



S I M S[®]

(SCHOLARS INTEGRAL MATHS & SCIENCE OLYMPIADS)



BIGGEST NATIONAL LEVEL OLYMPIADS (STAGE - II) : 2018-19

MAX. MARKS : 100

SISO QUESTION PAPER

TIME: 60 MIN.

NAME OF THE STUDENT :

HALL TICKET NUMBER :

NAME OF THE SCHOOL :

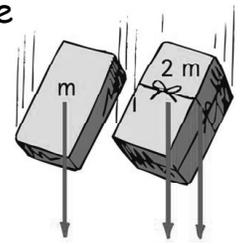
INSTRUCTIONS TO THE STUDENTS :

- ☞ Write your Hall ticket number immediately after receiving the question paper booklet.
- ☞ Darken the answers only on the OMR Sheet.
- ☞ Read the instructions given on the OMR sheet and follow them accordingly.
- ☞ Don't write any thing on the question paper booklet.
- ☞ To do rough work, use only the white paper provided in the examination hall.
- ☞ **No negative marks.**
- ☞ This question paper booklet consists of 45 questions.
- ☞ **PHYSICS (Q.No-1 to 15) :**
 - First 10 questions (1 to 10) are single correct answer type.
 - Each question carries TWO marks.
 - Next 5 questions (11 to 15) are one or more than one correct answer type.
 - Each question carries THREE marks.
- ☞ **CHEMISTRY (Q.No-16 to 30) :**
 - First 10 questions (16 to 25) are single correct answer type.
 - Each question carries TWO marks.
 - Next 5 questions (26 to 30) are one or more than one correct answer type.
 - Each question carries THREE marks.
- ☞ **BIOLOGY (Q.No-31 to 45) :**
 - All questions (31 to 45) are single correct answer type.
 - Each question carries TWO marks.
- ☞ Students are not allowed to use any Mathematical and Physical tables (OR) any other electronic devices.
- ☞ After completion of the examination hand over the OMR answer sheet to the invigilator without fail. You can retain the question paper with you.
- ☞ Students should not leave the examination hall before the last bell rings.
- ☞ To know your results log in to our website **www.simsolympiads.com**.
- ☞ Stage-I branch result copy will be sent to the school mail id. Please contact your principal to know your result.

Single Correct Answer Type :**10 × 2 = 20M**

1. At surface of Earth where air friction is negligible objects fall with the

- 1) Different acceleration
- 2) Same velocity
- 3) Same acceleration
- 4) Same speed



2. In elastic collision is collision in which kinetic energy is

- 1) Conserved
- 2) Not conserved
- 3) Increased
- 4) Decreased

3. Motorcycle safety helmet extends the time of collision , hence decreasing the

- 1) Chance of collision
- 2) Force acting
- 3) Velocity
- 4) Impulse



4. When an object is thrown up, the force of gravity

- 1) Acts in the direction of the motion
- 2) Acts in the opposite direction of the motion
- 3) Remains constant as the body moves up
- 4) Increases as the body moves up

5. A light and heavy body have equal momenta which one has greater kinetic energy.

- 1) The light body
- 2) The heavy body
- 3) Both have same K.E
- 4) None of these

6. During long jump, athlete runs before taking the jump, By doing so he

- 1) Provide him a larger inertia
- 2) Decreases his inertia
- 3) Decreases his momentum
- 4) Increases his momentum



7. The main constituent of biogas is

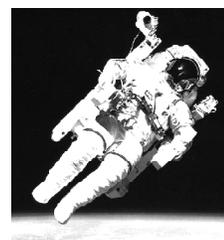
- 1) Methane
- 2) Carbondioxide
- 3) Hydrogen
- 4) Hydrogen sulphide

8. If a substance is hot, its particles will

- 1) Move fast than the cooler object
- 2) Move slow than the cooler object
- 3) May as the cooler object
- 4) May move fast or slow than the cooler object

9. For communication astronauts use radio because

- 1) Sound travels at very high speed in vacuum
- 2) Sound does not travel in vacuum
- 3) Vaccum repels sounds
- 4) Sound energy turns into light in vacuum



10. In longitudinal waves, the particles vibrate in a _____ direction of propagation
 1) Parallel 2) Perpendicular 3) Curved 4) Both (1) & (2)

Multi Correct Answer Type :**5 × 3 = 15M**

11. Which of the following options are correct in the case of motion of ball on an inclined plane
 1) The direction of motion remains constant
 2) Speed of the particle changes at every instant of time
 3) Direction of the particle changes at every instant of time
 4) Speed is same through out the motion

12. Formation of a mirage is due to
 1) Refraction of light in atmosphere
 2) Total internal reflection
 3) High refractive index
 4) Shadows of the plant.



