

Grade 8 Science: Comprehensive Study Notes & Master Practice MCQs

Complete NCERT Curriculum Coverage (Chapters 1 to 13)

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Standard Level: Grade 8 / Olympiad Prep

CHAPTER 1

Exploring the Investigative World of Science

CHAPTER CORE CONCEPTS & KEY SUMMARY

Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. The scientific method involves observation, formulating hypotheses, conducting controlled experiments, gathering qualitative and quantitative data, analyzing results, and drawing evidence-based conclusions. Scientific curiosity, objectivity, open-mindedness, and critical thinking form the cornerstone of scientific inquiry.

Key Terms: Scientific Method Hypothesis Variables (Independent, Dependent, Control) Qualitative & Quantitative Data
Experimental Verification Observation Scientific Ethics

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. Which step usually comes first in the scientific method?

- (A) Formulating a hypothesis
- (B) Making an observation
- (C) Analyzing data
- (D) Drawing a conclusion

Correct Answer: (B) Making an observation

Q2. An educated guess or testable statement in science is known as a:

- (A) Law
- (B) Theory
- (C) Hypothesis
- (D) Fact

Correct Answer: (C) Hypothesis

Q3. In an experiment, the variable that is deliberately changed by the scientist is called the:

- (A) Dependent variable
- (B) Controlled variable
- (C) Independent variable
- (D) Extraneous variable

Correct Answer: (C) Independent variable

Q4. Data that is described using numbers and measurements is known as:

- (A) Qualitative data
- (B) Quantitative data
- (C) Subjective data
- (D) Theoretical data

Correct Answer: (B) Quantitative data

Q5. Why are controlled variables kept constant during an experiment?

- (A) To ensure that only the independent variable affects the outcome (B) To speed up the experiment
(C) To reduce the cost of materials (D) To make data collection optional

Correct Answer: (A) To ensure that only the independent variable affects the outcome

Q6. A well-substantiated explanation of some aspect of the natural world based on a body of facts is a:

- (A) Scientific theory (B) Scientific law
(C) Hypothesis (D) Speculation

Correct Answer: (A) Scientific theory

Q7. Which of the following describes a scientific law?

- (A) An explanation of why natural phenomena occur (B) A statement describing what consistently happens under specific conditions in nature
(C) A temporary guess (D) A subjective belief

Correct Answer: (B) A statement describing what consistently happens under specific conditions in nature

Q8. Observing that 'the solution turned blue upon adding iodine' is an example of:

- (A) Quantitative observation (B) Qualitative observation
(C) Numerical inference (D) Mathematical deduction

Correct Answer: (B) Qualitative observation

Q9. Scientific inquiry requires which essential attitude?

- (A) Blind faith (B) Objectivity and willingness to revise ideas based on evidence
(C) Rigidity in beliefs (D) Disregard for peer review

Correct Answer: (B) Objectivity and willingness to revise ideas based on evidence

Q10. Peer review in science is critical because it:

- (A) Guarantees that all hypotheses become laws (B) Allows other scientists to evaluate and verify research methodology and conclusions
(C) Increases funding automatically (D) Eliminates the need for experiments

Correct Answer: (B) Allows other scientists to evaluate and verify research methodology and conclusions

Q11. Which of the following is NOT an example of quantitative data?

- (A) Temperature = 37°C (B) Mass = 12.5 grams
(C) The liquid smells like peppermint (D) Volume = 25 mL

Correct Answer: (C) The liquid smells like peppermint

Q12. When a scientist repeats an experiment and gets similar results each time, the results are said to be:

- (A) Invalid (B) Reproducible and reliable
(C) Biased (D) Hypothetical

Correct Answer: (B) Reproducible and reliable

Q13. In an investigation testing plant growth under different colors of light, the height of the plant is the:

- (A) Independent variable
- (B) Dependent variable
- (C) Control variable
- (D) Constants

Correct Answer: (B) Dependent variable

Q14. Which instrument is best suited for measuring liquid volume precisely?

- (A) Graduated cylinder
- (B) Beaker
- (C) Erlenmeyer flask
- (D) Test tube

Correct Answer: (A) Graduated cylinder

Q15. A graph that shows how a variable changes continuously over time is a:

- (A) Bar graph
- (B) Pie chart
- (C) Line graph
- (D) Histogram

Correct Answer: (C) Line graph

Q16. What should a scientist do if experimental results do not support the hypothesis?

- (A) Change the data to fit the hypothesis
- (B) Discard the experiment and hide results
- (C) Analyze errors and revise or refine the hypothesis
- (D) Declare the experiment a success anyway

Correct Answer: (C) Analyze errors and revise or refine the hypothesis

Q17. Scientific knowledge is considered 'tentative' because:

- (A) It is completely random
- (B) It can be revised or updated when new evidence emerges
- (C) It is based on imagination
- (D) It never changes under any circumstances

Correct Answer: (B) It can be revised or updated when new evidence emerges

Q18. The standard metric unit for measuring mass in a science laboratory is the:

- (A) Pound
- (B) Gram / Kilogram
- (C) Liter
- (D) Meter

Correct Answer: (B) Gram / Kilogram

Q19. The systematic approach to solving problems in science is termed:

- (A) Scientific method
- (B) Trial and error
- (C) Random guessing
- (D) Philosophical reasoning

Correct Answer: (A) Scientific method

Q20. Which variable is kept unchanged across all trial groups in an experiment?

- (A) Controlled variable
- (B) Dependent variable
- (C) Independent variable
- (D) Experimental variable

Correct Answer: (A) Controlled variable

Q21. A inference is defined as:

- (A) A direct measurement using an instrument
- (B) A logical conclusion based on observations and prior knowledge
- (C) A guess without evidence
- (D) An experimental procedure

Correct Answer: (B) A logical conclusion based on observations and prior knowledge

Q22. Which piece of equipment is used to measure force or weight?

- (A) Spring balance
- (B) Beam balance
- (C) Stopwatch
- (D) Thermometer

Correct Answer: (A) Spring balance

Q23. In a scatter plot, if points go from bottom-left to top-right, the relationship is:

- (A) Negative correlation
- (B) Positive correlation
- (C) No correlation
- (D) Inverse relation

Correct Answer: (B) Positive correlation

Q24. A sample in an experiment that receives no special treatment and is used as a benchmark is the:

- (A) Control group
- (B) Test group
- (C) Variable group
- (D) Hypothesis group

Correct Answer: (A) Control group

Q25. Which branch of science studies the structure, properties, and interactions of matter?

- (A) Astronomy
- (B) Chemistry
- (C) Geology
- (D) Botany

Correct Answer: (B) Chemistry

Q26. Which of the following is a key step after conducting an experiment?

- (A) Formulating a new theory immediately
- (B) Analyzing data and drawing conclusions
- (C) Ignoring anomalous data
- (D) Publishing without verification

Correct Answer: (B) Analyzing data and drawing conclusions

Q27. Accuracy in scientific measurement refers to:

- (A) How close a measured value is to the true or accepted value
- (B) How close repeated measurements are to each other
- (C) The speed of taking measurements
- (D) The number of digits displayed

Correct Answer: (A) How close a measured value is to the true or accepted value

Q28. Precision refers to:

- (A) How close repeated measurements are to one another
- (B) How close a measurement is to the true value
- (C) The cost of the measuring device
- (D) The ease of reading the instrument

Correct Answer: (A) How close repeated measurements are to one another

Q29. Which of the following is an example of a physical model in science?

- (A) 3D globe representing Earth
- (B) Mathematical equation $E=mc^2$
- (C) Computer simulation of weather
- (D) Flowchart of photosynthesis

Correct Answer: (A) 3D globe representing Earth

Q30. The SI unit for measuring temperature in scientific studies is:

- (A) Fahrenheit
- (B) Celsius
- (C) Kelvin
- (D) Rankine

Correct Answer: (C) Kelvin

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CHAPTER CORE CONCEPTS & KEY SUMMARY

Health is a state of complete physical, mental, and social well-being, not merely the absence of disease. Diseases are broadly classified into communicable (infectious) and non-communicable (chronic) diseases. Microorganisms like bacteria, viruses, fungi, and protozoa can act as pathogens. A balanced diet containing carbohydrates, proteins, fats, vitamins, minerals, roughage, and water is vital for immune function and overall growth. Vaccines, hygiene, vector control, and lifestyle management are essential strategies for health maintenance.

Key Terms: Pathogens Communicable vs Non-communicable Balanced Diet Immunity & Vaccines Vectors
Deficiency Diseases Lifestyle Disorders

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. Which of the following is a non-communicable disease?

- (A) Tuberculosis
- (B) Diabetes
- (C) Cholera
- (D) Malaria

Correct Answer: (B) Diabetes

Q2. Diseases caused by pathogenic microorganisms that spread from person to person are called:

- (A) Genetic disorders
- (B) Communicable diseases
- (C) Deficiency diseases
- (D) Degenerative diseases

Correct Answer: (B) Communicable diseases

Q3. Scurvy is caused by the deficiency of which vitamin?

- (A) Vitamin A
- (B) Vitamin B1
- (C) Vitamin C
- (D) Vitamin D

Correct Answer: (C) Vitamin C

Q4. Female Anopheles mosquito acts as a vector for which parasite?

- (A) Salmonella typhi
- (B) Plasmodium
- (C) Dengue virus
- (D) Wuchereria bancrofti

Correct Answer: (B) Plasmodium

Q5. Which macromolecule is primarily responsible for tissue growth and repair in the human body?

- (A) Carbohydrates
- (B) Proteins
- (C) Fats
- (D) Nucleic acids

Correct Answer: (B) Proteins

Q6. Rickets in children is associated with a deficiency of:

- (A) Vitamin D and Calcium
- (B) Vitamin C and Iron
- (C) Vitamin A and Iodine
- (D) Vitamin B12 and Potassium

Correct Answer: (A) Vitamin D and Calcium

Q7. Antibiotics are ineffective against which of the following pathogens?

- (A) Bacteria
- (B) Fungi
- (C) Viruses
- (D) Protozoa

Correct Answer: (C) Viruses

Q8. Goitre is a disease caused by the deficiency of which mineral?

- (A) Iron
- (B) Iodine
- (C) Sodium
- (D) Zinc

Correct Answer: (B) Iodine

Q9. Which component of diet adds bulk to food and aids in proper digestion without giving energy?

- (A) Fats
- (B) Proteins
- (C) Roughage (Dietary Fiber)
- (D) Vitamins

Correct Answer: (C) Roughage (Dietary Fiber)

Q10. Vaccination works by stimulating the body's immune system to produce:

- (A) Antigens
- (B) Antibodies
- (C) Hormones
- (D) Enzymes

Correct Answer: (B) Antibodies

Q11. Tuberculosis is caused by which group of microorganisms?

- (A) Virus
- (B) Bacteria
- (C) Fungus
- (D) Protozoa

Correct Answer: (B) Bacteria

Q12. Which vector transmits the Dengue virus?

- (A) Aedes mosquito
- (B) Anopheles mosquito
- (C) Culex mosquito
- (D) Housefly

Correct Answer: (A) Aedes mosquito

Q13. Anaemia is predominantly caused by the deficiency of:

- (A) Calcium
- (B) Iron
- (C) Iodine
- (D) Phosphorus

Correct Answer: (B) Iron

Q14. Night blindness is a direct result of a deficiency in:

- (A) Vitamin B1
- (B) Vitamin A
- (C) Vitamin C
- (D) Vitamin K

Correct Answer: (B) Vitamin A

Q15. Which of the following is considered a lifestyle-related health disorder?

- (A) Hypertension / Obesity
- (B) Smallpox
- (C) Polio
- (D) Ringworm

Correct Answer: (A) Hypertension / Obesity

Q16. The process of heating milk to about 70°C for 15-30 seconds and quickly cooling it to kill microbes is:

- (A) Fermentation
- (B) Pasteurization
- (C) Sterilization
- (D) Refrigeration

Correct Answer: (B) Pasteurization

Q17. Which immune cell in the human blood engulfs and destroys invading pathogens?

- (A) Red Blood Cells (RBCs)
- (B) White Blood Cells (WBCs)
- (C) Platelets
- (D) Plasma

Correct Answer: (B) White Blood Cells (WBCs)

Q18. Communicable diseases can be transmitted through:

- (A) Air, Water, Food, and Physical Contact
- (B) Hereditary genes only
- (C) Mental stress
- (D) Lack of exercise alone

Correct Answer: (A) Air, Water, Food, and Physical Contact

Q19. ORS (Oral Rehydration Solution) is administered to patients suffering from:

- (A) Anemia
- (B) Dehydration due to diarrhea
- (C) Goitre
- (D) Rickets

Correct Answer: (B) Dehydration due to diarrhea

Q20. Insulin deficiency in the human body leads to:

- (A) Diabetes mellitus
- (B) Hypertension
- (C) Rickets
- (D) Scurvy

Correct Answer: (A) Diabetes mellitus

Q21. Which of the following is a fungal infection affecting human skin?

