

Full Practice Exam — Set 3

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

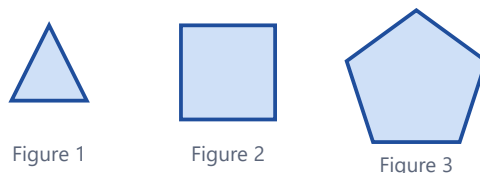
- There are **50 questions** in this paper. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–45 carry **1 mark** each. Questions 46–50 (Achievers Section) carry **3 marks** each.
- Take $g = 10 \text{ m/s}^2$ unless 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? 100, 81, 64, 49, ____
 (A) 25 (B) 30
 (C) 36 (D) 42
- What comes next in the series? DF, HJ, LN, ____
 (A) OQ (B) QS
 (C) PQ (D) PR
- If white is called blue, blue is called red and red is called yellow, what is the colour of a clear daytime sky called?
 (A) Red (B) Blue
 (C) Yellow (D) White
- Find the **odd one out**: ear, eye, nose, lungs
 (A) Ear (B) Eye
 (C) Nose (D) Lungs
- Complete the analogy: Kidney : Excretion :: Heart : ____
 (A) Circulation (B) Digestion
 (C) Respiration (D) Reproduction
- A man walks 4 km south from point A and then 3 km west. How far is he from A?
 (A) 1 km (B) 12 km
 (C) 7 km (D) 5 km
- A father is three times as old as his son. In 12 years he will be twice as old as his son. The son's present age is _____.
 (A) 12 years (B) 10 years
 (C) 8 years (D) 14 years

8. In a class of 45 students, Arjun ranks 17th from the top. What is his rank from the bottom?
- (A) 27th (B) 29th
(C) 28th (D) 30th
9. A science exhibition runs for the whole of a 30-day month, starting on a Monday. How many Sundays fall during the exhibition?
- (A) 3 (B) 4
(C) 5 (D) 6
10. The shapes below form a series. How many sides will the next shape have?



A series of shapes: Figure 1, Figure 2 and Figure 3

- (A) 5 (B) 6
(C) 7 (D) 8

Section 2 — Science

Q11–Q35 · 1 mark each

11. A gas can be converted into a liquid by _____.
(A) Heating it and reducing the pressure (B) Shaking it vigorously
(C) Adding a catalyst (D) Cooling it and applying pressure
12. Which statement correctly distinguishes evaporation from boiling?
(A) Evaporation occurs only at the surface and at any temperature (B) Evaporation occurs throughout the liquid at a fixed temperature
(C) Boiling occurs only at the surface (D) Both occur only at the boiling point
13. The best method to separate sand from water is _____.
(A) Distillation (B) Filtration
(C) Sublimation (D) Chromatography
14. An alloy such as brass is best described as _____.
(A) A compound (B) An element
(C) A homogeneous mixture (D) A suspension
15. Which postulate of Dalton's atomic theory was later shown to be incorrect?
(A) Matter is made of tiny particles called atoms (B) Atoms of a compound are alike
(C) Atoms combine in simple whole-number ratios (D) Atoms cannot be divided any further
16. The maximum number of electrons that the K shell of an atom can hold is _____.
(A) 2 (B) 8
(C) 18 (D) 32
17. Atoms of different elements that have the same mass number are called _____.
(A) Isobars (B) Isotopes
(C) Ions (D) Isomers

