

Full Practice Exam — Set 1

Science · Class 9 · Full Syllabus Practice Exam

TIME 60 minutes	QUESTIONS 50	TOTAL MARKS 60	MAX. SCORE ___ / 60
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

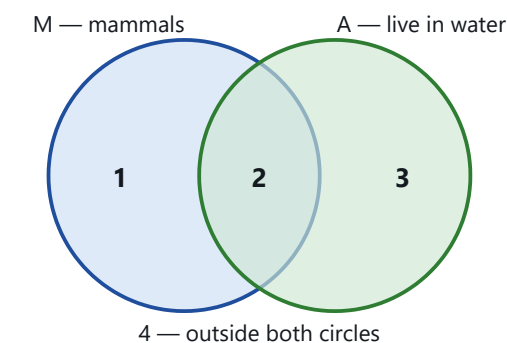
- There are **50 questions** in this paper. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–45 carry **1 mark** each. Questions 46–50 (Achievers Section) carry **3 marks** each.
- Take $g = 10 \text{ m/s}^2$ unless stated otherwise. There is no negative marking.
- Study every diagram and table carefully before answering.

Section 1 — Logical Reasoning

Q1–Q10 · 1 mark each

- What comes next in the series? 7, 14, 28, 56, ____
 (A) 84 (B) 98
 (C) 112 (D) 126
- What comes next in the series? ACE, GIK, MOQ, ____
 (A) RTV (B) STU
 (C) TVX (D) SUW
- If SUN is coded as TVO, then MOON is coded as _____.
 (A) NOPO (B) NPPN
 (C) LNNM (D) NPPO
- Find the **odd one out**: copper, iron, mercury, zinc
 (A) Mercury (B) Iron
 (C) Copper (D) Zinc
- Complete the analogy: Bird : Feathers :: Fish : ____
 (A) Fins (B) Scales
 (C) Gills (D) Water
- A boy stands facing the rising sun early in the morning. In which direction does his shadow fall?
 (A) East (B) South
 (C) North (D) West
- A colony of bacteria doubles every minute and fills a jar completely in 60 minutes. When was the jar half full?
 (A) At 59 minutes (B) At 45 minutes
 (C) At 30 minutes (D) At 58 minutes

8. Pointing to a man, Sita said, "His mother is the only daughter of my mother." How is the man related to Sita?
- (A) Brother (B) Son
(C) Father (D) Uncle
9. In a row of children facing north, Riya is 9th from the left and Anil is 12th from the right. If they exchange places, Riya becomes 15th from the left. How many children are in the row?
- (A) 24 (B) 25
(C) 26 (D) 27
10. In the Venn diagram below, circle M contains mammals and circle A contains animals that live in water. Which numbered region would a whale belong to?



Two overlapping circles, M and A, with four regions

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

Section 2 — Science

Q11–Q35 · 1 mark each

11. The rate of diffusion is highest in _____.
(A) Solids (B) Liquids
(C) Gases (D) It is the same in all three
12. The boiling point of water on the kelvin scale is _____.
(A) 373 K (B) 300 K
(C) 273 K (D) 400 K
13. Which of the following is a colloid?
(A) Sugar solution (B) Milk
(C) Sand in water (D) Brass
14. Two miscible liquids with different boiling points are best separated by _____.
(A) Filtration (B) A separating funnel
(C) Fractional distillation (D) Sublimation
15. Almost the entire mass of an atom is concentrated in its _____.
(A) Electron shells (B) Empty space
(C) Outermost orbit (D) Nucleus
16. The valency of oxygen is _____.
(A) 1 (B) 2
(C) 3 (D) 6