- (A) Tuberculosis
- (B) Ringworm
- (C) Malaria
- (D) Typhoid

Correct Answer: (B) Ringworm

Q22. Fat-soluble vitamins include:

- (A) Vitamin B and C
- (B) Vitamin A, D, E, and K
- (C) Vitamin B complex only
- (D) Vitamin C and Calcium

Correct Answer: (B) Vitamin A, D, E, and K

Q23. Which vitamin plays a vital role in blood clotting?

- (A) Vitamin A
- (B) Vitamin C
- (C) Vitamin E
- (D) Vitamin K

Correct Answer: (D) Vitamin K

Q24. Kwashiorkor and Marasmus are diseases caused by severe deficiency of:

- (A) Proteins / Protein-Energy Malnutrition
- (B) Vitamins
- (C) Minerals
- (D) Fats

Correct Answer: (A) Proteins / Protein-Energy Malnutrition

Q25. BCG vaccine provides immunity against which disease?

- (A) Polio
- (B) Tuberculosis
- (C) Measles
- (D) Hepatitis B

Correct Answer: (B) Tuberculosis

Q26. Waterborne diseases include which of the following pairs?

- (A) Cholera and Typhoid
- (B) Malaria and Dengue
- (C) Scurvy and Rickets
- (D) Asthma and Diabetes

Correct Answer: (A) Cholera and Typhoid

Q27. Which organ is primarily damaged by excessive alcohol consumption over long periods?

- (A) Heart
- (B) Liver (Cirrhosis)
- (C) Lungs
- (D) Kidneys

Correct Answer: (B) Liver (Cirrhosis)

Q28. Which microorganism is used in the commercial production of alcohol via fermentation?

- (A) Rhizobium
- (B) Yeast
- (C) Lactobacillus
- (D) Penicillium

Correct Answer: (B) Yeast

Q29. The barrier in our body that forms the first line of defense against pathogens is:

- (A) Skin and Mucous Membranes
- (B) Antibodies
- (C) White Blood Cells
- (D) Spleen

Correct Answer: (A) Skin and Mucous Membranes

Q30. Maintaining personal hygiene and sanitation helps directly in preventing:

- (A) Genetic mutations
- (B) Spread of infectious diseases
- (C) Ageing
- (D) Color blindness

Correct Answer: (B) Spread of infectious diseases

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Electricity: Magnetic and Heating Effect

CHAPTER CORE CONCEPTS & KEY SUMMARY

Electric current produces heating, magnetic, and chemical effects. When an electric current flows through a high-resistance wire (like nichrome), electrical energy is transformed into heat energy (Joule's heating effect). A current-carrying conductor generates a magnetic field around it (Oersted's discovery). An electromagnet consists of a coil of insulated wire wrapped around a soft iron core, gaining magnetic strength when current passes through it. Fuses and circuit breakers protect electrical circuits from overloading and short circuits.

Key Terms: Joule's Heating Effect Nichrome Magnetic Effect (Oersted) Electromagnet Electric Fuse
Short Circuit & Overloading Solenoid

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. Who discovered that an electric current produces a magnetic field around it?

- (A) Michael Faraday
- (B) Hans Christian Oersted
- (C) James Prescott Joule
- (D) Thomas Edison

Correct Answer: (B) Hans Christian Oersted

Q2. Which wire material is commonly used in heating elements of electric irons and heaters?

- (A) Copper
- (B) Aluminum
- (C) Nichrome
- (D) Silver

Correct Answer: (C) Nichrome

Q3. The heating effect of electric current depends on:

- (A) Current strength, resistance, and time of flow
- (B) Voltage only
- (C) Color of wire
- (D) Length of wire only

Correct Answer: (A) Current strength, resistance, and time of flow

Q4. An electromagnet acts as a magnet only when:

- (A) It is placed in water
- (B) Electric current flows through its coil
- (C) It is heated to high temperature
- (D) It is connected to a wooden block

Correct Answer: (B) Electric current flows through its coil

Q5. Which material is most suitable for making the core of a temporary electromagnet?

- (A) Steel
- (B) Soft iron
- (C) Copper
- (D) Alnico

Correct Answer: (B) Soft iron

Q6. An electric fuse works on which effect of electric current?

- (A) Magnetic effect
- (B) Heating effect
- (C) Chemical effect
- (D) Optical effect

Correct Answer: (B) Heating effect

Q7. A safety device containing a thin wire with a low melting point that breaks the circuit during excessive current is a:

- (A) Switch
- (B) Fuse
- (C) Resistor
- (D) Voltmeter

Correct Answer: (B) Fuse

Q8. When electric current flows through a straight conductor, the magnetic field lines around it are in the form of:

- (A) Parallel straight lines
- (B) Concentric circles
- (C) Ellipses
- (D) Zig-zag lines

Correct Answer: (B) Concentric circles

Q9. Which of the following increases the strength of an electromagnet?

- (A) Increasing the number of turns in the coil
- (B) Increasing the current in the coil
- (C) Using a soft iron core
- (D) All of the above

Correct Answer: (D) All of the above

Q10. Electric fuse wire is made of an alloy of:

- (A) Copper and Zinc
- (B) Tin and Lead
- (C) Aluminum and Iron
- (D) Silver and Gold

Correct Answer: (B) Tin and Lead

Q11. Which appliance operates based on the magnetic effect of electric current?

- (A) Electric heater
- (B) Electric bell
- (C) Toaster
- (D) Electric kettle

Correct Answer: (B) Electric bell

Q12. Overloading in an electrical circuit occurs when:

- (A) Too many electrical appliances are connected to a single socket
- (B) Voltage drops to zero
- (C) The switch is turned off
- (D) Resistance becomes infinite

Correct Answer: (A) Too many electrical appliances are connected to a single socket

Q13. A short circuit happens when:

- (A) Direct contact occurs between live wire and neutral wire
- (B) Current stops flowing completely
- (C) The switch is opened
- (D) An appliance uses low power

Correct Answer: (A) Direct contact occurs between live wire and neutral wire

Q14. Modern household electrical circuits use MCBs instead of traditional fuses. What does MCB stand for?

- (A) Main Circuit Breaker
- (B) Miniature Circuit Breaker
- (C) Maximum Current Fuse
- (D) Magnetic Control Box

Correct Answer: (B) Miniature Circuit Breaker

Q15. The rule used to find the direction of magnetic field around a straight current-carrying conductor is:

- (A) Fleming's Left Hand Rule
- (B) Right-Hand Thumb Rule
- (C) Lenz's Law
- (D) Faraday's Law

Correct Answer: (B) Right-Hand Thumb Rule

Q16. In an electric bell, which part gets attracted towards the electromagnet when current flows?

- (A) Gong
- (B) Hammer / Soft iron armature
- (C) Switch
- (D) Contact screw

Correct Answer: (B) Hammer / Soft iron armature

Q17. What happens to a magnetic needle kept near a current-carrying wire when current is turned on?

- (A) It deflects
- (B) It rotates continuously
- (C) It melts
- (D) It shows no movement

Correct Answer: (A) It deflects

Q18. A cylindrical coil of many tightly wound turns of insulated copper wire is called a:

- (A) Solenoid
- (B) Resistor
- (C) Capacitor
- (D) Rheostat

Correct Answer: (A) Solenoid

Q19. Why is soft iron preferred over steel for the core of an electromagnet?

- (A) Soft iron retains magnetism permanently
- (B) Soft iron loses its magnetism easily when current is switched off
- (C) Soft iron is cheaper than steel
- (D) Soft iron offers higher electrical resistance

Correct Answer: (B) Soft iron loses its magnetism easily when current is switched off

Q20. The amount of heat produced in a resistor is proportional to:

- (A) Square of current (I^2)
- (B) Resistance (R)
- (C) Time (t)
- (D) All of the above ($H = I^2Rt$)

Correct Answer: (D) All of the above ($H = I^2Rt$)

Q21. Filament of an incandescent electric bulb is made of tungsten because tungsten has:

- (A) Low melting point and low resistivity
- (B) Very high melting point and high resistivity
- (C) High ductility only
- (D) Low resistance and low density

Correct Answer: (B) Very high melting point and high resistivity

Q22. Which gas is filled in incandescent electric bulbs to prolong filament life?

- (A) Oxygen
- (B) Hydrogen
- (C) Argon / Nitrogen
- (D) Chlorine

Correct Answer: (C) Argon / Nitrogen

Q23. The SI unit of electric current is:

- (A) Volt
- (B) Ampere
- (C) Ohm
- (D) Joule

Correct Answer: (B) Ampere

Q24. The device used to measure electric current in a circuit is:

- (A) Voltmeter
- (B) Ammeter
- (C) Galvanometer
- (D) Multimeter

Correct Answer: (B) Ammeter

Q25. An ammeter should always be connected in:

- (A) Parallel
- (B) Series
- (C) Either series or parallel
- (D) Bridge combination

Correct Answer: (B) Series

Q26. The property of a conductor to oppose the flow of electric current is called:

- (A) Conductance
- (B) Resistance
- (C) Capacitance
- (D) Inductance

Correct Answer: (B) Resistance

Q27. Which of the following causes an electric fuse wire to melt?

- (A) Low current flow
- (B) Joule heating produced by excessive current
- (C) Cooling effect of air
- (D) Magnetic attraction

Correct Answer: (B) Joule heating produced by excessive current

Q28. Electromagnets are widely used in:

- (A) Cranes to lift heavy scrap iron
- (B) Loudspeakers and electric motors
- (C) MRI machines
- (D) All of the above

Correct Answer: (D) All of the above

Q29. If the direction of current in a wire is reversed, the direction of magnetic field lines around it will:

- (A) Remain unchanged
- (B) Reverse
- (C) Become perpendicular to wire
- (D) Vanish completely

Correct Answer: (B) Reverse

Q30. Standard electric mains supply in homes in India provides alternating current at a voltage of:

(A) 110 V, 60 Hz

(B) 220 V, 50 Hz

(C) 440 V, 50 Hz

(D) 12 V, Direct Current

Correct Answer: (B) 220 V, 50 Hz

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Exploring Forces

CHAPTER CORE CONCEPTS & KEY SUMMARY

A force is a push or pull acting upon an object resulting from its interaction with another object. Forces have both magnitude and direction (vector quantity). Forces can be broadly categorized into Contact Forces (Friction, Muscular force, Normal force, Tension) and Non-Contact Forces (Gravitational, Electrostatic, Magnetic forces). Force can change the state of motion, speed, direction, or shape of an object. Net force is the vector sum of all forces acting on an object.

Key Terms: Force Contact vs Non-Contact Forces Gravitational Force Electrostatic Force Friction
Balanced & Unbalanced Forces SI Unit (Newton)

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. A push or pull exerted on an object is defined as:

- (A) Energy (B) Work
(C) Force (D) Pressure

Correct Answer: (C) Force

Q2. The SI unit of force is named after which famous scientist?

- (A) Galileo Galilei (B) Sir Isaac Newton
(C) Blaise Pascal (D) James Watt

Correct Answer: (B) Sir Isaac Newton

Q3. Which of the following is a non-contact force?

- (A) Muscular force (B) Frictional force
(C) Gravitational force (D) Tension force

Correct Answer: (C) Gravitational force

Q4. When two equal and opposite forces act on a body, the net force is:

- (A) Double the individual force (B) Zero
(C) Negative (D) Infinite

Correct Answer: (B) Zero

Q5. Unbalanced forces acting on an object always result in a change in its:

- (A) Mass (B) State of motion or speed
(C) Chemical composition (D) Density

Correct Answer: (B) State of motion or speed

Q6. The force exerted by charged bodies on other charged or uncharged bodies is:

- (A) Magnetic force (B) Electrostatic force
(C) Gravitational force (D) Nuclear force

Correct Answer: (B) Electrostatic force

Q7. Which force is responsible for holding the planets in orbit around the Sun?

- (A) Electrostatic force
- (B) Magnetic force
- (C) Gravitational force
- (D) Centrifugal force

Correct Answer: (C) Gravitational force

Q8. Friction is a contact force that acts in a direction:

- (A) Parallel to motion in the same direction
- (B) Opposite to the direction of relative motion
- (C) Perpendicular to the surface
- (D) Vertically downwards

Correct Answer: (B) Opposite to the direction of relative motion

Q9. A comb rubbed with dry hair attracts small bits of paper due to:

- (A) Gravitational force
- (B) Electrostatic force
- (C) Magnetic force
- (D) Frictional force

Correct Answer: (B) Electrostatic force

Q10. When a force changes the shape of a clay ball, it demonstrates that force can:

- (A) Change the mass of an object
- (B) Deform or change the shape of an object
- (C) Increase gravitational pull
- (D) Create energy

Correct Answer: (B) Deform or change the shape of an object

Q11. Which instrument is used to measure force directly?

