



## CREST Science Olympiad (CSO) Previous Year Paper (2021-22)

# Class 9

**Time Allowed: 1-hour**

**Maximum Marks: 60**

- Additional **10 minutes** will be allotted to fill up information on the OMR Sheet, before the start of the exam.
- Fill in all the mandatory fields clearly on the OMR Sheet.
- There are **2 sections** in the question paper namely the **Practical Science & Achievers' Section** consisting of **40 questions (1 mark each) & 10 questions (2 marks each)**, respectively.
- There is no negative marking. The use of a calculator is not permitted.
- There is **only ONE correct option** to a given question.
- Use **HB Pencil or Blue / Black ball point pen only** for marking the correct choice of answers on the OMR Sheet.
- Rough work is to be done in the space provided in the test booklet. Extra plain sheet may be provided by the school for the rough work.
- The OMR Sheet is to be handed over to the invigilator at the end of the exam.
- No candidate is allowed to carry any textual material, printed or written, bits of paper, any electronic device, etc. inside the examination hall.
- The use of unfair means may result in the cancellation of the exam. Any such instances may be reported at **+91-98182-94134** or **info@crestolympiads.com**

**DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO**

**FILL IN THE DETAILS**

Student Name: \_\_\_\_\_

Class: \_\_\_\_\_ Section: \_\_\_\_\_

Enrollment No: \_\_\_\_\_

## Practical Science (Each Question is 1 Mark)

- A piece of paper and a cricket ball are dropped from the same height. Under which of the following conditions do both reach the surface simultaneously?

  - They must have the same volume.
  - They must have the same density.
  - They must have the same mass.
  - They must be dropped in a vacuum.
- Fill in the blank:  
A horse continues to apply a force in order to move a cart with a constant speed to \_\_\_\_\_.

  - conserve the momentum
  - continue the uniform motion
  - resist the inertia
  - balance the force of friction
- Consider the following statement and choose the correct option:  
I. A book raised at an angle has positive work done.  
II. A book is raised and is at rest has positive work done.  
III. The work done in bringing a book from the first floor to the ground floor through the staircase is negative.

  - Only I is correct
  - Both I and II are correct
  - Both I and III are correct
  - I, II and III are correct
- An element X has two isotopes which may be represented as  $^{238}\text{X}$  and  $^{235}\text{X}$ . How does  $^{238}\text{X}$  differ from  $^{235}\text{X}$ ?

  - It has 3 more protons and 3 more electrons.
  - It has 3 more protons but no more electrons.
  - It has 3 more neutrons and 3 more electrons.
  - It has 3 more neutrons, but no more electrons.
- In which of the following pairs of the ions/atoms are isoelectronic with each other?  
I.  $\text{Na}^+$  and Ne  
II.  $\text{Na}^+$  and  $\text{K}^+$   
III.  $\text{K}^+$  and  $\text{Cl}^-$

  - I and II
  - I and III
  - II and III
  - All of the above
- Which of the following statements is/are incorrect?  
I. Permanent tissue loses its capacity of cell division.  
II. A meristem is a group of cell that divides continually to form a new cell.  
III. Companion cells are usually seen associated with the sieve tube.

  - I and II
  - II and III
  - I, II and III
  - None of them is incorrect
- Which of the statement(s) given below is/are correct?  
I. Aerenchyma tissues are found in hydrophytes.  
II. The number of stomata is less and sunken in xerophytes.  
III. Velamen tissues in orchids are found in the root.

- a. Only I
- b. Only III
- c. Only II
- d. I, II and III

8. Which of the statements given below are correct about a tissue?
- I. Epithelium tissue forms a protective layer of the body.
  - II. Transmission of stimuli from one part of the body to other part takes place through nervous tissue.
  - III. Blood is an example of tissue.
- a. I and II
  - b. II and III
  - c. I and III
  - d. I, II and III

9. Which of the following cell organelles are responsible for the intracellular transport system?
- a. Mitochondria
  - b. Ribosome
  - c. Endoplasmic reticulum
  - d. Golgi complex

10. Which of the following organelles are involved in the protein synthesis?
- (i) Endoplasmic reticulum
  - (ii) Ribosomes
  - (iii) Golgi complex
  - (iv) Nucleus
- a. (i), (ii) only
  - b. (i), (ii), (iv) only
  - c. (i), (ii), (iii) only
  - d. (i), (ii), (iii), (iv)

11. In the following question, an assertion and a reason are given. Choose the correct option:

**Assertion:** A mixture of hydrogen and sulphur dioxide gas can be separated using a method of diffusion.

**Reason:** Diffusion is a method of separation by which two gases

with greater difference in their densities are separated.

- a. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
- b. Both assertion and reason are CORRECT, but reason is NOT THE CORRECT explanation of the assertion.
- c. Both assertion and reason are INCORRECT.
- d. Both assertion and reason are CORRECT.