17. The molecular mass of ammonia (NH_3) is _____. (N = 14 u, H = 1 u)
- (A) 17 u (B) 16 u
(C) 15 u (D) 18 u
18. Which cell organelle is the site of protein synthesis?
- (A) Lysosome (B) Ribosome
(C) Golgi apparatus (D) Vacuole
19. The plasma membrane of a cell is described as selectively permeable because it _____.
(A) Lets everything pass through (B) Stops all substances
(C) Allows only some substances to pass through (D) Dissolves in water
20. The tissue responsible for increasing the length of a plant is _____.
(A) Epidermis (B) Sclerenchyma
(C) Phloem (D) Apical meristem
21. Bryophytes are often called the amphibians of the plant kingdom because they _____.
(A) Live both on land and in water for reproduction (B) Can swim freely
(C) Have true roots and stems (D) Produce seeds
22. Which of the following is a cold-blooded vertebrate?
(A) Pigeon (B) Frog
(C) Bat (D) Whale
23. A body covers equal distances in equal intervals of time. Its motion is said to be _____.
(A) Accelerated (B) Non-uniform
(C) Uniform (D) Circular
24. An athlete runs once around a circular track and returns to the starting point. Her displacement is _____.
(A) Equal to the length of the track (B) Equal to the diameter
(C) Half the length of the track (D) Zero
25. Newton's second law of motion is expressed as _____.
(A) $F = ma$ (B) $F = m \div a$
(C) $F = mv$ (D) $F = m + a$
26. The SI unit of momentum is _____.
(A) $\text{kg}\cdot\text{m}/\text{s}^2$ (B) $\text{kg}\cdot\text{m}/\text{s}$
(C) $\text{N}\cdot\text{m}$ (D) J/s
27. The acceleration due to gravity on the moon is about _____ that on the earth.
(A) Six times (B) Equal to
(C) One-sixth of (D) One hundredth of
28. A man pushes hard against a stationary wall. The work done by him on the wall is _____.
(A) Very large (B) Negative
(C) Equal to the force applied (D) Zero, because there is no displacement

29. In a hydroelectric power station, the energy conversion is _____.
 (A) Potential energy → kinetic energy → electrical energy
 (B) Electrical energy → kinetic energy → potential energy
 (C) Chemical energy → heat energy → electrical energy
 (D) Kinetic energy → chemical energy → electrical energy
30. Sound waves travelling through air are _____.
 (A) Longitudinal waves
 (B) Transverse waves
 (C) Electromagnetic waves
 (D) Stationary waves
31. SONAR, used to find the depth of the sea, works on the reflection of _____.
 (A) Infrasonic waves
 (B) Ultrasonic waves
 (C) Radio waves
 (D) Light waves
32. AIDS is caused by _____.
 (A) A bacterium
 (B) A protozoan
 (C) A virus
 (D) A fungus
33. Which of the following is a renewable source of energy?
 (A) Coal
 (B) Petroleum
 (C) Natural gas
 (D) Solar energy
34. Which of the following soil practices helps prevent soil erosion on a hill slope?
 (A) Terrace farming
 (B) Deep ploughing along the slope
 (C) Removing all vegetation
 (D) Burning crop residues
35. The main function of white blood cells is to _____.
 (A) Carry oxygen
 (B) Fight infection
 (C) Help blood clot
 (D) Store food

Section 2 — Science (contd.)

Q36–Q45 · 1 mark each

36. A temperature of 27 °C on the kelvin scale is _____.
 (A) 246 K
 (B) 273 K
 (C) 300 K
 (D) 327 K
37. The number of moles in 36 g of water is _____. ($\text{H}_2\text{O} = 18 \text{ g per mole}$)
 (A) 0.5
 (B) 1
 (C) 18
 (D) 2
38. A body moving at 5 m/s accelerates uniformly at 2 m/s^2 for 4 seconds. Its final velocity is _____.
 (A) 13 m/s
 (B) 10 m/s
 (C) 8 m/s
 (D) 40 m/s
39. The kinetic energy of a body of mass 4 kg moving at 5 m/s is _____.
 (A) 20 J
 (B) 50 J
 (C) 100 J
 (D) 200 J
40. A machine does 600 J of work in 20 seconds. Its power is _____.
 (A) 12 W
 (B) 120 W
 (C) 30 W
 (D) 12 000 W

41. A ship sends an ultrasonic pulse to the sea bed and receives the echo after 4 seconds. If sound travels at 1500 m/s in sea water, the depth of the sea is _____.

- (A) 1500 m (B) 375 m
(C) 6000 m (D) 3000 m

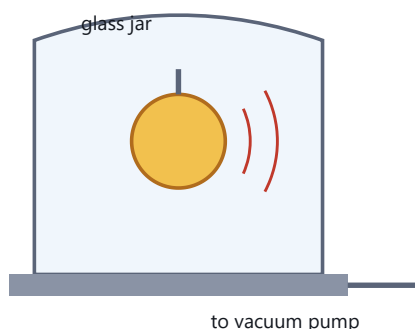
42. One row of the table below is **incorrectly** matched. Which row is it?

