

Science Sample Paper Class IX- SA-II

SECTION-A

1. A horse of mass 210 kg and a dog of mass 25 kg are running at the same speed. Which of the two possesses more kinetic energy? How? 1
2. Define ozone hole. 1
3. Seema tried to push a heavy rock of 100 kg for 200 s but could not move it. Find the work done by Seema at the end of 200 s. 1
4. Which group of plants has nitrogen fixing bacteria in the root nodules? 1
5. a. Name the fundamental particle not present in the nucleus of hydrogen atom. 2
b. Give one important application of isotopes of cobalt and uranium.
6. What is notochord? Mention its functions. 2
7. a. Why does a block of wood held under water rise to the surface when released? 2
b. An object of weight 200 N is floating in a liquid. what is the magnitude of buoyant force acting on it?
8. a. Three persons A, B and C are made to hear a sound travelling through different media as given below. Who will hear the sound first? Why 2

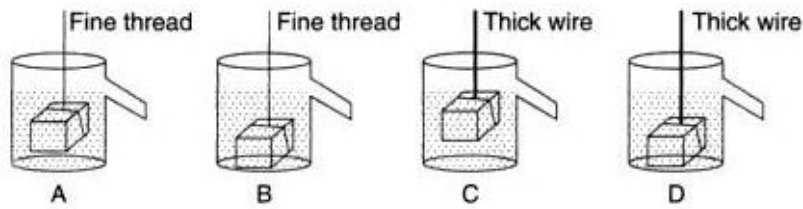
Person	medium
A	iron rod
B	air
C	water

- b. Sound of explosions taking place on other planets is not heard by a person on the earth. Give reason.
9. What is soil erosion? List two activities which cause soil erosion. 2
10. a. Write chemical formulae of the following compounds. 2
i. Aluminium nitride ii. Ammonium phosphate
b. Name the metal which shows variable Valency. Write the formulae of two of its chlorides.
11. Thallophyta, bryophyte and pteridophyte are classified as cryptogamiae whereas gymnosperms and angiosperms are classified as phanerogamiae, why? 2
12. Define relative density of a substance. Relative density of silver is 10.8 The density of water is 1000 kg/m^3 What is the density of silver in SI units? 2
13. Define air pollution. Write two methods to prevent it. 2
14. Write the most striking features of the following phyla/class: 3
a. Arthropoda b. Amphibia c. Porifera
15. a. Calculate the number of moles in 5.75 g of sodium. (Na=23u). 3
b. Define law of constant composition.
c. What is the atomicity of chloroform and methane?

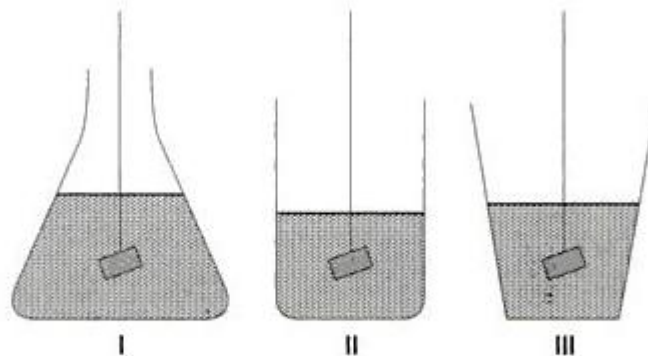
16. a. What are infectious diseases? Give two examples. 3
b. Name two infectious agents.
17. a. A gold sample contains 90% of gold and rest copper. How many atoms of gold are present in one gram of this sample of gold. (Au = 197u). 3
b. Which has more number of atoms, 100 g of calcium or 100 g of oxygen gas? (Ca = 40u, O = 16u)
18. A mass of 10 kg is dropped from a height of 50 cm. Find its 3
a. Potential energy just before dropping
b. Kinetic energy just on touching the ground.
c. Velocity with which it hits the ground. (given = 10 m/s^2)
19. a. State a condition for an echo to be heard. 1
b. Bats cannot see, then how do they catch their prey? 2
20. a. Name two diseases against which infants below one year are vaccinated. 1
b. Why are antibiotics effective against bacteria but not against viruses? 2
21. a. A sound wave travels at a speed of 339 m/s. If the wavelength is 1.2 cm, what is the frequency of the wave? 2
b. If 20 waves are produced per second, what is the frequency in hertz? 1
22. a. Distinguish between acute and chronic diseases. 1
b. What will be the symptom of a disease if the target organs are i. lungs ii. liver 2
23. Derive an expression to calculate the energy for an object in motion and calculate the work required to stop a car of mass 1500 kg moving at a velocity of 60 km/h. 5
- OR
- Name and define the physical quantity whose S.I unit is watt. Write a relation between kWh and joule.
- A pump delivers 1000 L of water in a tank at a height of 15 m in 120 sec. Calculate work done by the pump and its power. (Take $g = 9.8 \text{ m/s}^2$)
24. a. Describe briefly the Rutherford's alpha particle scattering experiment. Write the important observations and conclusions drawn from the experiment. 3
b. If the bromine atom is available in the form of two isotopes $^{79}_{35}\text{Br}$ and $^{81}_{35}\text{Br}$ in 49.7% and 50.3% abundance respectively. Calculate the average atomic mass of bromine. 2
25. Describe the steps and process involved in the nitrogen cycle. Also show cycling of various nutrients in this cycle diagrammatically. 5