13. Which of the following are the examples of Newton's third law of motion?

- 1) Jumping to land from boat 2) Walking
 3) Gunfiring 4) Bouncing of ball

14. Which of the following equations are correct

- 1) $a_c = \frac{v^2}{R}$ 2) $F_c = \frac{mv^2}{R}$ 3) $F = \frac{Gm_1 m_2}{d^2}$ 4) $g = \frac{GM}{R^2}$

15. The work done by a force on a body depends on

- 1) Magnitude of force acts on the body 2) Colour of the body
 3) Direction of the body 4) Distance through which the body moves

Single Correct Answer Type :**10 × 2 = 20M**

16. Match column I with column II and select the correct option from the codes given below.

Column I

- a) Sublimation
 b) Magnetic separation
 c) Distillation
 d) Separating funnel
 e) Fractional Crystallisation

Column II

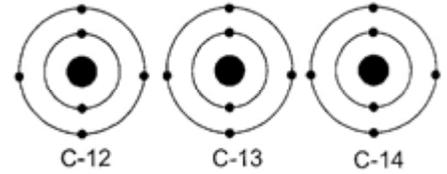
- i) Separation of water and CCl_4
 ii) Separation of NaCl from KNO_3
 iii) Separation of benzene and aniline
 iv) Separation of iron and sand
 v) Separation of iodine and sand

- 1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv), (e)-(v) 2) (a)-(v), (b)-(iv), (c)-(iii), (d)-(i), (e)-(ii)
 3) (a)-(iv), (b)-(v), (c)-(ii), (d)-(i), (e)-(iii) 4) (a)-(i), (b)-(ii), (c)-(iv), (d)-(v), (e)-(iii)

17. An element M forms a chloride with formula $MC\ell_3$. What will be the formula of its sulphate ?

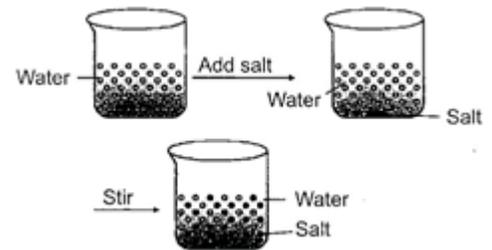
- 1) MSO_4 2) M_2SO_4 3) $M_2(SO_4)_3$ 4) $M(SO_4)_2$

18. There are three isotopes of carbon which are named as C-12, C-13 and C-14 out of which C-12 is the most abundant isotope. In the given structures of three isotopes, what will be the composition of the nucleus?



- 1) C - 12 : 6p + 6n, C - 13 : 7p + 6n, C - 14 : 8p + 6n
 2) C - 12 : 6p + 6n, C - 13 : 6p + 7n, C - 14 : 6p + 8n
 3) C - 12 : 6p + 6n, C - 13 : 5p + 8n, C - 14 : 7p + 7n
 4) C - 12 : 6p + 6n, C - 13 : 12p + 1n, C - 14 : 5p + 9n

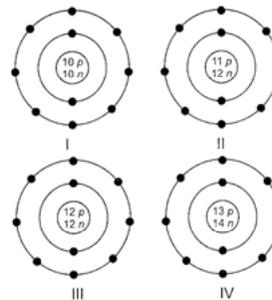
19. An experiment is performed as shown in the given figure. The conclusion we can draw from the above experiment is that



- 1) Nature of matter is continuous
 2) Matter is made up of particles
 3) Particles of salt get into the spaces between the particles of water
 4) All of these

20. Identify the Al^{3+} ion from the given structures.

- 1) I
 2) II
 3) III
 4) IV



21. Match column I with column II and select the correct option from the codes given below.

- | | |
|--------------|--|
| Column I | Column II |
| (a) Ions | (i) Same mass number, different atomic numbers |
| (b) Isobars | (ii) Same number of neutrons, different atomic numbers
different mass numbers |
| (c) Isotopes | (iii) Formed by loss or gain of electrons |
| (d) Isotones | (iv) Combining capacity of an atom |
| (e) Valency | (v) Same atomic number, different mass numbers. |

- 1) (a)-(i), (b)-(iii), (c)-(v), (d)-(ii), (e)-(iv) 2) (a)-(iii), (b)-(i), (c)-(v), (d)-(ii), (e)-(iv)
 3) (a)-(iii), (b)-(v), (c)-(i), (d)-(ii), (e)-(iv) 4) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv), (e)-(v)

22. Match column I with column II and select the correct option from the codes given below.

Column - I

Column - II

(1) Boiling point of water

(A) 373 K

(2) Melting point of ice

(B) 56 °C

(3) Boiling point of Acetone

(C) 273 K

(4) Melting point of Aluminum

(D) 660°C

1) 1-B, 2-D, 3-A, 4-C 2) 1-C, 2-B, 3-D, 4-A 3) 1-A, 2-C, 3-B, 4-D 4) 1-D, 2-A, 3-C, 4-B

23. The formula of chloride of a metal 'M' is $MC\ell_2$. Which among the following represent correct formulae of compounds of M?