Row	Organelle	Function
(A)	Vacuole	Releases energy as ATP
(B)	Lysosome	Digests worn-out cell parts
(C)	Chloroplast	Carries out photosynthesis
(D)	Golgi apparatus	Packages and dispatches materials

Table 1.1 — Cell organelles and their functions

- (A) (A) (B) (B)
(C) (C) (D) (D)

43. An electric bell is ringing inside a glass jar. As the air is pumped out of the jar, the sound _____.



An electric bell ringing inside a jar being evacuated

- (A) Grows fainter and finally cannot be heard (B) Becomes louder
(C) Stays exactly the same (D) Changes into light
44. A camel walks easily on soft sand because its broad feet _____.
- (A) Increase the pressure on the sand (B) Reduce the pressure on the sand by spreading the weight over a larger area
(C) Reduce the camel's weight (D) Make the sand harder
45. Which of the following foods is the richest source of protein?
- (A) Rice (B) Potato
(C) Pulses (D) Sugar

Achievers Section

Q46–Q50 · 3 marks each

46. **Assertion (A):** Sound travels faster in steel than in air.

Reason (R): The particles of a solid are packed closely and are strongly bound, so a disturbance is passed on quickly.

- (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false (D) A is false but R is true

47. A stone is dropped from the top of a tower 45 m high. Taking $g = 10 \text{ m/s}^2$ and ignoring air resistance, the time it takes to reach the ground is _____.
(A) 1.5 s (B) 9 s
(C) 4.5 s (D) 3 s
48. The mass of 5 moles of carbon dioxide is _____. (C = 12 u, O = 16 u)
(A) 220 g (B) 88 g
(C) 44 g (D) 440 g
49. A sample of blood is examined under a microscope. Which observation would identify a cell as a red blood cell rather than a white blood cell?
(A) It is much larger and moves about (B) It is a biconcave disc without a nucleus in humans
(C) It has many lobes in its nucleus (D) It engulfs bacteria
50. Consider the three statements below.
(i) Evaporation takes place only at the boiling point of a liquid.
(ii) The displacement of a body can be zero even when the distance travelled is not.
(iii) Vaccination gives protection by making the body produce its own antibodies.
Which of them are **true**?
(A) (i) and (ii) only (B) (ii) and (iii) only
(C) (i) and (iii) only (D) All three

Answer Key

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

Solutions

1. Answer: (C) 112

Each term is double the one before it: 7, 14, 28, 56. So the next term is $56 \times 2 = 112$.

2. Answer: (D) SUW

Within each group the letters skip one (A, C, E), and each group starts six letters after the previous one: A, G, M, **S**. So the next group is **SUW**.

3. Answer: (D) NPPO

Each letter moves one step forward in the alphabet (S→T, U→V, N→O). Applying this to MOON gives M→N, O→P, O→P, N→O, that is **NPPO**.

4. Answer: (A) Mercury

All four are metals, but **mercury** is the only one that is a liquid at room temperature. The other three are solids.

5. Answer: (B) Scales

Feathers form the body covering of a bird, so the analogy asks for the body covering of a fish, which is **scales**. Fins are for movement and gills for breathing, so neither is a covering.

6. Answer: (D) West

The sun rises in the east, so he faces east and the light comes from in front of him. His shadow therefore falls behind him, towards the **west**.

7. Answer: (A) At 59 minutes

Because the colony doubles each minute, the jar goes from half full to completely full in the final minute. So it was half full at **59 minutes**. Halving the total time is the trap here — the growth is not steady but doubling.

8. Answer: (B) Son

The only daughter of Sita's mother is Sita herself. So the man's mother is Sita, which makes him her **son**.

9. Answer: (C) 26

After the exchange Riya stands where Anil stood, so Anil's position was 15th from the left as well as 12th from the right. The total is therefore $15 + 12 - 1 = 26$ children.

10. Answer: (B) Region 2

A whale is a mammal — it breathes air and feeds its young on milk — and it also lives in water. It therefore belongs to both circles, which is the overlap, **region 2**.