18. The formula unit mass of sodium chloride (NaCl) is _____. (Na = 23 u, Cl = 35.5 u)
- (A) 35.5 u (B) 58.5 u
(C) 46 u (D) 71 u
19. The statement "all cells arise from pre-existing cells" was contributed to the cell theory by _____.
(A) Schleiden (B) Schwann
(C) Virchow (D) Robert Hooke
20. The main function of the Golgi apparatus is to _____.
(A) Release energy (B) Carry out photosynthesis
(C) Digest food particles (D) Store, modify and dispatch materials made in the cell
21. The tissue that stores fat in the body and acts as an insulator is _____.
(A) Adipose tissue (B) Areolar tissue
(C) Bone (D) Cartilage
22. Unlike xylem, phloem transports material _____.
(A) Only upwards (B) In both directions
(C) Only downwards (D) Only at night
23. Gymnosperms differ from angiosperms in that they _____.
(A) Never grow into trees (B) Have no vascular tissue
(C) Bear naked seeds not enclosed in a fruit (D) Reproduce only by spores
24. Which feature helps birds to fly?
(A) Solid, heavy bones (B) Three-chambered heart
(C) Moist scaleless skin (D) Hollow bones filled with air
25. A body moving along a circular path at a constant speed is _____.
(A) Accelerating, because its direction changes (B) Not accelerating at all
(C) Moving with uniform velocity (D) In equilibrium
26. The acceleration of a body is negative when the body is _____.
(A) Speeding up (B) Slowing down
(C) At rest (D) Moving uniformly
27. The force of friction between two surfaces always _____.
(A) Acts along the direction of motion (B) Increases the speed of the body
(C) Opposes the relative motion between them (D) Acts perpendicular to the surfaces
28. Pressure is defined as _____.
(A) Thrust $\times$ area (B) Force $\times$ distance
(C) Area $\div$ thrust (D) Thrust $\div$ area
29. According to Archimedes' principle, the upward buoyant force on a body immersed in a fluid equals the _____.
(A) Weight of the fluid displaced by the body (B) Weight of the body
(C) Volume of the body (D) Density of the fluid

30. Two bodies of different masses are dropped from the same height in a vacuum. They _____.
 (A) Have the heavier one accelerate faster
 (B) Fall with the same acceleration
 (C) Have the lighter one accelerate faster
 (D) Do not fall at all
31. As a ball falls freely towards the ground, its _____.
 (A) Potential energy increases and kinetic energy decreases
 (B) Total energy decreases steadily
 (C) Potential energy decreases and kinetic energy increases, the total staying constant
 (D) Kinetic energy stays constant
32. The commercial unit of electrical energy is the _____.
 (A) Joule
 (B) Watt
 (C) Newton metre
 (D) Kilowatt hour
33. Sound travels fastest in _____.
 (A) Steel
 (B) Water
 (C) Air
 (D) Vacuum
34. Sounds of frequency below 20 Hz are called _____.
 (A) Ultrasonic
 (B) Infrasonic
 (C) Audible
 (D) Supersonic
35. Tuberculosis and the common cold spread mainly through _____.
 (A) Contaminated water
 (B) Insect bites
 (C) Air, in droplets released by coughing and sneezing
 (D) Contaminated soil

Section 2 — Science (contd.)

Q36–Q45 · 1 mark each

36. A speed of 72 km/h expressed in metres per second is _____.
 (A) 10 m/s
 (B) 36 m/s
 (C) 25 m/s
 (D) 20 m/s
37. A force of 200 N acts on a surface of area 0.5 m^2 . The pressure exerted is _____.
 (A) 400 Pa
 (B) 200 Pa
 (C) 100 Pa
 (D) 1000 Pa
38. The potential energy of a body of mass 2 kg raised to a height of 10 m ($g = 10 \text{ m/s}^2$) is _____.
 (A) 20 J
 (B) 200 J
 (C) 100 J
 (D) 400 J
39. The number of molecules in 0.25 mole of a gas is _____.
 (A) 6.022×10^{23}
 (B) 3.011×10^{23}
 (C) 1.5055×10^{23}
 (D) 2.4×10^{24}
40. A sound of frequency 170 Hz travels in air at 340 m/s. Its wavelength is _____.
 (A) 0.5 m
 (B) 1 m
 (C) 4 m
 (D) 2 m

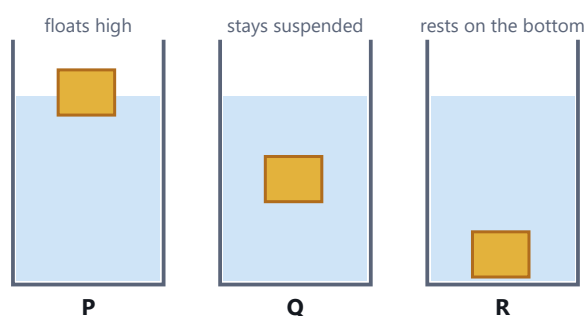
41. One row of the table below is **incorrectly** matched. Which row is it?

Row	Nutrient or vitamin	Deficiency disease
(A)	Vitamin C	Scurvy
(B)	Vitamin A	Rickets
(C)	Iron	Anaemia
(D)	Iodine	Goitre

Table 3.1 — Nutrients and deficiency diseases

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

42. Three identical solid blocks P, Q and R are placed in the same liquid, as shown. Which block has the greatest density?



