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(SCHOLARS INTEGRAL MATHS & SCIENCE OLYMPIADS)



BIGGEST NATIONAL LEVEL OLYMPIADS (STAGE - II)

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.org** after 1st March-2017.
- ☞ Stage-I result copy will be sent to the school mail id. Please contact your branch principal to know your branch result.

CLASS : IX

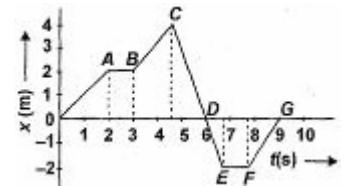
PHYSICS

Single Correct Answer Type :

 $10 \times 2 = 20M$

1. Read the passage carefully and answer

A dancer demonstrating dance steps along a straight line. The position time graph is given below. The average speed for the dance step depicted by CD is

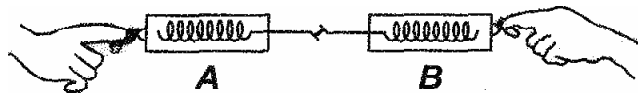


- 1) 1 ms^{-1} 2) 1.33 ms^{-1}
 3) 2.75 ms^{-1} 4) 0.89 ms^{-1}
2. A train starts from a station P with a uniform acceleration a_1 , for some distance and then goes with uniform retardation a_2 for some more distance to come to rest at the station Q. The distance between the stations P and Q is 4km and the train takes 4 minutes to complete this journey, then $\frac{1}{a_1} + \frac{1}{a_2} =$

- 1) 3 2) 4 3) 2 4) 5
3. Read the passage carefully and answer
- A source of sound is placed at one end of an iron bar two kilometer long and two sounds are heard at the other end at an interval of 5 6 seconds. If the velocity of sound in air is 330 m/s.

Velocity of sound in iron is

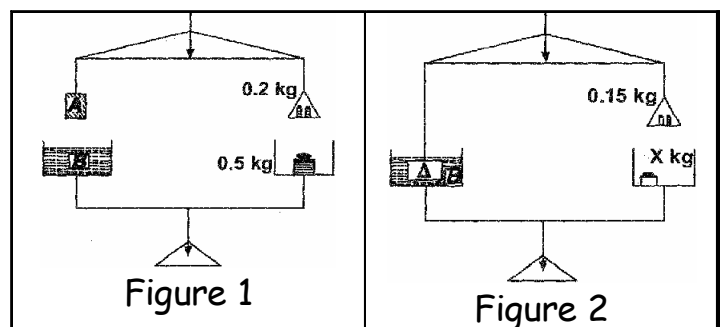
- 1) 2348 ms^{-1} 2) 4348 ms^{-1} 3) 1300 ms^{-1} 4) 5223 ms^{-1}
4. Consider two spring balances hooked as shown in the figure. We pull them in opposite directions. If the reading shown by A is 1.5 N, the reading shown by B will be



- 1) 1.5 N 2) 2.5 N 3) 3.0 N 4) Zero
5. A submarine emits a SONAR pulse which returns from an underwater cliff in 1.02 s. If the speed of sound in salt water is 1531 m/s, how far away is the cliff?
- 1) 500 m 2) 1 km 3) 781 km 4) 600 m
6. A player caught a cricket ball of mass 150 g moving at a rate of 20 m/s. If the catching process be completed in 0.1 s, then the force exerted by the ball on the hands of the player is

- 1) 0.3 N 2) 30 N 3) 300 N 4) 3000 N

7. Consider the following figures 1 and 2. In figure 1, the mass of the body A in air is 0.2 kg. The mass of the water container (with water in it) is 0.5 kg. In figure 2, when A is completely immersed in the water of the container B the readings of the respective balances change as shown.



What is the value of X?

- 1) 0.55 kg 2) 0.15 kg 3) 0.3 kg 4) 0.45 kg

8. A body of mass 6 kg is under a force of 6 N which causes displacement in it given by $s = \frac{t^2}{4}$. The work done by the force in 2 S is
- 1) 12 J 2) 9 J 3) 6 J 4) 3 J
9. A car weighing 1000kg and travelling at 30 m/s stops at a distance of 50 m accelerating uniformly. What is the force exerted on it by brakes?
- 1) 9000 N 2) 5000 N 3) 7000 N 4) 1000 N
10. Read the passage carefully and answer
- A source of sound is placed at one end of an iron bar two kilometer long and two sounds are heard at the other end at an interval of 5.6 seconds. If the velocity of sound in air is 330 m/s.
- The time taken by sound to travel 2 km in iron is
- 1) 0.46 s 2) 0.16 s 3) 2.26 s 4) 3.36 s