1) Metal oxide - MO

2) Metal phosphate - MPO_3

3) Metal sulphate - $M_2(SO_4)_3$

4) Metal hydroxide - MOH

24. State true (T) or false (F) using options given below:

I. The capacity of a liquid to have definite volume enables it to change its shape as per the container.

II. Mass is the measure of how much material is contained in a matter.

III. Gases do not possess any mass and volume.

IV. Mixture contains definite proportion of two or more elements.

V. Any massless particle that occupies space is considered to be matter.

Codes:

I II III IV V
1) F T F F F

I II III IV V
2) T T F F F

3) F F F F T

4) T T T T F

25. Study the diagram below.

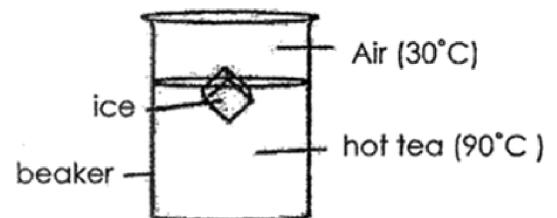
Which of the following explains why the ice melted completely after some time?

1) The hot tea loses heat to the air

2) The air gains heat from the hot tea

3) The ice loses coldness to the hot tea and the air

4) The ice gains heat from the hot tea and the air



Multi Correct Answer Type :

5 × 3 = 15M

26. Which of the following statements about the evaporation is true?

1) Water evaporates only at a temperature of 100°C

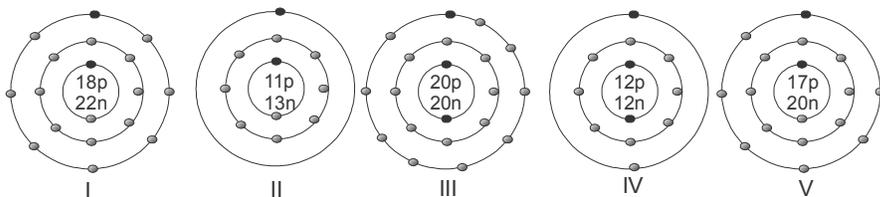
2) Water rises to the sky and forms clouds

3) When water on our skin evaporates, heat is lost from our body

4) During evaporation, water changes from liquid state to vapour state

27. Which of the following are isobaric pairs ?

- 1) I & III
- 2) III & V
- 3) II & IV
- 4) I & V



28. Which of the following statements is/are correct?

- 1) Centrifugation method can be used to separate butter from cream
- 2) Sugar solution can be separated by evaporation
- 3) Chromatography can be used in chemical industrial
- 4) Camphor and sodium chloride can be separated by sublimation

29. Which of the following statements is/are true?

- 1) The components in a mixture may have variable proportions
- 2) The constituents of a compound can be separated easily
- 3) The components of suspension can be separated by filtration
- 4) The particles of a colloid can pass through a filter paper

30. Which statement is correct about valency ?

- 1) It is the combining capacity of an element
- 2) It is equal to number of valence electrons in case of sodium, magnesium and aluminium
- 3) Valency of Mg in MgSO_4 is 2
- 4) It is always a whole number with no charge

Single Correct Answer Type :

15 × 2 = 30M

31. In eye donation, which one of the following parts of donor's eye is utilized?

- 1) Cornea
- 2) Lens
- 3) Iris
- 4) Retina

32. A scientist isolated pieces of plasma membrane from an animal cell and put them in an apparatus so that the membrane separated two reservoirs of distilled water. When she added a dilute solution of acetic acid to one side (side A) of the membrane, the pH of the solution on other side (side B) did not change. She then ground up a culture of animal cells, filtered out the organelles and bits of membrane, and added this cell extract to side A. The pH of the solution in side B then dropped. What is the most reasonable explanation for the drop in pH in side B ?

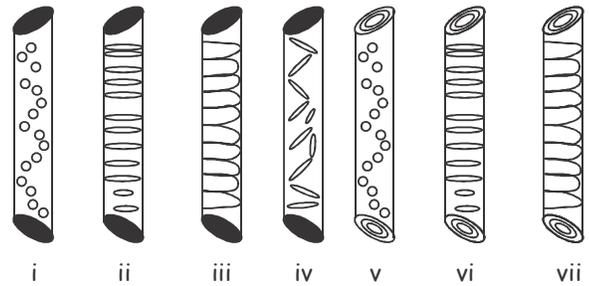
- 1) The cell extract contained lipids that dissolved in the membrane
- 2) Protons moved across the membrane by diffusion
- 3) Protons moved across the membrane by passive transport
- 4) Protons moved across the membrane by active transport