SECTION-B

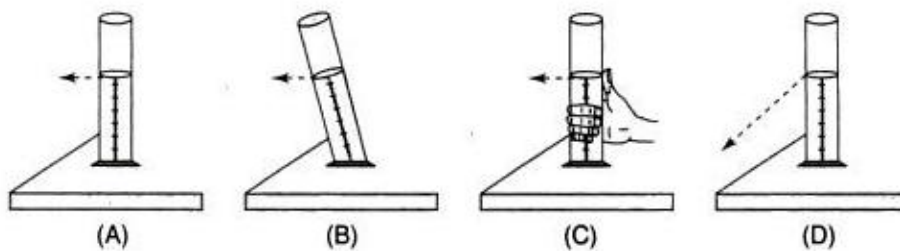
26. The correct set up shown for an experiment to establish relationship between loss in weight of an immersed solid with the weight of water displaced by it is: 1



- a. A b. B c. C d. D
27. The mass of a solid iron cube of side 4 cm is to be determined using a spring balance. If the density of iron is approximately 8.5 g cm^{-3} , the best suited spring balance for determining weight of the solid would be of: 1
- a. Range 0 – 250 gwt; Least count 1gwt
 b. Range 0 – 250 gwt; Least count 5 gwt
 c. Range 0 – 1000 gwt; Least count 5 gwt
 d. Range 0 – 1000 gwt; Least count 10 gwt
28. A body is weighed in liquid by immersing it fully in each of the three containers shown. The apparent weight of the solid will be: 1



- a. Least in I b. Least in II
 c. Least in III d. Equal in all
29. The correct way of reading a liquid level is shown in: 1



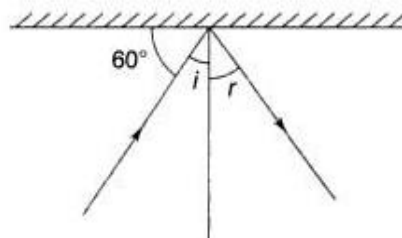
- a. figure A b. figure B
 c. figure C d. figure D

30. A glass cuboidal has dimensions $10\text{ cm} \times 10\text{ cm} \times 4\text{ cm}$. It is kept with its perfect face ($10\text{ cm} \times 10\text{ cm}$) in contact with the table. If it is lifted and allowed to rest on the table with its smaller surface ($10\text{ cm} \times 4\text{ cm}$) in contact with the table the pressure exerted will 1
- increase
 - decrease
 - remain unchanged
 - may increase or decrease depending on the shape of table
31. An iron cuboid and a wooden cuboid of the same dimensions are placed on sand on the face having the same area, then: 1
- Iron cuboid applies greater pressure
 - Both cuboids apply the same pressure
 - Wooden cuboid applies greater pressure
 - They exert no pressure
32. A pulse was created in a stretched string of length 5 m by four students A, B, C and D. They observed that the pulse returned after reflection at the point of creation 5 times in 10 seconds and calculated the speed as given in the table below. 1

Student	A	B	C	D
Speed m/s	0.5	2.5	5	10

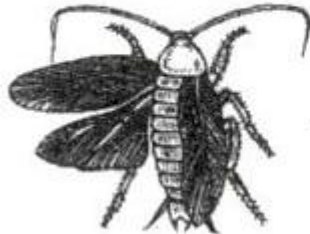
The student who has reported the speed correctly is:

- A
 - B
 - C
 - D
33. When a bell rings continuously, the waves produced in air are: 1
- Transverse waves
 - Electromagnetic waves
 - Transverse pulses
 - Longitudinal waves
34. If the air in the room warms up, the speed of sound: 1
- increases
 - remains same
 - decreases
 - fluctuates
35. The angle of reflection in the figure depicted is: 1



- 60°
- 30°
- Can be 60° or 30°
- All options are wrong

36. What is the role of the air bladder in fishes? 1
 a. acts as a reservoir of fresh air
 b. to maintain buoyancy in water
 c. reserve food material is stored in it
 d. acts as lungs when a fish jumps to the surface of water
37. The distinguishing characteristic of phylum chordata is: 1
 a. head with a pointed mouth b. dorsal nerve cord
 c. presence of pseudopodia d. diploblastic
38. An adaptation of earthworm is:
 a. aerial b. burrowing
 c. aquatic d. arboreal
39. Observe the pictures of Cockroach and house fly. 1



Cockroach



House Fly

- The common feature that assigns them in the same phylum is: 1
 a. three pairs of legs b. antennae
 c. wings d. jointed legs
40. Most of the fungi are harmful for human beings as they cause skin disease and food poisoning but the biggest role of fungi in nature is: 1
 a. as source of antibiotics
 b. increase the absorption of phosphate through mycorrhizal association.
 c. do fermentation
 d. decompose the dead organism and clean the environment
41. Feathers and beaks are present in the animals of class: 1
 a. Aves b. Reptilia
 c. Amphibia d. Mammals

Solution:

26. (a) 27. (c) 28. (d) 29. (a) 30. (a) 31. (a) 32. (c) 33. (d) 34. (a)
 35. (b) 36. (b) 37. (b) 38. (b) 39. (d) 40. (d) 41. (a)

Answer [Only Hints and Explanations]

1. Horse, more mass 1
 $\frac{1}{2} + \frac{1}{2}$
2. Define ozone hole 1
 - The thinning of ozone layer at few places/depletion of ozone layer/ breakdown of O_3 into O_2 by CFC's at certain places
3. zero, (no displacement) 1
4. Leguminous plants/Legumes 1
5. (a) Neutron 1
 (b) $^{60}\text{Co} \longrightarrow$ treatment of cancer $\frac{1}{2}$
 $^{235}_{92}\text{u} \longrightarrow$ used as a fuel in nuclear reaction $\frac{1}{2}$
6. Notochord is a long rod like support structure that runs along the back bone of the animals 1
 Separating the nervous tissue from gut $\frac{1}{2}$
 It provides a place for muscles to attach for $\frac{1}{2}=2$
7. (a) Buoyant force more than weight of object 1

OR

 Density of object less than that of water

OR

 Relative density of object (wood) less than 1
 (b) 200 N (equal to weight of object) 1
8. (a) A, as sound travels fastest in solids 1
 (b) Sound cannot travel through vacuum and space between planets and earth is mainly vacuum 1
9. SOIL EROSION: Removal of top soil by water or wind 2 activities which cause soil erosion 2

Any $2\frac{1}{2}$ mark each

 - overgrazing, forest fire, deforestation, flood, field follow, not doing terrace farming on hill slopes, etc
10. (a) (i) Al N 1
 (ii) $(\text{NH}_4)_3\text{PO}_4$ $\frac{1}{2}+\frac{1}{2}$
 (b) Fe /Cu $\rightarrow +1, +2$ $\frac{1}{2}$
 $\begin{array}{c} | \\ +2,+3 \\ \text{Fe Cl}_2/\text{Fe Cl}_3 \end{array}$ $\frac{1}{2}$
11. (a) Cryptogammae – have all hidden reproductive organs produce spores 1
 (b) Phanerogammoe – have well developed reproductive organs 2