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

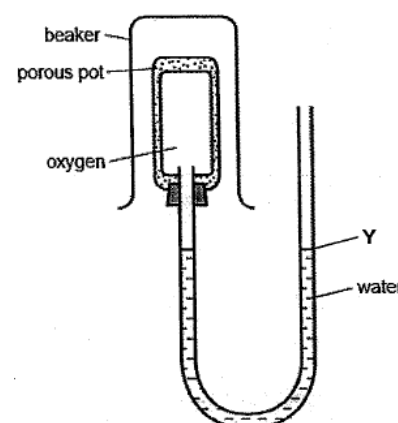
11. Which of the following are not the units of 'g' ?
- 1) m/s^2 2) N/Kg 3) Nm/s^2 4) Nms^2
12. Which of the following is/are not the characteristics of a sound wave ?
- 1) Transverse in nature 2) Longitudinal in nature
- 3) Both transverse and longitudinal in nature 4) Travels in vacuum
13. The weight of an object is
- 1) Greater on earth 2) Lesser on earth
- 3) Lesser on Moon 4) Greater on Moon
14. A sample of metal weighs 210g in air, 180g in water and 120g in liquid then relative density (R.D) of
- 1) Metal is 3 2) Metal is 7 3) Liquid is 3 4) Liquid is
15. An air column in a pipe, which is closed at one end, will be in resonance with a vibrating tuning fork of frequency 264 Hz if the length of the column in cm is
- 1) 31.25 2) 62.50 3) 93.75 4) 125

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

16. The diagram shows a diffusion experiment.

Which gas, when present in the beaker over the porous pot, will cause the water level at Y to drop most?

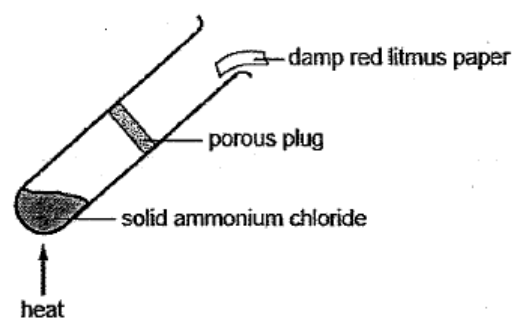
- 1) Hydrogen
- 2) Carbon dioxide
- 3) Helium
- 4) Methane



17. Sodium ammonium chloride decomposes upon heating produces ammonia gas and hydrogen chloride gas.

Which changes occur to the damp red litmus paper in the experiment above?

- 1) Damp red litmus paper is bleached
- 2) Damp red litmus paper remains red
- 3) Damp red litmus paper turns blue and then turns red
- 4) Damp red litmus paper blue, then bleached



18. A flask contains a mixture of benzene and aqueous sodium chloride. Benzene boils at 80°C and is immiscible with water.

Which of the following methods are suitable to obtain samples of benzene and dry sodium chloride?

First method

- 1) Fractional distillation
- 2) Filtration
- 3) Crystallisation
- 4) Use a separating funnel

Second method

- Evaporation
- Crystallisation
- Use a separating funnel
- Evaporation

19. The table shows the number of sub-atomic particles in four different ions. Which ion has the correct number of sub-atomic particles shown?

	Ion	Number of sub – atomic particles		
		Protons	Neutrons	electrons
A	${}^{14}_{7}\text{N}^{3-}$	7	14	10
B	${}^{37}_{17}\text{Cl}^{-}$	17	20	18
C	${}^7_3\text{Li}^{+}$	4	4	2
D	${}^{64}_{29}\text{Cu}^{2+}$	29	64	27

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

20. Oxygen has two isotopes, namely oxygen-16 and oxygen-18.

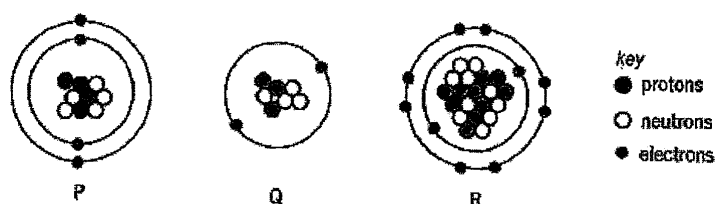
Which statement correctly describes the two isotopes of oxygen?

- 1) Both oxygen-16 and oxygen-18 form ions with a charge of 2^{-} .
- 2) Oxygen-16 has a smaller proton number than oxygen-18.
- 3) Both oxygen-16 and oxygen-18 have the same relative atomic masses.
- 4) Oxygen-16 has an electronic configuration of 2,8,6 while oxygen-18 has an electronic configuration of 2,8,8.

