least number of valence electrons?
(c) Which of them is a good conductor of electricity?
(d) Which element has an octet complete?
(e) Which element will form anion?

35. (a) What is potential energy? Give two examples. (5)
 (b) Define 1 joule.
 (c) Write one difference between potential energy and kinetic energy.
 (d) Calculate the potential energies of an object taken from ground to a height taken through
 (i) the looped path 8 m and (ii) straight line path 5 m. The mass of the object is 1 kg. ($g = 10 \text{ m/s}^2$)



OR

- (a) State the law of conservation of energy.
 (b) Illustrate the law of conservation of energy by discussing the energy changes which occur when a rock on a hill falls freely to the ground. Taking energy change on the hill, a midpoint between the hill and the ground and on the ground.
 (c) An object with a mass 20 kg at rest is given acceleration so that its velocity increases to 8 m/s in 10 s. Calculate the power.
36. (a) What do you understand by composite fish culture? (5)
 (b) Why bee keeping should be done in good pasturage?
 (c) Write one merit and demerit of fish culture.

OR

- (a) Which are the types of methods used in hybridization in crop improvement?
 (b) Name the two sources from where plants procure the nutrients they need. Give one example each.
 (c) Mention four objectives of plant breeding.

SECTION E

Questions 37 to 39 are Source-based/Case study-based questions of 4 marks with sub-parts.

37. If we shout or clap near a suitable reflecting object such as a tall building or a mountain, we will hear the same sound again a little later. This sound is called an echo. The sensation of sound persists in our brain for about 0.1s. To hear a distinct echo the time interval between the original and reflected sound should be at least 0.1 s. Echoes may be heard more than once due to successive or multiple reflections.
- (i) What is an echo? (1)
 (ii) Write an example for echoes heard more than once. (1)
 (iii) Calculate the minimum distance required to hear an echo. (Speed of sound = 344 m/s) (2)

OR

- (iii) A person living near a mountain at a distance of 1280 m hears an echo. If the speed of the sound is 320 m/s, after how much time he would have heard it?

38. In nature, a number of atoms of some elements have been identified, which have the same atomic number but different mass numbers. For example, take the case of hydrogen atom; it has three atomic species, namely protium, deuterium and tritium. The atomic number of each one is 1, but the mass number is 1, 2 and 3, respectively. Other such examples are (i) carbon-12, carbon-14, (ii) chlorine-35 and Cl-37, etc. On the basis of these examples, isotopes are defined as the atoms of the same element, having the same atomic number but different mass numbers. Therefore, we can say that there are three isotopes of hydrogen atom, namely protium, deuterium and tritium. Nuclear Medicine uses radioactive isotopes in a variety of ways. One of the more common uses is as a tracer in which a

radioisotope, such as technetium-99m, is taken orally or is injected or is inhaled into the body. The radioisotope then circulates through the body or is taken up only by certain tissues. Its distribution can be tracked according to the radiation it gives off. Therapeutic applications of radioisotopes typically are intended to destroy the targeted cells. This approach forms the basis of radiotherapy, which is commonly used to treat cancer and other conditions involving abnormal tissue growth, such as hyperthyroidism.

- (i) Name an isotope used as a fuel in nuclear reactors. (1)
- (ii) Isotope of which element is used in the treatment of goitre? (1)
- (iii) How does Co-60 help in the treatment of cancer? (2)

OR

(iii) Do isotopes of an element have similar chemical properties? Why?

39. Our country stands first in population in the world. At the rate at which it is growing, our population will require about 240 tonnes of grains production per year. In order to produce such a huge number of grains, we need extra land for cultivation which is not easily available. Hence, we need to increase the yield per available area. Green revolution in 1960s and 70s contributed to increase food production by improving crop varieties and cultivation practices. Though it did increase crop production many folds in the country, it was achieved at the cost of intensive use of irrigation, chemical fertilizers, chemical pesticides, costly modern agricultural equipment and other inputs.

- (i) Which are the desirable characteristics for improvement in cattle breed? (1)
- (ii) What are macronutrients? (1)
- (iii) What is genetic manipulation? What are its advantages? (2)

OR

(iii) Write any four points for increasing production common to poultry, fisheries and bee-keeping.