33. Which of the cells in retina are almost absent in many nocturnal animals ?

- 1) Rods 2) Cones 3) Epithelial cells 4) Neurons

34. Which of the following xylem elements are found in primitive angiosperms ?

- 1) (ii), (iii), (iv)
 2) (ii), (iii), (vi), (vii)
 3) (v), (vi), (vii)
 4) (i) and (v)



35. Match List - I (Physiological Processes) with List - II (Cell organelles) and select the correct answer using the codes given below the lists:

List - I

- A. Photosynthesis
 B. Mineral uptake
 C. Respiration
 D. Protein synthesis

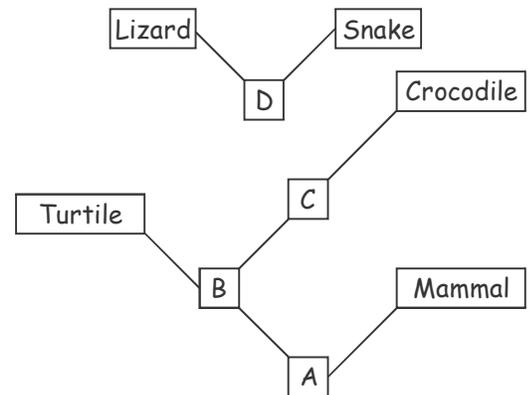
List - II

1. Plasma membrane
 2. Chloroplast
 3. Mitochondria
 4. Ribosomes

- 1) A → 2, B → 1, C → 3, D → 4 2) A → 1, B → 2, C → 4, D → 4
 3) A → 1, B → 2, C → 3, D → 4 4) A → 2, B → 1, C → 4, D → 3

36. Phylogenetic tree for animal classification is shown A, B, C and D are the ancestors. Mark the correct interpretation.

- 1) Turtle, lizard and snake form a monophyletic taxon
 2) Amniotic egg must have evolved at stage B or C
 3) The most recent common ancestor of lizard and turtle is B
 4) Both (1) and (3)



37. It is a semiautonomous cell organelle which is having its own genetic material. Identify that organelle from the following figures.



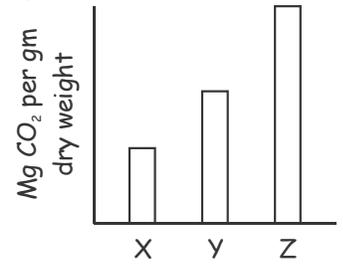
- 1) Figure (iii) 2) Figure (i) 3) Figure (iv) 4) Figure (i) & (ii)

38. The character that is shared by amphibia, mammals, birds and reptiles is

- 1) Limbs 2) Amnion 3) Hair 4) Mammary glands

39. The relative rates of respiration of various parts of a young dicot plant are shown. X, Y and Z would be

- 1) X : Stem apex Y : Flowering parts Z : Phloem
- 2) X : fruits Y : Stem apex Z : Flowering parts
- 3) X : Xylem Y : Cambium Z : Phloem
- 4) X : Leaf Y : Flower Z : Stem



40. Observe the four food webs given below. The lowermost dot in each figure represents autotrophs. Among these, the most stable community will be

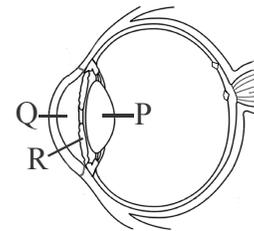


41. A ligament is

- 1) A fibrous tissue that joins muscle to bone
- 2) A type of amorphous gel that cements nonmovable joints together
- 3) A type of fibrous connective tissue that joins bones together at joints.
- 4) Formed from cartilage that then matures into bone

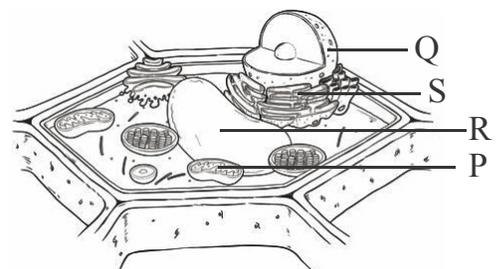
42. In the given figure P, Q and R respectively are _____

- 1) Pupil, Lens, Iris
- 2) Lens, Pupil, Iris
- 3) Iris, Lens, Pupil
- 4) Pupil, Iris, Lens



43. Kumar wants to see microscopic view of the organelle which takes part in the transmission of hereditary characters from one generation to the next. Which labelled part will his teacher focus to make a microscopic view of the organelle?

- 1) P 2) Q
- 3) R 4) S



44. The endoplasmic reticulum is involved with the

- 1) Replication of DNA 2) Formation of Ribosomes
- 3) Identification of foreign material 4) Initiation of cell division and replication

45. Tympanic cavity is another name for

- 1) Middle ear 2) Ear canal 3) Inner ear cavity 4) Cavity of the eyeball