21. How many moles of hydrogen atoms does 4.8 g of methane contain?

- 1) 1.20 2) 0.900 3) 0.300 4) 0.120

22. Which statement is correct about two gases with the same relative molecular mass?
- 1) They have the same melting and boiling points
 - 2) They have the same mass.
 - 3) They have the same rate of diffusion at room temperature and pressure.
 - 4) They have the same solubility in water at room temperature and pressure.
23. Element X has n protons and forms ions with a charge of $2-$. Element Y has $(n+3)$ protons.
- Which of the following correctly shows the structure and formula of a compound formed between elements X and Y?
- 1) An ionic compound YX_2
 - 2) A covalent compound YX_2
 - 3) An ionic compound Y_2X
 - 4) A covalent compound Y_2X
24. When a 2.31 g sample of oxide of nitrogen was analysed, it was found to contain 0.68 g of nitrogen. What is the empirical formula of the oxide of nitrogen?
- 1) NO
 - 2) NO_2
 - 3) N_2O
 - 4) N_2O_4
25. The diagrams below show the structure of three particles, P, Q and R.



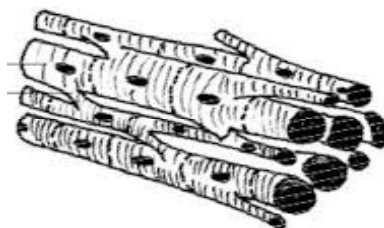
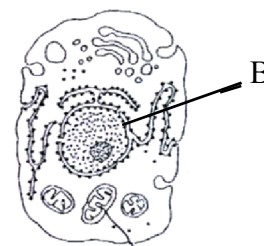
Which of the following statements about P, Q and R are correct?

- 1) P and Q are isotopes of the same element.
 - 2) The atoms of P and R have the same number of electron shells.
 - 3) They all have noble gas electronic configurations.
 - 4) They are all electrically neutral.
- Multi Correct Answer Type :** **5 × 3 = 15M**
26. An enclosed container containing only ammonia gas was slowly heated from room temperature to 450°C .
- What are the gas (es) which may be found in the enclosed container at 450°C ?
- 1) Nitrogen
 - 2) Hydrogen
 - 3) Ammonia
 - 4) Oxygen
27. An element X has two isotopes with mass numbers 35 and 37. If the atomic weight of the element is 35.5, which of the following statements are correct about it?
- 1) Isotope X^{35} has 25% abundance
 - 2) Isotope X^{37} has 75% abundance
 - 3) Isotope X^{35} has 75% abundance
 - 4) Isotope X^{37} has 25% abundance
28. Which of the following are having same number of molecules as that of 4 g of helium?
- 1) 28 g of N_2
 - 2) 10 g of Ne
 - 3) 14 g of CO
 - 4) 71 g of Cl_2

29. Diffusion is a technique used to separate different gases present in a gaseous mixture. But we cannot separate the mixture of two gases NH_3 and HCl . Identity the correct reasons from the following.
- 1) Both gases have same molecular mass.
 - 2) Both gases react easily and form ammonium chloride.
 - 3) Only non-reacting gaseous mixtures can be separated by using diffusion.
 - 4) Gases with different molecular weights cannot be separated by using diffusion.
30. Which of the following properties will be different for solids, liquids and gases ?
- 1) Intermolecular spaces
 - 2) Vibrations of molecules
 - 3) Energy of molecules
 - 4) Intermolecular attractions

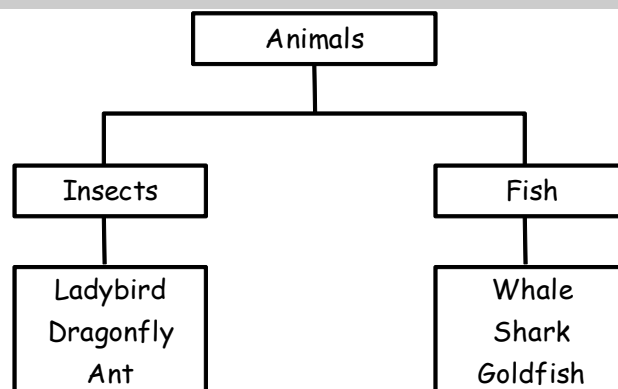
Single Correct Answer Type :**15 × 2 = 30M**

31. Jahnvi notices that the papaya plant in her garden does not bear fruits although it has flowered a few times. What could be the reason for this?
- i) Pollination has not occurred.
 - ii) The flowers has only male parts.
 - iii) The flowers has only female parts.
 - iv) The plant is not mature enough to bear fruits.
- 1) (i) Only 2) (ii) & (iii) Only 3) (i) & (ii) Only 4) (i),(ii),(iii) & (iv)
32. Select the alternative giving **CORRECT** identification and function of the organelle 'B' in the diagram.
- 1) Endoplasmic reticulum - Synthesis of lipids
 - 2) Mitochondria - Produce cellular energy in the form of ATP
 - 3) Nucleus - Controls all the functions of the cell
 - 4) Lysosomes - Secrete hydrolytic enzymes
33. What are the characteristics of the muscle given below.