Three blocks placed in identical beakers of the same liquid

- (A) P (B) Q
(C) R (D) All three are equal

43. A sharp knife cuts better than a blunt one because the sharp edge _____.

- (A) Has a smaller area of contact, so it produces greater pressure
(B) Applies a greater force
(C) Has a larger area of contact
(D) Reduces friction to zero

44. Grains are dried thoroughly in the sun before being stored mainly to _____.

- (A) Improve their taste (B) Prevent the growth of fungi and bacteria
(C) Increase their weight (D) Make them germinate faster

45. Which of the following diseases can be prevented by vaccination?

- (A) Anaemia (B) Diabetes
(C) Polio (D) Scurvy

Achievers Section

Q46–Q50 · 3 marks each

46. **Assertion (A):** A body moving along a circular track with constant speed has an acceleration.

Reason (R): Acceleration is the rate of change of speed only.

- (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 force of 20 N acts for 5 seconds on a body of mass 4 kg initially at rest. The momentum gained by the body is _____.
(A) 25 kg·m/s (B) 80 kg·m/s
(C) 400 kg·m/s (D) 100 kg·m/s
48. The mass of 0.5 mole of calcium carbonate (CaCO_3) is _____. (Ca = 40 u, C = 12 u, O = 16 u)
(A) 50 g (B) 25 g
(C) 100 g (D) 200 g
49. A student examines a muscle tissue and notes that its cells are branched, striated, uninucleate and contract rhythmically throughout life without tiring. The tissue is _____.
(A) Skeletal muscle (B) Cardiac muscle
(C) Smooth muscle (D) Nervous tissue
50. Consider the three statements below.
(i) The buoyant force on an object depends on the volume of fluid it displaces.
(ii) Isotopes of an element differ in the number of protons in their nuclei.
(iii) Antibiotics are of no use against viral infections.
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	A	4	D	5	A
6	D	7	A	8	B	9	B	10	B
11	D	12	A	13	B	14	C	15	D
16	A	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	B
31	C	32	D	33	A	34	B	35	C
36	D	37	A	38	B	39	C	40	D
41	B	42	C	43	A	44	B	45	C
46	C	47	D	48	A	49	B	50	C

Solutions

1. Answer: (C) 36

The terms are the squares $10^2, 9^2, 8^2, 7^2$, counting downwards. The next is $6^2 = 36$.

2. Answer: (D) PR

The first letters advance four at a time: D, H, L, **P**. The second letter is always two after the first: **R**. So the next pair is **PR**.

3. Answer: (A) Red

A clear sky is really blue, and in this language blue is called **red**. Answering "blue" means giving the real colour rather than its new name.

4. Answer: (D) Lungs

The ear, eye and nose are sense organs, receiving sound, light and smell. The **lungs** are a respiratory organ, so they are the odd one out.

5. Answer: (A) Circulation

The kidney carries out excretion, so the analogy asks for the heart's function, which is pumping blood, that is **circulation**.

6. Answer: (D) 5 km

The two legs are perpendicular, so the straight-line distance is $\sqrt{4^2 + 3^2} = \sqrt{25} = 5$ **km**, in the south-west direction from A.

7. Answer: (A) 12 years

Let the son be x , so the father is $3x$. In 12 years: $3x + 12 = 2(x + 12)$, giving $3x + 12 = 2x + 24$ and $x = 12$ **years**. The father is then 36, and in 12 years 48 will indeed be twice 24.

8. Answer: (B) 29th

Rank from the bottom = total – rank from the top + 1 = $45 - 17 + 1 = 29$ **th**.

9. Answer: (B) 4

If the 1st is a Monday, the Sundays are the 7th, 14th, 21st and 28th. The 35th would be the next one, but the month ends at 30, so there are **4** Sundays.

10. Answer: (B) 6

The shapes are a triangle (3 sides), a square (4 sides) and a pentagon (5 sides), so each figure gains one side. The next shape is a hexagon with **6** sides.

11. Answer: (D) Cooling it and applying pressure

Cooling slows the particles and pressure pushes them closer together, so the forces of attraction can hold them in the liquid state. This is how LPG is stored as a liquid inside a cylinder.