11. Answer: (C) Gases

Diffusion needs particles to move about freely. In **gases** the particles are far apart and move fastest, so gases mix most rapidly; in solids the particles only vibrate in place, so diffusion is negligible.

12. Answer: (A) 373 K

Water boils at 100 °C, and adding 273 converts this to **373 K**.

13. Answer: (B) Milk

Milk is a colloid of tiny fat droplets dispersed in water: the particles do not settle, pass through filter paper and scatter light. Sugar solution is a true solution and sand in water a suspension that settles on standing.

14. Answer: (C) Fractional distillation

Since the liquids mix completely, no funnel or filter can part them. **Fractional distillation** works because the liquid with the lower boiling point vaporises first and is condensed separately — the method used to separate the gases of air and the fractions of petroleum.

15. Answer: (D) Nucleus

Protons and neutrons are nearly 2000 times heavier than electrons, and both sit in the **nucleus**. So the nucleus holds virtually all the mass while occupying a minute part of the atom's volume.

16. Answer: (B) 2

Oxygen has the configuration 2, 6 and needs two more electrons to complete its outer shell, so its valency is **2**. This is why its compounds are H_2O , CO_2 and MgO .

17. Answer: (A) 17 u

One nitrogen atom contributes 14 u and three hydrogen atoms $3 \times 1 = 3$ u, giving $14 + 3 = \mathbf{17\ u}$.

18. Answer: (B) Ribosome

Ribosomes assemble amino acids into proteins. Lysosomes digest worn-out parts, the Golgi apparatus packages and dispatches materials, and vacuoles store substances.

19. Answer: (C) Allows only some substances to pass through

The membrane **allows only certain substances across**, controlling what enters and leaves the cell. This selective control is what makes osmosis and diffusion into the cell possible while keeping unwanted materials out.

20. Answer: (D) Apical meristem

Cells of the **apical meristem**, found at the tips of roots and shoots, divide continuously and so add to the plant's length. Lateral meristem, by contrast, increases girth.

21. Answer: (A) Live both on land and in water for reproduction

Mosses and liverworts grow on land but **need water for their male gametes to swim to the female ones**, so they depend on both habitats, like amphibians. They lack true roots, stems and seeds.

22. Answer: (B) Frog

The **frog** is an amphibian, and its body temperature varies with that of its surroundings, so it is cold-blooded (poikilothermic). Birds and mammals — pigeon, bat and whale — are warm-blooded.

23. Answer: (C) Uniform

Covering equal distances in equal intervals means the speed does not change, which is **uniform motion**. Its distance–time graph is a straight line.

24. Answer: (D) Zero

Displacement is the straight-line distance from start to finish. Since she ends exactly where she began, the displacement is **zero**, even though the distance covered equals the full circumference.

25. Answer: (A) $F = ma$

The law says the rate of change of momentum is proportional to the applied force, which for constant mass gives **$F = ma$** . The product mv is momentum, not force.

26. Answer: (B) $\text{kg}\cdot\text{m/s}$

Momentum = mass $\times$ velocity, so its unit is **$\text{kg}\cdot\text{m/s}$** . The unit $\text{kg}\cdot\text{m/s}^2$ is the newton, $\text{N}\cdot\text{m}$ the joule and J/s the watt.

27. Answer: (C) One-sixth of

The moon has both a much smaller mass and a smaller radius, and the two effects together give a surface gravity of about **one-sixth** of the earth's, roughly $1.6\ \text{m/s}^2$.

28. Answer: (D) Zero, because there is no displacement

Work = force $\times$ displacement, and the wall does not move at all. So the work done on it is **zero**, however tiring the effort feels.

29. Answer: (A) Potential energy $\rightarrow$ kinetic energy $\rightarrow$ electrical energy

Water stored high in a reservoir holds potential energy; as it falls this becomes kinetic energy, which spins a turbine and generates electricity. So the chain is **potential $\rightarrow$ kinetic $\rightarrow$ electrical**.

30. Answer: (A) Longitudinal waves

In air the particles vibrate back and forth along the same direction in which the sound travels, producing compressions and rarefactions. Such waves are **longitudinal**. Light, by contrast, is a transverse electromagnetic wave.

31. Answer: (B) Ultrasonic waves

SONAR sends out **ultrasonic waves** and measures the time taken by the echo to return. Ultrasound is used because its short wavelength travels as a well-defined beam and reflects clearly from the sea bed.