- i) It is a voluntary muscle
 - ii) It is an involuntary muscle
 - iii) It is a Striated muscle
 - iv) It is a smooth muscle
- 1) (i) & (ii) 2) (ii) & (iii) 3) (i) & (iii) 4) (iii) & (iv)

34. The chart below shows how two groups of animals are classified.



In the classification chart above, which of the following organisms is wrongly classified?

- 1) Ladybird
 - 2) Dragonfly
 - 3) Whale
 - 4) Goldfish
35. Which of the following is a 'Diploblastic animal' ?
- 1) Hydra
 - 2) Leech
 - 3) Ascaris
 - 4) Fasciola
36. Which part of the Ear is functionally important ?
- 1) Ear pinna
 - 2) Middle Ear
 - 3) Vestibule
 - 4) Choclea
37. Match the following with correct response.
- | | |
|--------------------|--------------------------------|
| (a) Collenchyma | (p) Flexibility in plants |
| (b) Sclereids | (q) Lignin deposition |
| (c) Sclerenchyma | (r) Grit cells |
| (d) Xylem & phloem | (s) Conduction of water & food |
- 1) a - q, b - s, c - p, d - r
 - 2) a - r, b - q, c - s, d - p
 - 3) a - p, b - r, c - q, d - s
 - 4) a - s, b - p, c - s, d - q
38. The presence of which of the following is useful in separating ferns and mosses into different taxonomic categories ?
- 1) Nuclei
 - 2) Chlorophyll
 - 3) Vascular tissue
 - 4) Flowers
39. Function of areolar tissue is
- | | |
|-------------------------------------|----------------------------------|
| (i) It supports internal organs | (ii) It stores fat |
| (iii) It helps in repair of tissues | (iv) It protects internal organs |
- 1) (i) & (vi)
 - 2) (ii), (iii) & (iv)
 - 3) (i) & (iii)
 - 4) (iii) & (iv)
40. Which of the following sentence(s) about bacteria and fungi is/are true?
- i) Some fungi are edible.
 - ii) Moulds only grow on dry substances.
 - iii) Bacteria cannot grow in bright places.
 - iv) Fungi and bacteria can cause food to decay.
- 1) (i) & (ii) only
 - 2) (i) & (iv) only
 - 3) (iii) & (iv) only
 - 4) (ii), (iii) & (iv) only

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

Column - I

- a) Thallophyte
- b) Bryophyte
- c) Pteridophyte
- d) Gymnosperm
- e) Angiosperm

Column - II

- i) Marsilea
- ii) Pinus
- iii) Ulothrix
- iv) Ficus
- v) Funaria

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

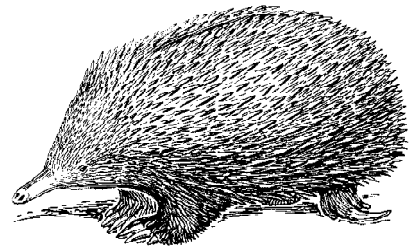
42. Which of the following is Hemichordate?

- (i) Balanoglossus (ii) Amphioxus (iii) Herdmania (iv) Mixin

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

43. Ornithorhynchus is a _____

- 1) Fossil bird
- 2) Flightless bird
- 3) Connecting link between reptiles and birds
- 4) Egg laying Mammal



44. Which group of animals belong to the same PHYLUM ?

- i) Malarial parasite , Amoeba , Euglena
- ii) Earthworm , Pinworm , Tapeworm
- iii) Prawn , Scorpion , Locust
- iv) Sponge , Sea anemone , Starfish

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

45. Select the CORRECT labelled option

- 1) A - Retina, B - Fovea , C - Cornea, D - Sclera
- 2) A - Retina, B - Blind spot, C - Choroid, D - Sclera
- 3) A - Sclera, B - Blind spot, C - Cornea, D - Retina
- 4) A - Choroid, B - Blind spot, C - Retina, D - Sclera