12. Read the following statements and choose the correct option:

Statement 1: The presence of circulatory system is not the characteristic feature of protochordata.

Statement 2: Rhizopus is the common 'black bread mould' fungus.

- a. Statement 1 is correct and statement 2 is incorrect
- b. Statement 1 is incorrect and statement 2 is correct
- c. Both the statements are correct
- d. Both the statements are incorrect

13. In the following question, an assertion and the reason are given. Choose the correct option:

**Assertion:** All bryophytes are called amphibians of the plant kingdom.

**Reason:** Water is necessary to complete their life-cycle.

- 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. Both assertion and reason are false.

14. Choose the correct option and complete the following sentence: Rohan lives in an overcrowded and poorly ventilated house, it is possible that he may suffer from the \_\_\_\_\_ diseases.
- a. hereditary                      b. congenital  
c. air borne                        d. water borne

15. In the following question, an assertion and a reason is given. Choose the correct option:  
**Assertion:** AIDS is not syndrome which results from infection through bacteria.  
**Reason:** AIDS is not transmitted through contact with saliva, breast milk and vaginal secretions of an infected individual.
- a. Both assertion and reason are true and reason is the correct explanation of assertion.  
b. Both assertion and reason are true and reason is not the correct explanation of assertion.  
c. Assertion is true but reason is false.  
d. Both assertion and reason are false.

16. Which of the following is the basic objective of the pulse polio immunisation programme?
1. To immunise those children who are not earlier immunised or are partially immunised.
  2. To boost the immunity of children already immunised.
  3. To eradicate the polio-causing virus from the world.

- a. Only 1                              b. Only 2  
c. Only 3                              d. 1, 2 and 3

17. Read the following statements and choose the correct option:  
Statement 1: Low visibility during cold weather is due to unburnt carbon particles or hydrocarbons suspended in the air.  
Statement 2: Transpiration step is not involved in the carbon cycle.
- a. Statement 1 is correct and statement 2 is incorrect  
b. Statement 1 is incorrect and statement 2 is correct  
c. Both the statements are correct  
d. Both the statements are incorrect

18. Choose the correct option and complete the following sentence: Pollutant which reduces oxygen-carrying capacity of haemoglobin, leading to suffocation or death is \_\_\_\_\_.
- a. carbon monoxide  
b. sulphur dioxide  
c. ozone  
d. nitric oxide

19. Which of the following maintains the organic matter of the soil?
- a. Fungi and semi-parasites  
b. Cyanobacteria and parasitic animals  
c. Bacteria and fungi  
d. All of these

20. In the following question, an assertion and reason are given. Choose the correct option:  
**Assertion:** Intercropping checks the population of insects.

**Reason:** Plant pests can be controlled biologically by their natural parasites and pathogens.

- 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. Both assertion and reason are false.
- 21.** Consider the following statements and choose the correct option:
1. Only liquid phase is present after mixing a teaspoon of solid sugar in a glass of liquid water.
  2. A saturated solution can be converted into unsaturated by increasing temperature.
  3. Clouds are an example of solid in gas solution.
- a. Only 1 is correct
  - b. Only 2 is correct
  - c. Only 1 and 2 are correct
  - d. 1, 2 and 3 are correct
- 22.** A gold manufacturing company manufactures gold coins with absolutely pure gold. If the mass of each gold coin is 9.85 g and 1000 gold coins are manufactured per day, calculate the number of moles of gold consumed per day. (At. wt. of gold is 197 amu)
- a. 5
  - b. 50
  - c. 100
  - d. 0.05
- 23.** Choose the correct option:  
The molecular formula  $\text{Al}_2\text{O}_3$  means that \_\_\_\_\_.
- a. a molecule contains 2 atoms of Al and 3 atoms of O
  - b. the ratio of the mass of Al to the mass of O in the molecule is 2 : 3
  - c. they are twice as many Al atoms in the molecule as there are O atoms
  - d. the ratio of the mass of Al to the mass of O in the molecule is 3 : 2
- 24.** Which of the following electronic configurations is/are correct?
- a. Ne = 2, 8
  - b. P = 2, 8, 5
  - c. Cl = 2, 8, 6
  - d. Both a and b
- 25.** A field gun of mass 2.4 ton fires a shell of mass 24 kg with a velocity of  $120 \text{ ms}^{-1}$ . Calculate the velocity of the recoil of the gun:
- a.  $1.2 \text{ ms}^{-1}$
  - b.  $1 \text{ ms}^{-1}$
  - c.  $3.2 \text{ ms}^{-1}$
  - d.  $4.2 \text{ ms}^{-1}$
- 26.** An astronaut in the orbit in a spacecraft feels weightlessness. Which of the following could be the reason for the above statement?
- a. It is due to the absence of gravity inside the spacecraft.
  - b. It is due to the fact that spacecraft has no energy.
  - c. It is because the acceleration in the orbit is equal to acceleration of gravity outside.
  - d. It is because there is no gravity outside the spacecraft.
- 27.** In the following question, an assertion and the reason are given. Choose the correct option:  
**Assertion:** Mass of a body on earth is equal to the force with which the body is attracted towards the earth.