- (A) Barometer
- (B) Spring Balance
- (C) Thermometer
- (D) Manometer

Correct Answer: (B) Spring Balance

Q12. If two forces of 10 N and 6 N act on an object in the same direction, the net resultant force is:

- (A) 4 N
- (B) 16 N
- (C) 60 N
- (D) 1.6 N

Correct Answer: (B) 16 N

Q13. If two forces of 10 N and 6 N act on an object in opposite directions, the net force is:

- (A) 16 N
- (B) 4 N in the direction of the larger force
- (C) 60 N
- (D) Zero

Correct Answer: (B) 4 N in the direction of the larger force

Q14. Muscular force is categorized as a:

- (A) Non-contact force
- (B) Contact force
- (C) Field force
- (D) Nuclear force

Correct Answer: (B) Contact force

Q15. What happens to an object in motion if balanced forces act on it?

- (A) It stops immediately
- (B) It accelerates rapidly
- (C) It continues moving at constant velocity
- (D) It changes direction continuously

Correct Answer: (C) It continues moving at constant velocity

Q16. Gravitational force between two masses:

- (A) Is always attractive
- (B) Is always repulsive
- (C) Can be attractive or repulsive
- (D) Depends on medium between them

Correct Answer: (A) Is always attractive

Q17. Electrostatic forces can be:

- (A) Attractive only
- (B) Repulsive only
- (C) Both attractive and repulsive
- (D) Neither attractive nor repulsive

Correct Answer: (C) Both attractive and repulsive

Q18. A stone thrown upwards eventually falls back to Earth due to:

- (A) Magnetic force
- (B) Atmospheric pressure
- (C) Gravitational force
- (D) Muscular force

Correct Answer: (C) Gravitational force

Q19. The force exerted by a stretched spring is called:

- (A) Spring force / Tension
- (B) Gravitational force
- (C) Electrostatic force
- (D) Magnetic force

Correct Answer: (A) Spring force / Tension

Q20. Which of the following is NOT an effect of force?

- (A) Starting motion in a stationary body
- (B) Stopping a moving body
- (C) Changing the chemical identity of matter
- (D) Changing the direction of motion

Correct Answer: (C) Changing the chemical identity of matter

Q21. A heavy box is pushed along the floor. The force opposing its motion is:

- (A) Gravitational force
- (B) Frictional force
- (C) Electrostatic force
- (D) Magnetic force

Correct Answer: (B) Frictional force

Q22. Mass of an object is measured in kg, whereas its weight (gravitational force on it) is measured in:

- (A) Kilograms
- (B) Newtons
- (C) Pascals
- (D) Joules

Correct Answer: (B) Newtons

Q23. Weight of an object is equal to:

- (A) Mass $\times$ acceleration due to gravity ($W = mg$)
- (B) Mass $\div$ volume
- (C) Force $\div$ area
- (D) Work $\times$ time

Correct Answer: (A) Mass $\times$ acceleration due to gravity ($W = mg$)

Q24. A maglev train floats above its track using which non-contact force?

- (A) Gravitational force
- (B) Magnetic repulsion
- (C) Electrostatic force
- (D) Nuclear force

Correct Answer: (B) Magnetic repulsion

Q25. When a ball rolling on ground slows down and stops on its own, it is due to:

- (A) Absence of force
- (B) Frictional force between ball and ground
- (C) Gravitational pull upwards
- (D) Air suction

Correct Answer: (B) Frictional force between ball and ground

Q26. Which non-contact force acts across infinite distances throughout the universe?

- (A) Gravitational force
- (B) Strong nuclear force
- (C) Weak nuclear force
- (D) Friction

Correct Answer: (A) Gravitational force

Q27. Like electric charges _____ each other, while unlike charges _____ each other.

- (A) Attract; Repel
- (B) Repel; Attract
- (C) Neutralize; Multiply
- (D) Destroy; Create

Correct Answer: (B) Repel; Attract

Q28. Like magnetic poles _____ each other, while unlike magnetic poles _____ each other.

- (A) Repel; Attract
- (B) Attract; Repel
- (C) Neutralize; Ignore
- (D) Absorb; Emit

Correct Answer: (A) Repel; Attract

Q29. Force per unit area is called:

- (A) Energy
- (B) Power
- (C) Pressure
- (D) Work

Correct Answer: (C) Pressure

Q30. An astronaut weighs less on the Moon than on Earth because:

- (A) Moon has no mass
- (B) Moon's gravitational acceleration is smaller than Earth's (~1/6th)
- (C) Moon has no atmosphere
- (D) Mass of astronaut decreases

Correct Answer: (B) Moon's gravitational acceleration is smaller than Earth's (~1/6th)

CHAPTER 5

Pressure, Wind, Storm and Cyclone

CHAPTER CORE CONCEPTS & KEY SUMMARY

Pressure is defined as force exerted per unit area ($P = F/A$). Liquids and gases (fluids) exert pressure on the walls of their containers in all directions. Atmospheric pressure is the weight of the air column acting per unit area on the Earth's surface. High-speed winds are accompanied by reduced air pressure (Bernoulli's principle concept). Differences in atmospheric pressure due to uneven solar heating drive wind patterns, thunderstorms, tropical cyclones, and tornadoes.

Key Terms: Pressure ($P = F/A$) Atmospheric Pressure Barometer Fluid Pressure Cyclone & Anticyclone
Eye of Cyclone Tornado

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. Pressure is defined mathematically as:

- (A) Force $\times$ Area
- (B) Force / Area
- (C) Area / Force
- (D) Force + Area

Correct Answer: (B) Force / Area

Q2. The SI unit of pressure is named after Blaise Pascal and is equivalent to:

- (A) 1 Newton per meter
- (B) 1 Newton per square meter (N/m^2)
- (C) 1 Joule per second
- (D) 1 Kg per cubic meter

Correct Answer: (B) 1 Newton per square meter (N/m^2)

Q3. Why do sharp knives cut vegetables much more easily than dull knives?

- (A) Smaller edge area exerts higher pressure for the same force
- (B) Sharp knives apply more muscular force
- (C) Dull knives have less mass
- (D) Sharp knives decrease friction

Correct Answer: (A) Smaller edge area exerts higher pressure for the same force

Q4. High-speed winds are accompanied by:

- (A) Increased air pressure
- (B) Reduced air pressure
- (C) Constant temperature
- (D) Zero humidity

Correct Answer: (B) Reduced air pressure

Q5. Atmospheric pressure is measured using which instrument?

- (A) Thermometer
- (B) Barometer
- (C) Anemometer
- (D) Hygrometer

Correct Answer: (B) Barometer

Q6. Wind speed is measured using an instrument called:

- (A) Wind vane
- (B) Anemometer
- (C) Barometer
- (D) Manometer

Correct Answer: (B) Anemometer

Q7. The direction of wind is indicated by a:

- (A) Anemometer
- (B) Wind Vane / Weather Cock
- (C) Barometer
- (D) Hypsometer

Correct Answer: (B) Wind Vane / Weather Cock

Q8. As altitude increases above sea level, atmospheric pressure:

- (A) Increases
- (B) Decreases
- (C) Remains constant
- (D) First increases then decreases

Correct Answer: (B) Decreases

Q9. A calm, low-pressure region at the center of a tropical cyclone is called the:

- (A) Wall
- (B) Eye of the cyclone
- (C) Tail
- (D) Vortex

Correct Answer: (B) Eye of the cyclone

Q10. Warm air is _____ dense than cold air and therefore _____.

- (A) More; Sinks
- (B) Less; Rises
- (C) More; Rises
- (D) Less; Sinks

Correct Answer: (B) Less; Rises

Q11. Wind flows from regions of:

- (A) Low pressure to high pressure
- (B) High pressure to low pressure
- (C) Low temperature to high pressure only
- (D) Equal pressure

Correct Answer: (B) High pressure to low pressure

Q12. Which factor primarily drives global air movement and wind patterns?

- (A) Uneven heating of Earth's surface by the Sun
- (B) Rotation of the Moon
- (C) Ocean tides
- (D) Volcanic eruptions

Correct Answer: (A) Uneven heating of Earth's surface by the Sun

Q13. A dark funnel-shaped cloud that reaches from the sky to the ground with extremely violent rotating winds is a:

- (A) Cyclone
- (B) Tornado
- (C) Tsunami
- (D) Landslide

Correct Answer: (B) Tornado

Q14. In the Northern Hemisphere, winds in a tropical cyclone rotate in which direction?

- (A) Clockwise
- (B) Counter-clockwise
- (C) Vertical
- (D) Random

Correct Answer: (B) Counter-clockwise

Q15. Which state in India is particularly vulnerable to cyclones originating in the Bay of Bengal?

- (A) Rajasthan
- (B) Odisha
- (C) Punjab
- (D) Madhya Pradesh

Correct Answer: (B) Odisha

Q16. Liquid pressure at a given depth inside a container:

- (A) Acts only downwards
- (B) Acts equally in all directions
- (C) Acts only sideways
- (D) Is zero

Correct Answer: (B) Acts equally in all directions

Q17. As the depth inside a liquid increases, the pressure exerted by the liquid:

- (A) Decreases
- (B) Increases
- (C) Remains unchanged
- (D) Becomes zero

Correct Answer: (B) Increases

Q18. Why do foundation bases of heavy buildings and dams have very wide surface areas?

- (A) To look attractive
- (B) To decrease pressure on the ground to prevent sinking
- (C) To increase weight
- (D) To increase ground pressure

Correct Answer: (B) To decrease pressure on the ground to prevent sinking

Q19. Why do camel footpads spread wide on desert sand?

- (A) To increase force
- (B) To increase contact area and reduce pressure, preventing sinking
- (C) To generate heat
- (D) To decrease friction

Correct Answer: (B) To increase contact area and reduce pressure, preventing sinking

Q20. Which of the following is NOT a safety measure during a thunderstorm?

- (A) Taking shelter under an isolated tall tree
- (B) Staying inside a car or building
- (C) Avoiding contact with metal objects
- (D) Unplugging electrical appliances

Correct Answer: (A) Taking shelter under an isolated tall tree

Q21. Air pressure inside our bodies prevents us from getting crushed by atmospheric pressure because it is:

- (A) Equal to atmospheric pressure
- (B) Much lower than atmospheric pressure
- (C) Zero
- (D) Fluctuating constantly

Correct Answer: (A) Equal to atmospheric pressure

Q22. Which weather satellite system in India provides early warnings for cyclones?

- (A) INSAT / GSAT series
- (B) GPS
- (C) Galileo
- (D) Hubble

Correct Answer: (A) INSAT / GSAT series

Q23. A sea breeze blows during the:

- (A) Daytime from sea to land
- (B) Nighttime from land to sea
- (C) Daytime from land to sea
- (D) Nighttime from sea to land

Correct Answer: (A) Daytime from sea to land

Q24. A land breeze blows during the:

- (A) Nighttime from land to sea
- (B) Daytime from sea to land
- (C) Daytime from land to sea
- (D) Nighttime from sea to land

Correct Answer: (A) Nighttime from land to sea

Q25. Why do roofs of thatched huts or tin sheds get blown away during high-speed storms?

- (A) High-speed wind creates low pressure above roof while indoor air pressure is high
- (B) Wind pushes down on the roof
- (C) Rain weighs down the roof
- (D) Electrostatic attraction

Correct Answer: (A) High-speed wind creates low pressure above roof while indoor air pressure is high

Q26. The atmospheric pressure at sea level is approximately equal to:

- (A) 101.3 kPa (or 76 cm of Mercury)
- (B) 10 kPa
- (C) 500 kPa
- (D) 1 Pascal

Correct Answer: (A) 101.3 kPa (or 76 cm of Mercury)

Q27. What happens to a rubber sucker pressed firmly onto a smooth surface?

- (A) It sticks because air pressure outside holds it against suction vacuum inside
- (B) It sticks due to glue
- (C) It falls off due to gravity
- (D) It melts

Correct Answer: (A) It sticks because air pressure outside holds it against suction vacuum inside

Q28. Hydraulic lifts and hydraulic brakes work on which principle of fluid pressure?

- (A) Bernoulli's Principle
- (B) Pascal's Law
- (C) Archimedes' Principle
- (D) Boyle's Law

Correct Answer: (B) Pascal's Law

Q29. A manometer is used to measure:

- (A) Atmospheric pressure
- (B) Pressure difference in liquids or gases
- (C) Wind direction
- (D) Humidity

Correct Answer: (B) Pressure difference in liquids or gases

Q30. Tornado speed can reach up to approximately:

- (A) 30 km/h
- (B) 300 km/h or more
- (C) 10 km/h
- (D) 50 km/h

Correct Answer: (B) 300 km/h or more

Particulate Nature of Matter

CHAPTER CORE CONCEPTS & KEY SUMMARY

All matter is composed of extremely tiny particles called atoms and molecules. These particles have spaces between them, are in continuous random motion (Brownian motion), and exert attractive forces on each other. Matter exists in three primary classical states: Solid, Liquid, and Gas, defined by particle arrangement, kinetic energy, and intermolecular forces. Phase changes (melting, boiling, condensation, freezing, sublimation) involve energy exchange and rearrangement of particles without changing chemical identity.