32. Answer: (C) A virus

AIDS is caused by **HIV**, the human immunodeficiency *virus*, which attacks the immune system so that ordinary infections become life-threatening.

33. Answer: (D) Solar energy

Solar energy is replenished continuously and will not run out on any human timescale. Coal, petroleum and natural gas are fossil fuels, formed over millions of years and therefore non-renewable.

34. Answer: (A) Terrace farming

Terrace farming cuts the slope into level steps, so rainwater cannot gather speed and carry the topsoil away. Ploughing down the slope and clearing vegetation both make erosion worse.

35. Answer: (B) Fight infection

White blood cells are the body's defence force: they engulf microbes and produce antibodies, so their job is to **fight infection**. Red cells carry oxygen and platelets help the blood to clot.

36. Answer: (C) 300 K

Add 273 to convert Celsius to kelvin: $27 + 273 = 300 \text{ K}$.

37. Answer: (D) 2

Number of moles = mass $\div$ molar mass = $36 \div 18 = 2 \text{ moles}$, which contain $2 \times 6.022 \times 10^{23}$ molecules.

38. Answer: (A) 13 m/s

Using $v = u + at$: $v = 5 + (2 \times 4) = 13 \text{ m/s}$.

39. Answer: (B) 50 J

Kinetic energy = $\frac{1}{2}mv^2 = \frac{1}{2} \times 4 \times 25 = 50 \text{ J}$.

40. Answer: (C) 30 W

Power = work $\div$ time = $600 \div 20 = 30 \text{ W}$.

41. Answer: (D) 3000 m

In 4 s the pulse travels $1500 \times 4 = 6000 \text{ m}$, but that covers the trip down *and* back. So the depth is $6000 \div 2 = 3000 \text{ m}$.

42. Answer: (A) (A)

The vacuole stores water, sap and waste and helps keep a plant cell turgid; releasing energy as ATP is the work of the *mitochondrion*. So row **(A)** is wrong, while the other three are correctly matched.

43. Answer: (A) Grows fainter and finally cannot be heard

Sound needs particles of a medium to carry its vibrations. As air is removed there are fewer and fewer particles, so the sound **grows fainter and eventually stops being heard**, even though the hammer can still be seen striking the bell.

44. Answer: (B) Reduce the pressure on the sand by spreading the weight over a larger area

Pressure = force $\div$ area. The camel's weight is unchanged, but spreading it over broad feet gives a much larger contact area, so the **pressure on the sand is reduced** and the feet do not sink in.

45. Answer: (C) Pulses

Pulses such as gram, lentil and pea are the main protein source in a vegetarian diet. Rice, potato and sugar are chiefly carbohydrates.

46. Answer: (A) Both A and R are true and R is the correct explanation of A

Sound moves at about 340 m/s in air but roughly 5000 m/s in steel. The close packing and strong bonds of a solid let each particle pass the vibration to its neighbour almost immediately. Both statements are true and the second is exactly **why** the first holds.

47. Answer: (D) 3 s

Use $h = ut + \frac{1}{2}gt^2$ with $u = 0$: $45 = \frac{1}{2} \times 10 \times t^2 = 5t^2$, so $t^2 = 9$ and $t = \mathbf{3\ s}$. Its speed on landing would be $v = gt = 30$ m/s.

48. Answer: (A) 220 g

The molar mass of CO_2 is $12 + 32 = 44$ g per mole, so 5 moles have mass $5 \times 44 = \mathbf{220\ g}$. That sample contains $5 \times 6.022 \times 10^{23}$ molecules.

49. Answer: (B) It is a biconcave disc without a nucleus in humans

A mature human red blood cell is **a small biconcave disc that has lost its nucleus**, which leaves more room for haemoglobin and helps it squeeze through narrow capillaries. Lobed nuclei, amoeboid movement and engulfing bacteria are all features of white blood cells.

50. Answer: (B) (ii) and (iii) only

Statement (i) is false: evaporation happens at every temperature and only from the surface, while boiling occurs throughout the liquid at a fixed temperature. Statement (ii) is true, as for an athlete finishing a lap where she started. Statement (iii) is true, which is what makes the protection long-lasting. So only **(ii) and (iii)** hold.