**Reason:** Weight of a body is independent of the mass of the body.

- a. Both assertion and reason are true and reason is the correct explanation of assertion.
- b. Both assertion and reason are true and reason is not the correct explanation of assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false

**28.** A solid piece of lead experiences certain upthrust. What happens to the upthrust acting on the lead piece when it is shaped into a hollow cube and placed in the same liquid?

- a. Increases
- b. Decreases
- c. Remains same
- d. None of the above

**29.** Kevin carries a bag weighing 6 kg from the ground floor to his house on the first floor that is 10 m high. Calculate the work done by Kevin: ( $g = 9.8 \text{ m/s}^2$ )

- a. 500 J
- b. Zero
- c. 588 J
- d. 58.8 J

**30.** Fill in the blank:

The change in density/pressure of a medium from a maximum value to a minimum value and again to the maximum value, due to the propagation of a longitudinal wave is called a complete \_\_\_\_\_.

- a. oscillation
- b. frequency
- c. amplitude

d. none of these

**31.** An athlete completes one round of circular track of radius  $r$  in 60 s with uniform speed. What is the ratio of distance to the displacement travelled by the athlete at the end of 30 s?

- a.  $\frac{2\pi}{3}$
- b.  $\frac{2}{3\pi}$
- c.  $\frac{\pi}{2}$
- d.  $2\pi$

**32.** Choose the correct option and complete the following sentence: If you are asked to push an object so that the acceleration produced in it is now twice as before, then the force required will be \_\_\_\_\_.

- a. twice as before
- b. half as before
- c. same as before
- d. four times as before

**33.** If different planets have the same density but different radii, then the acceleration due to gravity on the surface of the planet is related to the radius ( $R$ ) of the planet as:

- a.  $g \propto \frac{1}{R^2}$
- b.  $g \propto \frac{1}{R}$
- c.  $g \propto R$
- d.  $g \propto R^2$

**34.** Choose the wrong statement:

- a. The accelerated motion may be due to change in the magnitude of velocity or direction of velocity or both.
- b. The velocity and acceleration of a body may not necessarily be in the same direction.

- c. The velocity and acceleration of a body may not be zero simultaneously.
- d. When a body falls freely under the action of gravity, its acceleration is zero.

**35.** What happens when green tomatoes turn into the red?

- a. Chloroplasts are changed into chromoplasts
- b. Chromoplasts are changed into chloroplasts
- c. New chromoplasts are made
- d. All of the above

**36.** Select the correct reason for the given statement:

Algae and other submerged green plants often float in water during daytime and sink at night.

- a. They lose weight at night because fish and other animals eat away at their parts.
- b. They become buoyant due to accumulation of oxygen as a result of photosynthesis.
- c. They become light due to consumption of food.
- d. They come up to enjoy sunlight.

**37.** The presence of ozone in the atmosphere of earth

- 1. is advantageous since it supplies  $O_2$  for people travelling in jets
- 2. helps in checking the penetration of ultraviolet rays to earth
- 3. hinders higher rate of photosynthesis

4. has been responsible for increasing the average global temperature in recent years

- a. Only 1
- b. Only 2
- c. Only 3
- d. Both 1 and 4

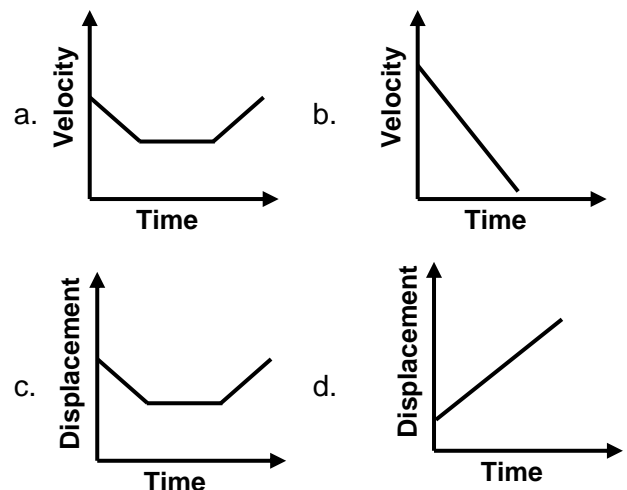
**38.** What is the function of chloroplast in plants?