Key Terms: Atoms & Molecules States of Matter Intermolecular Forces Brownian Motion Diffusion Sublimation
Latent Heat

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. According to the kinetic molecular theory, all matter is composed of:

- (A) Continuous solid blocks
- (B) Tiny particles (atoms and molecules) in constant motion
- (C) Energy rays
- (D) Liquids only

Correct Answer: (B) Tiny particles (atoms and molecules) in constant motion

Q2. The random, zig-zag motion of microscopic particles suspended in a fluid is called:

- (A) Diffusion
- (B) Brownian Motion
- (C) Osmosis
- (D) Sublimation

Correct Answer: (B) Brownian Motion

Q3. In which state of matter are intermolecular forces of attraction strongest?

- (A) Gas
- (B) Liquid
- (C) Solid
- (D) Plasma

Correct Answer: (C) Solid

Q4. In which state of matter do particles possess maximum kinetic energy?

- (A) Solid
- (B) Liquid
- (C) Gas
- (D) Bose-Einstein Condensate

Correct Answer: (C) Gas

Q5. The process of direct transition of a solid into its gaseous state without passing through liquid is:

- (A) Evaporation
- (B) Condensation
- (C) Sublimation
- (D) Melting

Correct Answer: (C) Sublimation

Q6. Which of the following substances undergoes sublimation at room temperature/heating?

- (A) Ice
- (B) Sodium Chloride
- (C) Camphor / Ammonium Chloride / Dry Ice
- (D) Sugar

Correct Answer: (C) Camphor / Ammonium Chloride / Dry Ice

Q7. Intermixing of particles of two different substances on their own is known as:

- (A) Osmosis
- (B) Diffusion
- (C) Fusion
- (D) Vaporization

Correct Answer: (B) Diffusion

Q8. Why does the scent of perfume spread quickly across a room?

- (A) Due to rapid diffusion of gas particles
- (B) Due to gravity
- (C) Due to surface tension
- (D) Due to high density

Correct Answer: (A) Due to rapid diffusion of gas particles

Q9. Which state of matter has a definite shape and a definite volume?

- (A) Gas
- (B) Liquid
- (C) Solid
- (D) Plasma

Correct Answer: (C) Solid

Q10. Which state of matter has a definite volume but no definite shape (takes shape of container)?

- (A) Solid
- (B) Liquid
- (C) Gas
- (D) Plasma

Correct Answer: (B) Liquid

Q11. Which state of matter has neither definite volume nor definite shape and is highly compressible?

- (A) Solid
- (B) Liquid
- (C) Gas
- (D) Crystal

Correct Answer: (C) Gas

Q12. When a liquid changes into gas at a temperature below its boiling point, the process is called:

- (A) Boiling
- (B) Evaporation
- (C) Condensation
- (D) Sublimation

Correct Answer: (B) Evaporation

Q13. Evaporation is a surface phenomenon that produces a:

- (A) Heating effect
- (B) Cooling effect
- (C) Chemical change
- (D) Radiation effect

Correct Answer: (B) Cooling effect

Q14. Which of the following factors INCREASES the rate of evaporation?

- (A) Increase in surface area
- (B) Increase in temperature
- (C) Increase in wind speed
- (D) All of the above

Correct Answer: (D) All of the above

Q15. Dry Ice is chemically known as:

- (A) Solid Water
- (B) Solid Carbon Dioxide
- (C) Solid Nitrogen
- (D) Solid Oxygen

Correct Answer: (B) Solid Carbon Dioxide

Q16. The temperature at which a solid converts into a liquid at atmospheric pressure is its:

- (A) Boiling point
- (B) Melting point
- (C) Critical point
- (D) Triple point

Correct Answer: (B) Melting point

Q17. During a phase change (e.g., ice melting to water at 0°C), the temperature remains constant because heat energy is used as:

- (A) Sensible heat
- (B) Latent heat (to overcome intermolecular forces)
- (C) Kinetic heat
- (D) Friction

Correct Answer: (B) Latent heat (to overcome intermolecular forces)

Q18. Which state of matter consists of super-energetic and super-excited ionized gas particles?

- (A) Plasma
- (B) Solid
- (C) Liquid
- (D) Bose-Einstein Condensate

Correct Answer: (A) Plasma

Q19. The force of attraction between particles of the SAME substance is called:

- (A) Adhesive force
- (B) Cohesive force
- (C) Gravitational force
- (D) Frictional force

Correct Answer: (B) Cohesive force

Q20. The force of attraction between particles of DIFFERENT substances is called:

- (A) Cohesive force
- (B) Adhesive force
- (C) Magnetic force
- (D) Nuclear force

Correct Answer: (B) Adhesive force

Q21. What happens to the kinetic energy of particles when a substance is heated?

- (A) It decreases
- (B) It increases
- (C) It remains unchanged
- (D) It drops to zero

Correct Answer: (B) It increases

Q22. Compressibility is maximum in:

- | | |
|------------|-------------|
| (A) Solids | (B) Liquids |
| (C) Gases | (D) Metals |

Correct Answer: (C) Gases

Q23. Space between particles is maximum in:

- | | |
|------------|--------------|
| (A) Gases | (B) Liquids |
| (C) Solids | (D) Crystals |

Correct Answer: (A) Gases

Q24. LPG (Liquefied Petroleum Gas) used in households is stored in cylinders as a:

- | | |
|----------------------------------|--------------------------------|
| (A) Solid under high temperature | (B) Liquid under high pressure |
| (C) Gas at low pressure | (D) Plasma |

Correct Answer: (B) Liquid under high pressure

Q25. Spreading of a drop of ink in water is an example of:

- | | |
|-------------------|----------------|
| (A) Sublimation | (B) Diffusion |
| (C) Sedimentation | (D) Filtration |

Correct Answer: (B) Diffusion

Q26. Water stored in earthen pots (matkas) stays cool in summer due to continuous:

- | | |
|-------------------|-------------------------------|
| (A) Transpiration | (B) Evaporation through pores |
| (C) Condensation | (D) Precipitation |

Correct Answer: (B) Evaporation through pores

Q27. What is the SI unit of temperature?

- | | |
|--------------------|----------------|
| (A) Degree Celsius | (B) Kelvin (K) |
| (C) Fahrenheit | (D) Calorie |

Correct Answer: (B) Kelvin (K)

Q28. To convert a temperature from Celsius to Kelvin scale, we add:

- | | |
|------------|---------|
| (A) 273.15 | (B) 100 |
| (C) 32 | (D) 460 |

Correct Answer: (A) 273.15

Q29. 0°C is equal to how many Kelvin?

- | | |
|-----------|-----------|
| (A) 0 K | (B) 100 K |
| (C) 273 K | (D) 373 K |

Correct Answer: (C) 273 K

Q30. Boiling is a _____ phenomenon, whereas evaporation is a _____ phenomenon.

(A) Surface; Bulk

(B) Bulk; Surface

(C) Chemical; Physical

(D) Nuclear; Atomic

Correct Answer: (B) Bulk; Surface

RAMAN SPACE
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Nature of Matter: Elements, Compounds and Mixtures

CHAPTER CORE CONCEPTS & KEY SUMMARY

Matter can be classified based on composition into Pure Substances (Elements and Compounds) and Impure Substances (Mixtures). Elements consist of only one type of atom and cannot be broken down chemically (Metals, Non-metals, Metalloids). Compounds are formed when two or more elements combine chemically in a fixed mass ratio. Mixtures consist of physically combined substances in variable ratios and can be Homogeneous (uniform composition) or Heterogeneous (non-uniform composition). Separation techniques like filtration, evaporation, distillation, and chromatography isolate components based on physical properties.

Key Terms: Pure Substances Elements & Symbols Compounds & Chemical Formulas Homogeneous vs Heterogeneous
Distillation Chromatography Crystallization

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. A substance made up of only one kind of atom that cannot be split into simpler substances chemically is an:

- (A) Element
- (B) Compound
- (C) Mixture
- (D) Solution

Correct Answer: (A) Element

Q2. Which of the following is a pure substance?

- (A) Air
- (B) Distilled Water (H_2O)
- (C) Brass
- (D) Milk

Correct Answer: (B) Distilled Water (H_2O)

Q3. Water (H_2O) is classified as a compound because:

- (A) It contains hydrogen and oxygen physically mixed
- (B) It has fixed properties and elements combined in a 1:8 mass ratio chemically
- (C) It can be separated by simple filtration
- (D) It is a liquid at room temperature

Correct Answer: (B) It has fixed properties and elements combined in a 1:8 mass ratio chemically

Q4. Air is considered a:

- (A) Pure compound
- (B) Homogeneous mixture of gases
- (C) Element
- (D) Heterogeneous slurry

Correct Answer: (B) Homogeneous mixture of gases

Q5. Which element is a liquid metal at room temperature?

- (A) Mercury (Hg)
- (B) Bromine (Br)
- (C) Sodium (Na)
- (D) Gallium (Ga)

Correct Answer: (A) Mercury (Hg)

Q6. Which element is a non-metal that exists as a shiny liquid at room temperature?

- (A) Iodine
- (B) Bromine (Br₂)
- (C) Chlorine
- (D) Carbon

Correct Answer: (B) Bromine (Br₂)

Q7. A mixture in which components are uniformly distributed throughout without visible boundaries is:

- (A) Heterogeneous mixture
- (B) Homogeneous mixture
- (C) Suspension
- (D) Emulsion

Correct Answer: (B) Homogeneous mixture

Q8. Which of the following is a heterogeneous mixture?

- (A) Salt solution
- (B) Brass
- (C) Oil and Water mixture
- (D) Sugar in water

Correct Answer: (C) Oil and Water mixture

Q9. An alloy like Brass is an example of a:

- (A) Solid-solid homogeneous mixture
- (B) Compound
- (C) Heterogeneous element
- (D) Liquid-solid suspension

Correct Answer: (A) Solid-solid homogeneous mixture

Q10. Which technique is used to separate a mixture of two miscible liquids with sufficient difference in boiling points?

- (A) Filtration
- (B) Simple Distillation
- (C) Sedimentation
- (D) Centrifugation

Correct Answer: (B) Simple Distillation

Q11. Fractional distillation is used when the difference in boiling points of miscible liquids is:

- (A) Greater than 100°C
- (B) Less than 25°C
- (C) Exactly 50°C
- (D) Zero

Correct Answer: (B) Less than 25°C

Q12. Which separation technique is used to separate pigments from plant dyes or ink?

- (A) Distillation
- (B) Paper Chromatography
- (C) Evaporation
- (D) Magnetic separation

Correct Answer: (B) Paper Chromatography

Q13. Metalloids exhibit properties of both:

- (A) Metals and Non-metals
- (B) Solids and Gases
- (C) Acids and Bases
- (D) Conductors and Insulators

Correct Answer: (A) Metals and Non-metals

Q14. Which of the following elements is a metalloid?

- (A) Silicon (Si)
- (B) Iron (Fe)
- (C) Oxygen (O)
- (D) Gold (Au)

Correct Answer: (A) Silicon (Si)

Q15. The constituent elements of a compound can be separated only by:

- (A) Physical methods
- (B) Chemical or Electrochemical reactions
- (C) Filtration
- (D) Magnetic separation

Correct Answer: (B) Chemical or Electrochemical reactions

Q16. Which metal is soft enough to be cut with a knife?

- (A) Iron
- (B) Sodium (Na) / Potassium (K)
- (C) Copper
- (D) Aluminum

Correct Answer: (B) Sodium (Na) / Potassium (K)

Q17. Which non-metal is an excellent conductor of electricity?

- (A) Diamond
- (B) Graphite
- (C) Sulphur
- (D) Phosphorus

Correct Answer: (B) Graphite

Q18. Tincture of Iodine is a mixture of Iodine dissolved in:

- (A) Water
- (B) Alcohol (Ethanol)
- (C) Acetone
- (D) Ether

Correct Answer: (B) Alcohol (Ethanol)

Q19. Scattering of a beam of light when passed through a colloidal solution is known as:

- (A) Refraction
- (B) Tyndall Effect
- (C) Dispersion
- (D) Reflection

Correct Answer: (B) Tyndall Effect

Q20. Milk is an example of a:

- (A) True solution
- (B) Colloid (Emulsion)
- (C) Suspension
- (D) Compound

Correct Answer: (B) Colloid (Emulsion)

Q21. Chalk powder in water forms a:

- (A) True solution
- (B) Colloid
- (C) Suspension
- (D) Homogeneous alloy

Correct Answer: (C) Suspension

Q22. Which state of matter colloid has liquid droplets dispersed in gas (e.g., Fog, Cloud)?