12. Answer: (A) Evaporation occurs only at the surface and at any temperature

Evaporation happens at the surface of a liquid at every temperature, as wet clothes drying in the shade show. Boiling happens throughout the liquid and only at its boiling point.

13. Answer: (B) Filtration

Sand is insoluble and its particles are large, so they are held back by filter paper while the water passes through. **Filtration** is therefore the simplest method.

14. Answer: (C) A homogeneous mixture

Brass is copper and zinc melted together and mixed uniformly, with no fixed ratio and no chemical bond between them, so it is a **homogeneous mixture**. Its components keep their own properties, unlike those in a compound.

15. Answer: (D) Atoms cannot be divided any further

The discovery of the electron, proton and neutron showed that the atom is not indivisible, so "**atoms cannot be divided**" failed. Dalton's other ideas, such as combination in whole-number ratios, still stand.

16. Answer: (A) 2

The capacity of a shell is $2n^2$. For the K shell $n = 1$, giving $2 \times 1^2 = 2$ electrons. The L shell ($n = 2$) holds 8 and the M shell 18.

17. Answer: (A) Isobars

Isobars have the same mass number but different atomic numbers, so they are different elements — calcium-40 and argon-40 are a familiar pair. Isotopes are atoms of the *same* element with different mass numbers.

18. Answer: (B) 58.5 u

Adding the masses of one sodium and one chlorine: $23 + 35.5 = 58.5 \text{ u}$. The term *formula unit mass* is used because sodium chloride exists as a lattice of ions rather than as separate molecules.

19. Answer: (C) Virchow

Schleiden and Schwann proposed that all plants and animals are made of cells, and **Rudolf Virchow** completed the theory by showing that new cells arise only by the division of existing ones.

20. Answer: (D) Store, modify and dispatch materials made in the cell

The Golgi apparatus receives material from the endoplasmic reticulum and **modifies, packages and sends it** to its destination inside or outside the cell. It also forms lysosomes.

21. Answer: (A) Adipose tissue

Adipose tissue is a connective tissue whose cells are filled with fat globules. It stores energy and, lying beneath the skin, acts as a heat insulator.

22. Answer: (B) In both directions

Xylem carries water in one direction only, upwards from the roots. **Phloem carries prepared food both up and down** the plant, to wherever it is needed or stored — a process called translocation that uses energy.

23. Answer: (C) Bear naked seeds not enclosed in a fruit

Gymnosperm literally means naked seed: pines and cycads bear their seeds on cones, without any fruit around them. Angiosperms enclose their seeds within a fruit.

24. Answer: (D) Hollow bones filled with air

Birds have **hollow, air-filled bones** that keep the skeleton light without losing strength. They also have feathers, powerful flight muscles and a four-chambered heart.

25. Answer: (A) Accelerating, because its direction changes

Velocity includes direction, and the direction changes continuously along a circle. So the body is **accelerating** even at constant speed, and the acceleration points towards the centre.

26. Answer: (B) Slowing down

Negative acceleration, or retardation, means the velocity is decreasing, so the body is **slowing down**. Its acceleration then points opposite to its motion.

27. Answer: (C) Opposes the relative motion between them

Friction always **opposes relative motion**, which is why a rolling ball eventually stops. It is a nuisance in machinery yet essential for walking and braking.

28. Answer: (D) Thrust $\div$ area

Pressure is the **thrust acting per unit area**, measured in pascals (N/m^2). The same force therefore produces a much greater pressure when it acts over a smaller area.

29. Answer: (A) Weight of the fluid displaced by the body

The buoyant force equals the **weight of the fluid displaced**. If that weight matches the body's own weight the body floats; if it is less, the body sinks.

30. Answer: (B) Fall with the same acceleration

The gravitational force on a heavier body is larger, but so is its inertia, and the two effects cancel exactly: $a = F \div m = g$ for every body. So both **fall with the same acceleration**, as Galileo argued.