- a. To absorb carbon dioxide during photosynthesis.
- b. To break up water into hydrogen and oxygen during photosynthesis.
- c. To synthesise food in the presence of sunlight.
- d. To form carbon dioxide and glucose in sunlight.

**39.** Which of the following is the main difference between onion peel cells and human cheek cells?

- a. Presence of mitochondria in onion peel cells only.
- b. Presence of cell wall in onion peel cells only.
- c. Absence of plasma membrane in human cheek cells.
- d. Absence of endoplasmic reticulum in human cheek cells.

**40.** Which one of the following graphs represents uniform motion?



## Achiever's Section (Each Question is 2 Marks)

41. The weight of person on a planet X is about half that on the Earth. He can jump up to 0.8 m height on the surface of the Earth. How high he can jump on the planet X?

- a. 0.8 m                                      b. 1.6 m  
c. 1.0 m                                      d. 1.2 m

42. Consider the following statements:

- I. Parenchyma tissue provides support to plant and also stores food.  
II. The flexibility in plants is due to collenchyma.  
III. Sclerenchyma makes the plant hard and stiff.

Which of the statements given above are correct?

- a. I and II                                      b. II and III  
c. I and III                                      d. I, II and III

43. In the following question, an assertion and a reason are given. Choose the correct option:

**Assertion (A):** Epithelial tissue lining the urinary bladder is transitional epithelium.

**Reason (R):** Transitional epithelium helps in changing the size of the bladder accordingly.

- a. Both A and R are true and R is the correct explanation for A.  
b. Both A and R are true, but R is not the correct explanation for A.  
c. A is true and R is false.  
d. A is false and R is true.

44. Consider the following statements and choose the correct option:

Statement 1: The number of molecules present in 2.8 g of nitrogen is  $6.023 \times 10^{22}$ .

Statement 2: Both 44 g  $\text{CO}_2$  and 16 g  $\text{CH}_4$  have the same number of carbon atoms.

- a. Statement 1 is correct and statement 2 is incorrect  
b. Statement 1 is incorrect and statement 2 is correct  
c. Both the statements are correct  
d. Both the statements are incorrect

45. If two balls of different masses have the same kinetic energy, then \_\_\_\_\_.

- a. heavier ball has greater momentum than the lighter ball  
b. lighter ball has greater momentum than the heavier ball  
c. both balls have equal momentum  
d. both balls have zero momentum

46. A mixture of gases with a pressure of 800 mm Hg contains 10% oxygen and 90% nitrogen by volume. What is the partial pressure of the oxygen gas in the mixture?

- a. 10 mm Hg                                      b. 80 mm Hg  
c. 700 mm Hg                                      d. 800 mm Hg

47. Which of the following solutions will have the greatest concentration?

- a. 2 moles of solute dissolved in 1 liter of solution



- b. 0.3 mole of solute dissolved in 0.6 liter of solution
- c. 2 moles of solute dissolved in 10 liters of solution
- d. 0.1 mole of solute dissolved in 0.5 liter of solution

48. In the following question, an assertion and the reason are given. Choose the correct option:

**Assertion:** The motion of a body moving in a circular path with constant speed is an example of constant acceleration.

**Reason:** Acceleration varies due to change in direction.

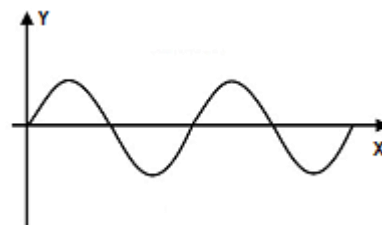
- a. Both assertion and reason are true and reason is the correct explanation of assertion.
- b. Both assertion and reason are true and reason is not the correct explanation of assertion.
- c. Assertion is true but reason is false.
- d. Assertion is false but reason is true.

49. A car travels with a constant speed of 50 km/hr for 30 min and then quickly speed up to 100 km/hr to be maintained for 60 min.

Calculate its average speed in m/s:

- a. 83.33
- b. 43.33
- c. 23.14
- d. 40.90

50. The distance between 2<sup>nd</sup> crest and 6<sup>th</sup> trough of a wave shown below is 24 cm. If the wave velocity of the moving crests is 20 m s<sup>-1</sup>, then the frequency of rocking of the boat is:



- a. 24 Hz
- b. 20 Hz
- c. 375 Hz
- d. 240 Hz

## Answer Key

1. d	2. d	3. c	4. d	5. b	6. d	7. d	8. d	9. c	10. a
11. a	12. b	13. a	14. c	15. d	16. d	17. c	18. a	19. c	20. b
21. c	22. b	23. a	24. d	25. a	26. c	27. d	28. a	29. c	30. a
31. c	32. a	33. c	34. d	35. a	36. b	37. b	38. c	39. b	40. d
41. b	42. d	43. a	44. c	45. a	46. b	47. a	48. d	49. c	50. c