- (A) Aerosol
- (B) Foam
- (C) Sol
- (D) Gel

Correct Answer: (A) Aerosol

Q23. The chemical formula of common salt (table salt) is:

- (A) NaOH
- (B) NaCl
- (C) HCl
- (D) NaHCO₃

Correct Answer: (B) NaCl

Q24. Which property is characteristic of metals?

- (A) Malleability and Ductility
- (B) Sonorous nature
- (C) High electrical conductivity
- (D) All of the above

Correct Answer: (D) All of the above

Q25. Ductility refers to the ability of a material to be:

- (A) Beaten into thin sheets
- (B) Drawn into thin wires
- (C) Molded into liquids
- (D) Broken easily

Correct Answer: (B) Drawn into thin wires

Q26. Malleability refers to the ability of a material to be:

- (A) Beaten into thin sheets
- (B) Drawn into wires
- (C) Dissolved in water
- (D) Melted instantly

Correct Answer: (A) Beaten into thin sheets

Q27. The process used to obtain pure solid crystals from an impure solution is:

- (A) Evaporation
- (B) Crystallization
- (C) Filtration
- (D) Decantation

Correct Answer: (B) Crystallization

Q28. Which component of air is present in the maximum percentage by volume (~78%)?

- (A) Oxygen
- (B) Nitrogen
- (C) Carbon Dioxide
- (D) Argon

Correct Answer: (B) Nitrogen

Q29. A mixture of iron filings and sulphur powder can be separated physically using a:

- (A) Filter paper
- (B) Magnet
- (C) Separating funnel
- (D) Sieve

Correct Answer: (B) Magnet

Q30. A separating funnel is used to separate a mixture of:

- (A) Two miscible liquids
- (B) Two immiscible liquids (e.g., Oil and Water)
- (C) Solid dissolved in liquid
- (D) Gases

Correct Answer: (B) Two immiscible liquids (e.g., Oil and Water)

RAMAN SPACE
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The Amazing World of Solute, Solvent and Solutions

CHAPTER CORE CONCEPTS & KEY SUMMARY

A solution is a homogeneous mixture of two or more substances. The constituent present in larger quantity that dissolves the other is the Solvent, while the dissolved component is the Solute. Solutions can be classified as unsaturated, saturated, or supersaturated based on solute concentration. Concentration is expressed in mass percentage or volume percentage. Factors affecting solubility include temperature, pressure (for gases), and nature of solute/solvent ('like dissolves like').

Key Terms: [Solute & Solvent](#) [True Solution](#) [Saturated vs Unsaturated](#) [Solubility](#) [Concentration Mass %](#)
[Factors Affecting Solubility](#) [Henry's Law \(Intro\)](#)

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. In a sugar solution in water, sugar acts as the _____ and water acts as the _____.

- (A) Solvent; Solute
- (B) Solute; Solvent
- (C) Colloid; Suspension
- (D) Sol; Gel

Correct Answer: (B) Solute; Solvent

Q2. A solution in which no more solute can be dissolved at a given specified temperature is called a:

- (A) Unsaturated solution
- (B) Saturated solution
- (C) Supersaturated solution
- (D) Dilute solution

Correct Answer: (B) Saturated solution

Q3. Water is frequently called a 'Universal Solvent' because:

- (A) It boils at 100°C
- (B) It dissolves a wide variety of polar ionic and covalent substances
- (C) It is abundant on Earth
- (D) It has zero density

Correct Answer: (B) It dissolves a wide variety of polar ionic and covalent substances

Q4. The maximum amount of solute (in grams) that can dissolve in 100g of solvent at a specific temperature is its:

- (A) Concentration
- (B) Solubility
- (C) Molarity
- (D) Density

Correct Answer: (B) Solubility

Q5. For most solid solutes, as temperature increases, their solubility in liquid solvent:

- (A) Decreases
- (B) Increases
- (C) Remains unchanged
- (D) Drops to zero

Correct Answer: (B) Increases

Q6. For gaseous solutes (like O₂ or CO₂ in water), as temperature INCREASES, gas solubility:

- (A) Increases
- (B) Decreases
- (C) Remains constant
- (D) Doubles

Correct Answer: (B) Decreases

Q7. Why do aerated soft drinks effervesce/fizz when the bottle cap is opened?

- (A) Pressure drops, reducing CO₂ solubility and releasing gas bubbles
- (B) Temperature drops rapidly
- (C) Sugar reacts with water
- (D) Gas converts to solid

Correct Answer: (A) Pressure drops, reducing CO₂ solubility and releasing gas bubbles

Q8. A solution containing a small amount of solute relative to solvent is termed:

- (A) Concentrated
- (B) Dilute
- (C) Saturated
- (D) Supersaturated

Correct Answer: (B) Dilute

Q9. Mass percentage of a solution is calculated using the formula:

- (A) $(\text{Mass of solute} / \text{Mass of solution}) \times 100$
- (B) $(\text{Mass of solvent} / \text{Mass of solute}) \times 100$
- (C) $(\text{Volume of solute} / \text{Volume of solvent}) \times 100$
- (D) $(\text{Mass of solution} / \text{Mass of solute}) \times 100$

Correct Answer: (A) $(\text{Mass of solute} / \text{Mass of solution}) \times 100$

Q10. If 20g of salt is dissolved in 180g of water, what is the mass percentage of the salt solution?

- (A) 10%
- (B) 20%
- (C) 11.1%
- (D) 9%

Correct Answer: (A) 10%

Q11. Which type of mixture has particle size less than 1 nanometer (1 nm = 10⁻⁹ m) and does not show Tyndall effect?

- (A) Suspension
- (B) True Solution
- (C) Colloid
- (D) Coarse mixture

Correct Answer: (B) True Solution

Q12. Which of the following is an example of a gas-in-liquid solution?

- (A) Soda water (Carbonated water)
- (B) Air
- (C) Brass
- (D) Humid air

Correct Answer: (A) Soda water (Carbonated water)

Q13. An example of a gas-in-gas solution is:

- (A) Soda water
- (B) Air
- (C) Vinegar
- (D) Amalgam

Correct Answer: (B) Air

Q14. Which of the following is a solid-in-solid solution?

- (A) Bronze / Brass (Alloys)
- (B) Salt water
- (C) Iodine vapor in air
- (D) Dental amalgam

Correct Answer: (A) Bronze / Brass (Alloys)

Q15. Dental amalgam used in tooth fillings is a solution of liquid _____ in solid gold/silver.

- (A) Mercury
- (B) Water
- (C) Alcohol
- (D) Lead

Correct Answer: (A) Mercury

Q16. What happens when a saturated solution prepared at 60°C is cooled down to 20°C?

- (A) Solute dissolves further
- (B) Excess solute precipitates/crystallizes out of solution
- (C) Solution evaporates completely
- (D) Color changes instantly

Correct Answer: (B) Excess solute precipitates/crystallizes out of solution

Q17. A unstable solution that contains more dissolved solute than a saturated solution at the same temperature is:

- (A) Unsaturated
- (B) Supersaturated
- (C) Dilute
- (D) Colloidal

Correct Answer: (B) Supersaturated

Q18. Suspension particle sizes are typically:

- (A) Less than 1 nm
- (B) Between 1 nm and 1000 nm
- (C) Greater than 1000 nm (1 μm)
- (D) Atomic scale

Correct Answer: (C) Greater than 1000 nm (1 μm)

Q19. Colloidal particles range in size between:

- (A) < 1 nm
- (B) 1 nm and 1000 nm (1 μm)
- (C) > 1000 nm
- (D) 1 mm

Correct Answer: (B) 1 nm and 1000 nm (1 μm)

Q20. Which of the following statements about true solutions is CORRECT?

- (A) They are heterogeneous and settle over time
- (B) They leave residue on filter paper
- (C) Particles do not scatter light and pass through filter paper completely
- (D) Particles are visible to the naked eye

Correct Answer: (C) Particles do not scatter light and pass through filter paper completely

Q21. The phenomenon where colloidal particles scatter light rays making the light path visible is:

- (A) Tyndall effect
- (B) Raman effect
- (C) Photoelectric effect
- (D) Doppler effect

Correct Answer: (A) Tyndall effect

Q22. Solids like naphthalene or camphor dissolve readily in organic solvents like benzene but not in water because:

- (A) Like dissolves like (Non-polar in non-polar)
- (B) Water is too cold
- (C) Organic solvents are heavier
- (D) Water has higher density

Correct Answer: (A) Like dissolves like (Non-polar in non-polar)

Q23. Stirring or crushing solute crystals increases the rate of dissolution because it:

- (A) Increases surface area and solvent contact frequency
- (B) Decreases temperature
- (C) Increases volume of solvent
- (D) Changes chemical bonds

Correct Answer: (A) Increases surface area and solvent contact frequency

Q24. Which of the following is a non-polar solvent?

- (A) Water
- (B) Benzene / Carbon Tetrachloride
- (C) Liquid Ammonia
- (D) Ethanol

Correct Answer: (B) Benzene / Carbon Tetrachloride

Q25. Vinegar is a solution containing roughly 5-8% _____ acid in water.

- (A) Citric
- (B) Acetic (Ethanoic)
- (C) Hydrochloric
- (D) Sulphuric

Correct Answer: (B) Acetic (Ethanoic)

Q26. When copper sulphate crystals are dissolved in water, the resulting solution color is:

- (A) Green
- (B) Deep Blue
- (C) Red
- (D) Yellow

Correct Answer: (B) Deep Blue

Q27. A solution that conducts electricity due to presence of free ions is called an:

- (A) Electrolyte solution
- (B) Non-electrolyte solution
- (C) Inert solution
- (D) Organic solution

Correct Answer: (A) Electrolyte solution

Q28. Which of the following is a non-electrolyte in aqueous solution?

- (A) Sodium chloride
- (B) Pure Sugar (Glucose / Sucrose)
- (C) Hydrochloric acid
- (D) Sodium hydroxide

Correct Answer: (B) Pure Sugar (Glucose / Sucrose)

Q29. The maximum amount of solute that dissolves in a given solvent depends on:

- (A) Nature of solute and solvent
- (B) Temperature
- (C) Pressure (for gases)
- (D) All of the above

Correct Answer: (D) All of the above

Q30. Concentration of a solution expressed in moles of solute per liter of solution is known as:

- (A) Molality
- (C) Normality

- (B) Molarity
- (D) Mass fraction

Correct Answer: (B) Molarity

RAMAN SPACE
MANTHAN INDIA

The Invisible Living World Beyond Our Naked Eye

CHAPTER CORE CONCEPTS & KEY SUMMARY

Microorganisms are tiny living entities invisible to the naked eye, studied under Microbiology. They include Bacteria, Viruses, Fungi, Algae, and Protozoa. Microbes inhabit diverse environments ranging from thermal vents to ice caps. While many microorganisms cause infectious diseases (Pathogens), others play indispensable beneficial roles in food production (fermentation by yeast/Lactobacillus), nitrogen fixation (Rhizobium), sewage treatment, decomposition, and biotechnology.

Key Terms: Microbiology Bacteria Viruses Fungi & Algae Protozoa Lactobacillus & Yeast
Nitrogen Fixation (Rhizobium) Pathogens

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. The study of microscopic organisms is known as:

- | | |
|-------------|------------------|
| (A) Botany | (B) Microbiology |
| (C) Zoology | (D) Ecology |

Correct Answer: (B) Microbiology

Q2. Who is widely regarded as the 'Father of Microbiology' for discovering bacteria using self-designed microscopes?

- | | |
|-------------------|---------------------------|
| (A) Robert Hooke | (B) Anton van Leeuwenhoek |
| (C) Louis Pasteur | (D) Alexander Fleming |

Correct Answer: (B) Anton van Leeuwenhoek

Q3. Which organism converts lactose sugar in milk into lactic acid to form curd?

- | | |
|---------------|-------------------|
| (A) Rhizobium | (B) Lactobacillus |
| (C) Yeast | (D) Penicillium |

Correct Answer: (B) Lactobacillus

Q4. Yeast reproduces rapidly and produces which gas during aerobic/anaerobic fermentation in dough?

- | | |
|--------------|--------------------|
| (A) Oxygen | (B) Carbon Dioxide |
| (C) Nitrogen | (D) Methane |

Correct Answer: (B) Carbon Dioxide

Q5. First antibiotic, Penicillin, was discovered by Alexander Fleming from which organism?