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12. Relative density of a substance is the ratio of density of substance to the density of water

$$\text{or Relative density} = \frac{\text{density of substance}}{\text{density of water}} \quad 1$$

x = density of silver

$$10.8 = \frac{x}{1000}, x = 10800 \text{ kg/m}^3 \quad 1$$

13. Contamination of air by undesirable particles is called air pollution 1

Methods to prevent air pollution

(i) to reduce the use of aerosol/refrigerants ½

(ii) to reduce the use of fossil fuel ½

14. Most striking feature:

(a) Arthropoda – jointed legs/chitinous cuticle/Haemocoel 1

(b) Amphibia – found both in H₂O + land/moist skin/3 chambered heart 1

(c) Porifera – pores over the body/canal sys/non-otile/minimum differentiation to division into tissues 3

15. (a) No. of moles = $\frac{5.75}{23} = 0.25$ moles 1

(b) Law of constant composition → According to this law, a pure substance is a compound is made up of same kind of element combine together in a definite ratio by mass 1

(c) CHCl₃ – 5 atomicity CH₄ – 5 ½+½

16. • diseases caused by microbes

• Any 2 examples of infectious disease ½+½
i.e. cholera, influenza etc

• Any 2 infectious agents – bacteria, virus, fungi, protozoa ½+½=3

17. (a) 100 gm of alloy – 90 gm of Au

$$\therefore 1 \text{ gm of alloy} - \frac{90 \times 1}{100} = 0.9 \text{ gm of Au} \quad 1$$

$$\text{No. of Au atom} = \frac{0.9}{197} \times 6.023 \times 10^{23} \quad \frac{1}{2}$$

$$\begin{aligned} \text{No. of Au atom} &= 0.027 \times 10^{23} \\ &= 2.7 \times 10^{21} \quad \frac{1}{2} \end{aligned}$$

(b) 100 gm Ca

$$\text{No. of atoms of ca} = \frac{100}{40} \times 6.023 \times 10^{23} = 1.505 \times 10^{24}$$

23. Energy in motion = K.E.

Work done in moving a body from rest = K.E. of the body

$$w = K.E = FS \cos \theta \quad F = ma, \theta = 0^\circ [F \text{ and } S \text{ in same direction}] \quad \cos 0^\circ = 1$$

$$\therefore w = mas \quad 1$$

From 3rd equation of motion

$$v^2 = 2as \quad [\because u = 0] \quad \therefore as = \frac{v^2}{2} \quad 2$$

Substituting for 'as' from (2) in (1), we get $w = \frac{mv^2}{2} = \text{K.E.} \quad 3$

$$w = \frac{1}{2} mv^2 - \frac{1}{2} mu^2, \quad u = 60 \text{ kg/h} = \frac{50}{3} \text{ m/s}, \quad m = 1500 \text{ kg}, \quad v = 0$$

$$w = \frac{1}{2} \times 1500 \left[0 - \left(\frac{50}{3} \right)^2 \right] = -208333.3 \text{ J} \quad 2$$

OR

Power, power is the rate of doing work 1

$$1 \text{ kWh} = 3.6 \times 10^6 \text{ J} \quad 1$$

$$m \text{ of water} = 1000 \text{ L} \times 1 \text{ kg/L} = 1000 \text{ kg}$$

$$h = 15 \text{ m}, \quad t = 120 \text{ s} \quad w = PE = mgh = 1000 \times 9.8 \times 15 = 147000 \text{ J} \quad \frac{1}{2}$$

$$P = w/t = \frac{147000}{120} = 1225 \text{ W} \quad 1\frac{1}{2}$$

24. (a) *Main observations and conclusion*

(i) Most of the α -rays went straight without showing any deviation. This proves that there are large empty spaces within an atom. 3

(ii) Few rays are deviated by larger or smaller angle. This proves that there is a presence of a positive sphere which could deviate the +ve charged $\frac{4}{2}\alpha$ -rays. He named this +ve sphere as 'nucleus'.

(iii) Very few $\frac{4}{2}\alpha$ -rays rebounded back. This process that this +ve sphere is very hard and dense and the entire mass is concentrated within the nucleus. Size of nucleus is very small compared to size of atom.

(b) ${}_{35}^{79}\text{Br}$ ${}_{35}^{81}\text{Br}$ $= \frac{49.7}{100} \times 79 + \frac{50.3}{100} \times 81 = 80.0 \quad 2$

25. (ii) Explanation: Fixing of nitrogen by N_2 , fixing bacteria which are found in root nodules of legumes or which are free living ammonification by bacteria in soil, conservation of ammonia to nitrates or nitrites to nitrates by different type of bacteria. Nitrates to nitrogen in air by different bacteria (any two) 3=5