- 31. Answer: (C)** Potential energy decreases and kinetic energy increases, the total staying constant
As the height falls, mgh falls, and the energy lost reappears as $\frac{1}{2}mv^2$. Ignoring air resistance, the **sum of the two stays constant**, which is the law of conservation of energy.
- 32. Answer: (D)** Kilowatt hour
Electricity bills are measured in **kilowatt hours**, each equal to 3.6×10^6 J. The joule is far too small a unit for household use.
- 33. Answer: (A)** Steel
The closer and more strongly bound the particles, the faster a disturbance is handed on, so sound is quickest in solids: about 5000 m/s in **steel** against 1500 m/s in water and 340 m/s in air. It cannot travel in a vacuum at all.
- 34. Answer: (B)** Infrasonic
Infrasonic sounds lie below the audible range, and elephants and whales use them to communicate over long distances. Ultrasonic sounds lie above 20 000 Hz.
- 35. Answer: (C)** Air, in droplets released by coughing and sneezing
Both are **air-borne diseases**: tiny droplets released when an infected person coughs or sneezes carry the pathogen to others nearby. Crowded, poorly ventilated rooms therefore help them spread.
- 36. Answer: (D)** 20 m/s
Multiply by $\frac{5}{18}$ to convert: $72 \times \frac{5}{18} = \mathbf{20 \text{ m/s}}$.
- 37. Answer: (A)** 400 Pa
Pressure = thrust $\div$ area = $200 \div 0.5 = \mathbf{400 \text{ Pa}}$. Dividing by a number smaller than 1 increases the value, a step often slipped.
- 38. Answer: (B)** 200 J
Potential energy = $mgh = 2 \times 10 \times 10 = \mathbf{200 \text{ J}}$.
- 39. Answer: (C)** 1.5055×10^{23}
Multiply the number of moles by Avogadro's number: $0.25 \times 6.022 \times 10^{23} = \mathbf{1.5055 \times 10^{23}}$ molecules.
- 40. Answer: (D)** 2 m
From $v = f\lambda$, the wavelength is $\lambda = \frac{340}{170} = \mathbf{2 \text{ m}}$.
- 41. Answer: (B)** (B)
Lack of vitamin A causes night blindness; rickets is caused by a shortage of vitamin D. So row **(B)** is wrong, while the other three pairings are correct.
- 42. Answer: (C)** R
A block floats when it is less dense than the liquid, stays suspended when the densities match, and sinks when it is denser. **R** rests on the bottom, so it is the densest, while P, floating with most of its bulk above the surface, is the least dense.
- 43. Answer: (A)** Has a smaller area of contact, so it produces greater pressure
The hand supplies about the same force either way, but a sharp edge concentrates it on a **very small area**. Since pressure = force $\div$ area, the pressure is far greater and the material gives way.
- 44. Answer: (B)** Prevent the growth of fungi and bacteria
Moisture allows fungi and bacteria to grow on stored grain and spoil it. Drying reduces the moisture content so these organisms **cannot grow**, which is why sun-drying precedes storage.
- 45. Answer: (C)** Polio
Polio is caused by a virus, and a vaccine primes the immune system against it — the basis of the pulse polio programme. Diabetes is non-communicable, while anaemia and scurvy are deficiency diseases cured by diet, not vaccines.

46. Answer: (C) A is true but R is false

The assertion is true: along a circle the direction of motion changes constantly, so the velocity changes and the body accelerates towards the centre. But the reason is false — acceleration is the rate of change of **velocity**, which includes direction, not of speed alone. So A is true and R is false.

47. Answer: (D) 100 kg·m/s

The acceleration is $a = F \div m = 20 \div 4 = 5 \text{ m/s}^2$, so after 5 s the velocity is $v = 0 + 5 \times 5 = 25 \text{ m/s}$ and the momentum is $4 \times 25 = \mathbf{100 \text{ kg}\cdot\text{m/s}}$. The same follows directly from impulse: $F \times t = 20 \times 5 = 100 \text{ kg}\cdot\text{m/s}$.

48. Answer: (A) 50 g

The molar mass is $40 + 12 + (3 \times 16) = 100 \text{ g per mole}$, so half a mole has mass $0.5 \times 100 = \mathbf{50 \text{ g}}$.

49. Answer: (B) Cardiac muscle

Branched, striated cells with a single nucleus that contract and relax tirelessly all life long describe **cardiac muscle**, found only in the heart. Skeletal muscle is striated but unbranched and multinucleate, and smooth muscle is spindle-shaped and unstriated.

50. Answer: (C) (i) and (iii) only

Statement (i) is true, since the buoyant force equals the weight of the displaced fluid, which depends on the volume displaced and the fluid's density. Statement (ii) is false — isotopes differ in *neutrons*; equal protons is what makes them the same element. Statement (iii) is true, because viruses lack the machinery antibiotics act on. So **(i) and (iii)** hold.