- | | |
|--------------------------------------|-----------------------------|
| (A) Penicillium chrysogenum (Fungus) | (B) Streptomyces (Bacteria) |
| (C) Amoeba (Protozoa) | (D) Spirogyra (Algae) |

Correct Answer: (A) Penicillium chrysogenum (Fungus)

Q6. Rhizobium bacteria reside symbiotically in root nodules of leguminous plants to fix atmospheric:

- (A) Carbon dioxide
- (B) Nitrogen
- (C) Oxygen
- (D) Phosphorus

Correct Answer: (B) Nitrogen

Q7. Viruses are considered borderlines between living and non-living because:

- (A) They reproduce only inside host cells and show no metabolism outside
- (B) They have cellular structures without nucleus
- (C) They move using flagella
- (D) They perform photosynthesis

Correct Answer: (A) They reproduce only inside host cells and show no metabolism outside

Q8. Malaria is caused by which protozoan parasite?

- (A) Amoeba proteus
- (B) Plasmodium
- (C) Paramecium
- (D) Trypanosoma

Correct Answer: (B) Plasmodium

Q9. Which disease is caused by a virus?

- (A) Typhoid
- (B) Tuberculosis
- (C) Polio / Influenza / Smallpox
- (D) Cholera

Correct Answer: (C) Polio / Influenza / Smallpox

Q10. Bread dough rises due to the production of CO₂ gas by multiplying cells of:

- (A) Lactobacillus
- (B) Yeast
- (C) Rhizobium
- (D) Mould

Correct Answer: (B) Yeast

Q11. Single-celled eukaryotic organisms like Amoeba and Paramecium belong to group:

- (A) Protozoa
- (B) Bacteria
- (C) Fungi
- (D) Algae

Correct Answer: (A) Protozoa

Q12. Chlorophyll-containing microscopic photosynthetic organisms found in aquatic habitats are:

- (A) Fungi
- (B) Algae (e.g., Chlamydomonas)
- (C) Protozoa
- (D) Bacteria

Correct Answer: (B) Algae (e.g., Chlamydomonas)

Q13. Blue-green algae capable of nitrogen fixation are also known as:

- (A) Cyanobacteria
- (B) Mycoplasma
- (C) Bacteriophages
- (D) Protozoans

Correct Answer: (A) Cyanobacteria

Q14. Fungi like Bread Mould (Rhizopus) obtain nutrition by which mode?

- (A) Photosynthetic
- (B) Saprophytic (decaying organic matter)
- (C) Parasitic on metals
- (D) Autotrophic

Correct Answer: (B) Saprophytic (decaying organic matter)

Q15. Which disease is caused by a bacterial infection?

- (A) Typhoid and Cholera
- (B) Dengue and Chikungunya
- (C) Malaria and Amoebiasis
- (D) Ringworm and Athlete's foot

Correct Answer: (A) Typhoid and Cholera

Q16. Amoebic dysentery is caused by which protozoan?

- (A) Entamoeba histolytica
- (B) Plasmodium vivax
- (C) Euglena
- (D) Paramecium

Correct Answer: (A) Entamoeba histolytica

Q17. Foot and Mouth disease in cattle is caused by a:

- (A) Bacteria
- (B) Virus
- (C) Fungus
- (D) Protozoan

Correct Answer: (B) Virus

Q18. Citrus Canker is a plant disease caused by:

- (A) Fungus
- (B) Bacteria (Xanthomonas citri)
- (C) Virus
- (D) Algae

Correct Answer: (B) Bacteria (Xanthomonas citri)

Q19. Rust of wheat is a common agricultural disease caused by a:

- (A) Fungus (Puccinia)
- (B) Bacteria
- (C) Virus
- (D) Protozoan

Correct Answer: (A) Fungus (Puccinia)

Q20. The process of converting atmospheric nitrogen into nitrogenous compounds usable by plants is:

- (A) Denitrification
- (B) Nitrogen Fixation
- (C) Nitrification
- (D) Ammonification

Correct Answer: (B) Nitrogen Fixation

Q21. Certain soil bacteria like Nitrosomonas convert ammonia into nitrates, a process called:

- (A) Nitrogen fixation
- (B) Nitrification
- (C) Denitrification
- (D) Fermentation

Correct Answer: (B) Nitrification

Q22. Denitrifying bacteria like Pseudomonas convert soil nitrates back into:

- (A) Free atmospheric Nitrogen gas
- (B) Ammonia
- (C) Proteins
- (D) Urea

Correct Answer: (A) Free atmospheric Nitrogen gas

Q23. Which microscope component controls the amount of light reaching the specimen slide?

- (A) Objective lens
- (B) Iris Diaphragm
- (C) Eyepiece
- (D) Coarse adjustment knob

Correct Answer: (B) Iris Diaphragm

Q24. Total magnification of a compound microscope with 10x eyepiece and 40x objective lens is:

- (A) 50x
- (B) 400x
- (C) 40x
- (D) 300x

Correct Answer: (B) 400x

Q25. A vaccine contains:

- (A) Live virulent pathogens
- (B) Killed or weakened (attenuated) microbes/antigens
- (C) Strong antibiotics
- (D) Pure vitamins

Correct Answer: (B) Killed or weakened (attenuated) microbes/antigens

Q26. Who developed the world's first successful vaccine (against Smallpox in 1796)?

- (A) Edward Jenner
- (B) Louis Pasteur
- (C) Robert Koch
- (D) Jonas Salk

Correct Answer: (A) Edward Jenner

Q27. Oral Polio Vaccine (Sabin vaccine) is administered to protect children against:

- (A) Poliomyelitis virus
- (B) Tetanus bacteria
- (C) Diphtheria
- (D) Pertussis

Correct Answer: (A) Poliomyelitis virus

Q28. Microbes that decompose dead plants and animals convert organic waste into:

- (A) Humus and plant nutrients
- (B) Toxic plastics
- (C) Non-biodegradable ash
- (D) Metals

Correct Answer: (A) Humus and plant nutrients

Q29. Amoeba moves and captures food using temporary finger-like projections called:

- (A) Cilia
- (B) Flagella
- (C) Pseudopodia ('false feet')
- (D) Tentacles

Correct Answer: (C) Pseudopodia ('false feet')

Q30. Paramecium swims smoothly through water using thousands of tiny hair-like structures called:

(A) Flagella

(B) Pseudopodia

(C) Cilia

(D) Pili

Correct Answer: (C) Cilia

RAMAN SPACE
MANTHAN INDIA

CHAPTER CORE CONCEPTS & KEY SUMMARY

Light travels along straight lines (rectilinear propagation). When light bounces off a polished surface, it undergoes Reflection following the Laws of Reflection (Angle of Incidence = Angle of Reflection; Incident ray, reflected ray, and normal lie in the same plane). Plane mirrors form virtual, erect, laterally inverted images of equal size. Spherical mirrors (Concave and Convex) and Lenses (Convex converging and Concave diverging) bend light to form real or virtual images described by mirror/lens formulas and ray optics rules.

Key Terms: [Laws of Reflection](#) [Plane Mirror & Lateral Inversion](#) [Concave & Convex Mirrors](#) [Convex & Concave Lenses](#)
[Real vs Virtual Image](#) [Refraction](#) [Spectrum & Dispersion](#)

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. According to the Law of Reflection, the angle of incidence (i) is always _____ the angle of reflection (r).

- (A) Greater than (B) Less than
 (C) Equal to (D) Unrelated to

Correct Answer: (C) Equal to

Q2. An image that can be caught on a physical screen is called a:

- (A) Virtual image (B) Real image
 (C) Inverted image (D) Erect image

Correct Answer: (B) Real image

Q3. An image formed by a plane mirror is always:

- (A) Real, inverted, magnified (B) Virtual, erect, same size as object, laterally inverted
 (C) Real, erect, diminished (D) Virtual, inverted, enlarged

Correct Answer: (B) Virtual, erect, same size as object, laterally inverted

Q4. The left-right reversal of an object's image in a plane mirror is termed:

- (A) Refraction (B) Lateral Inversion
 (C) Dispersion (D) Total internal reflection

Correct Answer: (B) Lateral Inversion

Q5. A spherical mirror whose reflecting surface curves INWARDS towards the center of curvature is a:

- (A) Convex mirror (B) Concave mirror
 (C) Plane mirror (D) Cylindrical mirror

Correct Answer: (B) Concave mirror

Q6. A spherical mirror whose reflecting surface bulges OUTWARDS is a:

- (A) Concave mirror
- (B) Convex mirror
- (C) Parabolic mirror
- (D) Plane mirror

Correct Answer: (B) Convex mirror

Q7. Which type of mirror is used as a rear-view mirror in motor vehicles because it provides a wider field of view and erect diminished images?

- (A) Concave mirror
- (B) Convex mirror
- (C) Plane mirror
- (D) Concave-convex mirror

Correct Answer: (B) Convex mirror

Q8. Dentists use which type of mirror to obtain magnified images of teeth?

- (A) Convex mirror
- (B) Concave mirror
- (C) Plane mirror
- (D) Cylindrical mirror

Correct Answer: (B) Concave mirror

Q9. The focal length (f) of a spherical mirror is equal to half of its:

- (A) Radius of Curvature ($R = 2f$)
- (B) Aperture
- (C) Principal Axis length
- (D) Diameter

Correct Answer: (A) Radius of Curvature ($R = 2f$)

Q10. A transparent optical medium bounded by two curved surfaces (or one curved and one plane) is a:

- (A) Prism
- (B) Lens
- (C) Mirror
- (D) Glass slab

Correct Answer: (B) Lens

Q11. A lens that is thicker at the middle and thinner at the edges is a:

- (A) Concave lens
- (B) Convex lens
- (C) Plano-concave lens
- (D) Cylindrical lens

Correct Answer: (B) Convex lens

Q12. A Convex lens is also known as a:

- (A) Diverging lens
- (B) Converging lens
- (C) Bifocal lens
- (D) Reflecting lens

Correct Answer: (B) Converging lens

Q13. A Concave lens is also known as a:

- (A) Converging lens
- (B) Diverging lens
- (C) Magnifying lens
- (D) Prism

Correct Answer: (B) Diverging lens

Q14. Which lens always forms a virtual, erect, and diminished image regardless of object position?

- (A) Convex lens
- (B) Concave lens
- (C) Biconvex lens
- (D) Cylindrical lens

Correct Answer: (B) Concave lens

Q15. When light passes from one transparent medium into another medium of different density, it bends. This phenomenon is:

- (A) Reflection
- (B) Refraction
- (C) Dispersion
- (D) Diffraction

Correct Answer: (B) Refraction

Q16. The splitting of white light into its seven constituent colors when passing through a glass prism is:

- (A) Refraction
- (B) Dispersion
- (C) Reflection
- (D) Scattering

Correct Answer: (B) Dispersion

Q17. The acronym VIBGYOR stands for the spectrum colors in order of increasing wavelength. 'V' stands for:

- (A) Violet
- (B) Vanilla
- (C) Vermillion
- (D) Velvet

Correct Answer: (A) Violet

Q18. In human eyes, the light-sensitive inner back layer where real inverted images are formed is the:

- (A) Cornea
- (B) Iris
- (C) Retina
- (D) Pupil

Correct Answer: (C) Retina

Q19. The colored part of the eye that controls the size of the pupil to regulate light entry is the:

- (A) Sclera
- (B) Retina
- (C) Iris
- (D) Ciliary muscle

Correct Answer: (C) Iris

Q20. A person suffering from Myopia (short-sightedness) can see near objects clearly but struggles with distant objects. Myopia is corrected using a:

- (A) Convex lens
- (B) Concave lens
- (C) Cylindrical lens
- (D) Bifocal lens

Correct Answer: (B) Concave lens

Q21. Hypermetropia (far-sightedness) is an eye defect corrected by using a:

- (A) Concave lens
- (B) Convex lens
- (C) Plane mirror
- (D) Prism

Correct Answer: (B) Convex lens

Q22. Persistence of vision in human eye lasts for approximately:

- (A) 1/16th of a second
- (B) 1 second
- (C) 1/2 second
- (D) 1/60th of a second

Correct Answer: (A) 1/16th of a second

Q23. Visually challenged persons can read and write using a tactile system invented by:

- (A) Louis Braille
- (B) Helen Keller
- (C) Thomas Edison
- (D) Alexander Graham Bell

Correct Answer: (A) Louis Braille

Q24. In the Braille system, how many dot patterns or cells are used?

- (A) 26
- (B) 63
- (C) 100
- (D) 128

Correct Answer: (B) 63

Q25. A Kaleidoscope creates beautiful symmetrical patterns based on the principle of:

- (A) Single refraction
- (B) Multiple reflections from inclined mirrors
- (C) Dispersion of light
- (D) Total absorption

Correct Answer: (B) Multiple reflections from inclined mirrors

Q26. If two plane mirrors are placed parallel to each other facing one another, how many images of an object placed between them will be formed?

- (A) One
- (B) Two
- (C) Four
- (D) Infinite

Correct Answer: (D) Infinite

Q27. The power of a lens is measured in units called:

- (A) Watts
- (B) Dioptres (D)
- (C) Joules
- (D) Lumens

Correct Answer: (B) Dioptres (D)

Q28. The focal length of a convex lens is 0.5 meters. Its power P ($P = 1/f$) is:

- (A) +2 D
- (B) -2 D
- (C) +0.5 D
- (D) +5 D

Correct Answer: (A) +2 D

Q29. A magnifying glass (simple microscope) consists of a single:

- (A) Concave lens of long focal length
- (B) Convex lens of short focal length
- (C) Plane mirror
- (D) Concave mirror

Correct Answer: (B) Convex lens of short focal length

Q30. When a ray of light enters perpendicularly (normally) from air into a glass block (angle of incidence = 0°), the angle of refraction is:

- (A) 90°
- (B) 45°
- (C) 0° (passes undeviated)
- (D) 30°

Correct Answer: (C) 0° (passes undeviated)

RAMAN SPACE
MANTHAN INDIA

Keeping Time with the Skies

CHAPTER CORE CONCEPTS & KEY SUMMARY

Humans historically kept track of time and seasons by observing celestial cycles: Earth's rotation (Day and Night), Earth's revolution around the Sun (Solar Year), and Moon's orbital phases around Earth (Lunar Month). Sundials, water clocks, and hourglasses were early timekeeping tools. Celestial phenomena like equinoxes, solstices, lunar and solar eclipses, constellations, and astronomical calendars form the basis of navigational and time-keeping systems.

Key Terms: Rotation & Revolution Phases of Moon Solar & Lunar Eclipse Equinox & Solstice

Sundial (Samrat Yantra) Constellations Celestial Sphere

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. The rotation of Earth on its axis once every 24 hours causes:

- (A) Seasons
- (B) Day and Night
- (C) Eclipses
- (D) Tides only

Correct Answer: (B) Day and Night

Q2. The revolution of Earth around the Sun in an elliptical orbit once every ~365.25 days along with its tilted axis causes:

- (A) Day and night length variation & Seasons
- (B) Daily tides
- (C) Moon phases only
- (D) Solar flares

Correct Answer: (A) Day and night length variation & Seasons

Q3. An ancient astronomical instrument that tells time by the position of the shadow cast by the Sun is a:

- (A) Water clock
- (B) Sundial
- (C) Hourglass
- (D) Astrolabe

Correct Answer: (B) Sundial

Q4. The famous giant sundial 'Samrat Yantra' located at Jantar Mantar (Jaipur/Delhi) was built by:

- (A) Maharaja Sawai Jai Singh II
- (B) Emperor Akbar
- (C) Aryabhata
- (D) Varahamihira

Correct Answer: (A) Maharaja Sawai Jai Singh II

Q5. How long does it take for the Moon to complete one orbit around the Earth relative to stars (sidereal month)?

- (A) 24 hours
- (B) 27.3 days
- (C) 365 days
- (D) 12 hours

Correct Answer: (B) 27.3 days

Q6. The time period from one New Moon (Amavasya) to the next New Moon (Full Lunar Synodic Month) is approx:

- (A) 15 days
- (B) 29.5 days
- (C) 30 days exactly
- (D) 365 days

Correct Answer: (B) 29.5 days

Q7. A Solar Eclipse occurs when:

- (A) Earth comes between Sun and Moon
- (B) Moon comes directly between Sun and Earth
- (C) Sun comes between Earth and Moon
- (D) Mars blocks the Sun

Correct Answer: (B) Moon comes directly between Sun and Earth

Q8. A Solar Eclipse can occur ONLY on which lunar phase?

- (A) Full Moon (Purnima)
- (B) New Moon (Amavasya)
- (C) First Quarter
- (D) Waxing Crescent

Correct Answer: (B) New Moon (Amavasya)

Q9. A Lunar Eclipse occurs when:

- (A) Earth's shadow falls on the Moon as Earth passes between Sun and Moon
- (B) Moon blocks the Sun
- (C) Sun blocks the Moon
- (D) Venus crosses the Sun

Correct Answer: (A) Earth's shadow falls on the Moon as Earth passes between Sun and Moon

Q10. A Lunar Eclipse can occur ONLY on which lunar phase?

- (A) New Moon
- (B) Full Moon (Purnima)
- (C) Crescent Moon
- (D) Half Moon

Correct Answer: (B) Full Moon (Purnima)

Q11. The day of the year when day and night are of equal duration (~12 hours each) everywhere on Earth is called an:

- (A) Solstice
- (B) Equinox
- (C) Zenith
- (D) Aphelion

Correct Answer: (B) Equinox

Q12. Equinoxes occur twice a year, around which dates?

- (A) March 21 (Vernal) and September 23 (Autumnal)
- (B) June 21 and December 22
- (C) January 1 and July 4
- (D) August 15 and January 26

Correct Answer: (A) March 21 (Vernal) and September 23 (Autumnal)

Q13. The Summer Solstice in the Northern Hemisphere (longest day of the year) occurs around:

- (A) June 21
- (B) December 22
- (C) March 21
- (D) September 23

Correct Answer: (A) June 21

Q14. The Winter Solstice in the Northern Hemisphere (shortest day of the year) occurs around:

- (A) June 21
- (B) December 22
- (C) March 21
- (D) September 23

Correct Answer: (B) December 22

Q15. A group of stars that forms a recognizable shape or pattern in the night sky is called a:

- (A) Galaxy
- (B) Constellation
- (C) Nebula
- (D) Solar System

Correct Answer: (B) Constellation

Q16. Ursa Major (The Great Bear / Saptarishi) is a famous:

- (A) Constellation
- (B) Planet
- (C) Comet
- (D) Asteroid

Correct Answer: (A) Constellation

Q17. Which star remains stationary in the northern sky and helps navigators locate the North direction?

- (A) Sirius
- (B) Pole Star (Polestar / Dhruva Tara)
- (C) Alpha Centauri
- (D) Betelgeuse

Correct Answer: (B) Pole Star (Polestar / Dhruva Tara)

Q18. The Pole Star is aligned almost directly above Earth's:

- (A) Equator
- (B) North Pole axis
- (C) South Pole axis
- (D) Tropic of Cancer

Correct Answer: (B) North Pole axis

Q19. Orion is a prominent constellation visible during winter, also known as:

- (A) The Hunter (Vyadha)
- (B) The Great Bear
- (C) The Scorpion
- (D) The Lion

Correct Answer: (A) The Hunter (Vyadha)

Q20. Brightest star visible in the night sky, located near Orion constellation, is:

- (A) Pole Star
- (B) Sirius (Dog Star)
- (C) Proxima Centauri
- (D) Vega

Correct Answer: (B) Sirius (Dog Star)

Q21. The tilt of Earth's rotational axis relative to its orbital plane is approximately:

- (A) 0°
- (B) 23.5°
- (C) 45°
- (D) 90°

Correct Answer: (B) 23.5°

Q22. Leap years occur every 4 years to compensate for the extra fraction of a day (~0.25 days) in Earth's orbital period, adding 1 day to:

- (A) January
- (B) February (29 days)
- (C) March
- (D) December

Correct Answer: (B) February (29 days)

Q23. The changing shapes of the bright visible portion of the Moon as seen from Earth are called:

- (A) Lunar eclipses
- (B) Phases of the Moon
- (C) Solar flares
- (D) Tidal cycles

Correct Answer: (B) Phases of the Moon

Q24. When the visible lit part of the Moon is growing larger night after night, the Moon is:

- (A) Waxing
- (B) Waning
- (C) Eclipsing
- (D) Receding

Correct Answer: (A) Waxing

Q25. When the visible lit part of the Moon is shrinking night after night, the Moon is:

- (A) Waxing
- (B) Waning
- (C) Gibbous
- (D) Full

Correct Answer: (B) Waning

Q26. Cassiopeia is a prominent constellation in the northern sky visible during winter that resembles the letter:

- (A) W or M
- (B) O or C
- (C) X or Y
- (D) Z

Correct Answer: (A) W or M

Q27. Indian astronomical calendar systems (Panchang) are primarily based on:

- (A) Solar cycles only
- (B) Luni-solar combined astronomical calculations
- (C) Jupiter revolutions only
- (D) Geocentric fixed models

Correct Answer: (B) Luni-solar combined astronomical calculations

Q28. The path in the sky along which the Sun, Moon, and major planets appear to move through the 12 zodiac constellations is the:

- (A) Celestial equator
- (B) Ecliptic
- (C) Galactic plane
- (D) Horizon

Correct Answer: (B) Ecliptic

Q29. An hourglass measures time interval by the steady flow of which material through a narrow neck?

- (A) Water
- (B) Sand
- (C) Oil
- (D) Mercury

Correct Answer: (B) Sand

Q30. Modern ultra-precise international standard timekeeping relies on atomic clocks utilizing oscillations of which element?

- (A) Quartz
- (C) Radium

- (B) Cesium-133
- (D) Uranium

Correct Answer: (B) Cesium-133

RAMAN SPACE
MANTHAN INDIA

How Nature Works in Harmony

CHAPTER CORE CONCEPTS & KEY SUMMARY

Ecosystems consist of biotic (living organisms: producers, consumers, decomposers) and abiotic (non-living: air, water, soil, sunlight) components interacting in functional balance. Energy flows unidirectionally from the Sun through trophic levels in food chains and food webs, following Lindeman's 10% energy transfer rule. Biogeochemical cycles (Carbon, Nitrogen, Water cycles) recycle nutrients through the biosphere. Biodiversity, ecological succession, and conservation ensure environmental stability and sustainability.

Key Terms: Ecosystem Biotic & Abiotic Components Food Chain & Food Web Trophic Levels & 10% Rule

Decomposers Biogeochemical Cycles Biodiversity & Balance

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. A structural and functional unit of nature comprising living organisms and their non-living environment interacting together is an:

- (A) Organ system
- (B) Ecosystem
- (C) Population
- (D) Organelle

Correct Answer: (B) Ecosystem

Q2. Which of the following is a biotic component of an ecosystem?

- (A) Sunlight
- (B) Plants, Animals, Microbes
- (C) Soil
- (D) Temperature

Correct Answer: (B) Plants, Animals, Microbes

Q3. Which of the following is an abiotic component of an ecosystem?

- (A) Bacteria
- (B) Fungi
- (C) Water and Minerals
- (D) Herbivores

Correct Answer: (C) Water and Minerals

Q4. Green plants that synthesize their own organic food via photosynthesis using solar energy are called:

- (A) Primary Consumers
- (B) Producers (Autotrophs)
- (C) Decomposers
- (D) Secondary Consumers

Correct Answer: (B) Producers (Autotrophs)

Q5. Organisms that feed directly on green plants are known as:

- (A) Producers
- (B) Primary Consumers (Herbivores)
- (C) Secondary Consumers (Carnivores)
- (D) Decomposers

Correct Answer: (B) Primary Consumers (Herbivores)

Q6. Organisms like bacteria and fungi that break down dead organic matter and return nutrients to the soil are:

- (A) Producers
- (B) Decomposers (Saprophytes)
- (C) Herbivores
- (D) Apex predators

Correct Answer: (B) Decomposers (Saprophytes)

Q7. A linear sequence of organisms where each organism eats the lower one and is eaten by the higher one is a:

- (A) Food Web
- (B) Food Chain
- (C) Ecological Pyramid
- (D) Nutrient Cycle

Correct Answer: (B) Food Chain

Q8. A complex network of interconnected food chains within an ecosystem is termed a:

- (A) Trophic Level
- (B) Food Web
- (C) Biomagnification
- (D) Energy Pyramid

Correct Answer: (B) Food Web

Q9. Each step or level in a food chain is referred to as a:

- (A) Trophic level
- (B) Succession step
- (C) Niche
- (D) Habitat

Correct Answer: (A) Trophic level

Q10. According to Lindeman's 10% Law of energy transfer in an ecosystem, how much energy is passed to the next trophic level?

- (A) 100%
- (B) 50%
- (C) 10%
- (D) 1%

Correct Answer: (C) 10%

Q11. What happens to the remaining 90% of energy at each trophic level?

- (A) It is lost as metabolic heat and used for respiration/life processes
- (B) It is stored in rocks
- (C) It turns into light
- (D) It is passed to decomposers only

Correct Answer: (A) It is lost as metabolic heat and used for respiration/life processes

Q12. In an energy pyramid, which trophic level always contains the maximum stored energy?

- (A) First Trophic Level (Producers)
- (B) Second Trophic Level (Herbivores)
- (C) Third Trophic Level (Carnivores)
- (D) Apex Predators

Correct Answer: (A) First Trophic Level (Producers)

Q13. Biological Magnification (Biomagnification) refers to:

- (A) Increase in population of producers
- (B) Progressive accumulation of non-biodegradable chemicals (like DDT) at higher trophic levels
- (C) Increase in forest cover
- (D) Growth of microbial colonies

Correct Answer: (B) Progressive accumulation of non-biodegradable chemicals (like DDT) at higher trophic levels

Q14. Which cycle describes the continuous movement of water on, above, and below the surface of Earth?

- (A) Carbon cycle
- (B) Water Cycle (Hydrological cycle)
- (C) Nitrogen cycle
- (D) Phosphorus cycle

Correct Answer: (B) Water Cycle (Hydrological cycle)

Q15. Plant loss of water vapor from aerial parts through stomata into the atmosphere is called:

- (A) Evaporation
- (B) Transpiration
- (C) Precipitation
- (D) Condensation

Correct Answer: (B) Transpiration

Q16. Which gas is absorbed by plants during photosynthesis and released back during cellular respiration?

- (A) Oxygen
- (B) Carbon Dioxide
- (C) Nitrogen
- (D) Methane

Correct Answer: (B) Carbon Dioxide

Q17. Which human activity causes major disruption to the natural carbon cycle and leads to global warming?

- (A) Afforestation
- (B) Deforestation and Burning of Fossil Fuels
- (C) Organic farming
- (D) Rainwater harvesting

Correct Answer: (B) Deforestation and Burning of Fossil Fuels

Q18. Organisms that eat both plants and animals are classified as:

- (A) Herbivores
- (B) Carnivores
- (C) Omnivores
- (D) Decomposers

Correct Answer: (C) Omnivores

Q19. The natural home or environment where an organism lives and obtains food, shelter, and water is its:

- (A) Niche
- (B) Habitat
- (C) Biome
- (D) Ecosystem

Correct Answer: (B) Habitat

Q20. The functional role or profession of a species within its ecosystem is its:

- (A) Habitat
- (B) Ecological Niche
- (C) Trophic rank
- (D) Territory

Correct Answer: (B) Ecological Niche

Q21. Extinction of a key species (Keystone Species) in an ecosystem often causes:

- (A) Increase in overall stability
- (B) Collapse or severe imbalance of the ecosystem structure
- (C) Immediate rise in solar radiation
- (D) No change

Correct Answer: (B) Collapse or severe imbalance of the ecosystem structure

Q22. Which of the following is a non-biodegradable pollutant?

- (A) Fallen leaves
- (B) Plastic bottles / DDT
- (C) Paper
- (D) Animal dung

Correct Answer: (B) Plastic bottles / DDT

Q23. Which ecological pyramid is ALWAYS upright in all stable natural terrestrial ecosystems?

- (A) Pyramid of Numbers
- (B) Pyramid of Biomass
- (C) Pyramid of Energy
- (D) Pyramid of Height

Correct Answer: (C) Pyramid of Energy

Q24. Forests are often called the 'Lungs of the Earth' because they:

- (A) Absorb oxygen and produce nitrogen
- (B) Produce vast amounts of oxygen through photosynthesis and absorb CO₂
- (C) Filter groundwater
- (D) Prevent earthquakes

Correct Answer: (B) Produce vast amounts of oxygen through photosynthesis and absorb CO₂

Q25. The gradual, predictable process of change in species composition in an ecosystem over time is:

- (A) Erosion
- (B) Ecological Succession
- (C) Deforestation
- (D) Eutrophication

Correct Answer: (B) Ecological Succession

Q26. Excessive enrichment of water bodies with nutrients (like nitrates/phosphates) leading to algal blooms and oxygen depletion is:

- (A) Biomagnification
- (B) Eutrophication
- (C) Salinization
- (D) Acid Rain

Correct Answer: (B) Eutrophication

Q27. Which of the following represents a correct simple grassland food chain?

- (A) Grass → Frog → Insect → Snake
- (B) Grass → Grasshopper → Frog → Snake → Eagle
- (C) Eagle → Snake → Frog → Grass
- (D) Insect → Grass → Snake → Frog

Correct Answer: (B) Grass → Grasshopper → Frog → Snake → Eagle

Q28. Scavengers like vultures and hyenas help the environment by:

- (A) Hunting live prey only
- (B) Consuming dead animal carcasses and cleaning the habitat
- (C) Destroying green plants
- (D) Fixing nitrogen

Correct Answer: (B) Consuming dead animal carcasses and cleaning the habitat

Q29. Conservation of ecosystems helps maintain:

- (A) Ecological balance and biodiversity
- (B) Industrial output only
- (C) Urban expansion
- (D) Global temperature rise

Correct Answer: (A) Ecological balance and biodiversity

Q30. The Red Data Book published by IUCN maintains a record of:

- (A) Economically useful plants
- (B) Endangered and threatened plant and animal species
- (C) List of national parks only
- (D) Agricultural yields

Correct Answer: (B) Endangered and threatened plant and animal species

RAMAN SPACE
MANTHAN INDIA

Our Earth: The Unique Life-Sustaining Planet

CHAPTER CORE CONCEPTS & KEY SUMMARY

Earth is uniquely situated in the circumstellar habitable zone ('Goldilocks Zone') of our Solar System, allowing liquid water to exist on its surface. Life on Earth is supported by a dynamic interaction between four major spheres: Atmosphere (protective gas envelope), Hydrosphere (water bodies), Lithosphere (crust and landmasses), and Biosphere (zone of life). The protective Ozone Layer in the stratosphere shields life from harmful solar ultraviolet (UV) radiation. Sustainable resource management is vital to protect Earth's environment.

Key Terms: Goldilocks Zone Four Spheres (Atmosphere, Hydrosphere, Lithosphere, Biosphere)

Ozone Layer (Stratosphere)

Greenhouse Effect

Soil Profile

Conservation & Sustainability

STANDARD LEVEL PRACTICE MCQS (30 QUESTIONS)

Q1. Earth is situated in the 'Goldilocks Zone' of the Solar System, which means:

- (A) It is too hot for water
- (B) It is at the right distance from the Sun where temperatures allow liquid water to exist
- (C) It is composed entirely of solid gold
- (D) It is the largest planet

Correct Answer: (B) It is at the right distance from the Sun where temperatures allow liquid water to exist

Q2. Which protective layer in Earth's stratosphere shields living organisms from harmful solar Ultraviolet (UV) radiation?

- (A) Troposphere
- (B) Ozone Layer (O₃)
- (C) Ionosphere
- (D) Mesosphere

Correct Answer: (B) Ozone Layer (O₃)

Q3. The Earth's atmosphere is composed primarily of which two gases?

- (A) Oxygen (78%) and Nitrogen (21%)
- (B) Nitrogen (~78%) and Oxygen (~21%)
- (C) Carbon dioxide (50%) and Argon (50%)
- (D) Hydrogen and Helium

Correct Answer: (B) Nitrogen (~78%) and Oxygen (~21%)

Q4. The blanket of gases surrounding the Earth is known as the:

- (A) Lithosphere
- (B) Hydrosphere
- (C) Atmosphere
- (D) Biosphere

Correct Answer: (C) Atmosphere

Q5. All water bodies on Earth including oceans, seas, rivers, lakes, ice caps, and groundwater form the:

- (A) Atmosphere
- (B) Hydrosphere
- (C) Lithosphere
- (D) Cryosphere

Correct Answer: (B) Hydrosphere

Q6. The solid outer rocky crust and upper mantle of the Earth form the:

- (A) Biosphere
- (B) Lithosphere
- (C) Hydrosphere
- (D) Atmosphere

Correct Answer: (B) Lithosphere

Q7. The narrow zone of Earth where land, water, and air interact to support life is the:

- (A) Atmosphere
- (B) Lithosphere
- (C) Biosphere
- (D) Stratosphere

Correct Answer: (C) Biosphere

Q8. Which layer of the atmosphere is closest to Earth's surface where all weather phenomena (clouds, rain, storms) occur?

- (A) Troposphere
- (B) Stratosphere
- (C) Mesosphere
- (D) Thermosphere

Correct Answer: (A) Troposphere

Q9. Commercial jet aircraft typically fly in the lower portion of which atmospheric layer to avoid weather turbulence?

- (A) Troposphere
- (B) Stratosphere
- (C) Exosphere
- (D) Ionosphere

Correct Answer: (B) Stratosphere

Q10. The natural phenomenon where atmospheric gases trap heat radiated from Earth's surface to keep the planet warm is the:

- (A) Ozone depletion
- (B) Greenhouse Effect
- (C) Geothermal heating
- (D) Solar radiation storm

Correct Answer: (B) Greenhouse Effect

Q11. Which gas is the primary greenhouse gas released by human burning of fossil fuels?

- (A) Oxygen
- (B) Carbon Dioxide (CO₂)
- (C) Nitrogen
- (D) Helium

Correct Answer: (B) Carbon Dioxide (CO₂)

Q12. Synthetic chemicals responsible for causing thinning/holes in the protective Ozone Layer are:

- (A) Chlorofluorocarbons (CFCs)
- (B) Carbon monoxide
- (C) Nitrogen dioxide
- (D) Sulfur dioxide

Correct Answer: (A) Chlorofluorocarbons (CFCs)

Q13. What percentage of Earth's surface is covered by water?

- (A) ~50%
- (B) ~71%
- (C) ~90%
- (D) ~33%

Correct Answer: (B) ~71%

Q14. Out of all water present on Earth, approximately what percentage is fresh water accessible for human use?

- (A) ~97%
- (B) Less than 1% (usable freshwater out of ~2.5% total freshwater)
- (C) ~50%
- (D) ~25%

Correct Answer: (B) Less than 1% (usable freshwater out of ~2.5% total freshwater)

Q15. The top layer of Earth's crust rich in organic humus and minerals essential for plant growth is:

- (A) Topsoil (A-Horizon)
- (B) Subsoil (B-Horizon)
- (C) Bedrock (R-Horizon)
- (D) C-Horizon

Correct Answer: (A) Topsoil (A-Horizon)

Q16. Humus in soil is formed by the decomposition of:

- (A) Rocks by weathering
- (B) Dead organic plant and animal remains by soil microbes
- (C) Volcanic ash
- (D) Synthetic fertilizers

Correct Answer: (B) Dead organic plant and animal remains by soil microbes

Q17. The process of breaking down rocks into smaller soil particles by wind, water, climate, and living organisms is:

- (A) Erosion
- (B) Weathering
- (C) Deposition
- (D) Siltation

Correct Answer: (B) Weathering

Q18. Removal of fertile topsoil by wind and flowing water is called:

- (A) Soil Conservation
- (B) Soil Erosion
- (C) Weathering
- (D) Desertification

Correct Answer: (B) Soil Erosion

Q19. Which agricultural technique helps prevent soil erosion on steep mountain slopes?

- (A) Terrace Farming
- (B) Deforestation
- (C) Overgrazing
- (D) Monoculture

Correct Answer: (A) Terrace Farming

Q20. Planting lines of trees along farm borders to reduce wind velocity and prevent soil erosion forms:

- (A) Shelterbelts / Windbreaks
- (B) Contour bunds
- (C) Terraces
- (D) Mulching

Correct Answer: (A) Shelterbelts / Windbreaks

Q21. Which international protocol signed in 1987 aimed at phasing out ozone-depleting substances like CFCs?

- (A) Kyoto Protocol
- (B) Montreal Protocol
- (C) Paris Agreement
- (D) Rio Summit

Correct Answer: (B) Montreal Protocol

Q22. Earth is often called the 'Blue Planet' because:

- (A) Its sky is blue
- (B) Over 70% of its surface is covered by liquid water oceans
- (C) It contains blue rocks
- (D) Its atmosphere is made of ozone

Correct Answer: (B) Over 70% of its surface is covered by liquid water oceans

Q23. Earth's magnetosphere protects the planet from:

- (A) Meteor strikes
- (B) Harmful energetic solar wind particles and cosmic rays
- (C) Ocean tides
- (D) Global warming

Correct Answer: (B) Harmful energetic solar wind particles and cosmic rays

Q24. What generates Earth's magnetic field?

- (A) Convection currents of molten iron and nickel in Earth's outer core
- (B) Ocean currents
- (C) Rotation of atmosphere
- (D) Crustal granite rocks

Correct Answer: (A) Convection currents of molten iron and nickel in Earth's outer core

Q25. The tilt of Earth's rotational axis relative to its orbital plane causes:

- (A) Changes in solar output
- (B) Seasonal variation in solar radiation and length of days
- (C) Earthquakes
- (D) Tsunamis

Correct Answer: (B) Seasonal variation in solar radiation and length of days

Q26. Sustainable development means meeting the needs of the present without compromising:

- (A) The profit of corporations
- (B) The ability of future generations to meet their own needs
- (C) Industrial expansion
- (D) Population growth

Correct Answer: (B) The ability of future generations to meet their own needs

Q27. Rainwater harvesting is a practice used to:

- (A) Increase surface runoff
- (B) Recharge underground aquifers and store rainwater for usage
- (C) Evaporate water faster
- (D) Cause localized flooding

Correct Answer: (B) Recharge underground aquifers and store rainwater for usage

Q28. Which factor makes Earth unique compared to neighboring planets like Venus and Mars?

- (A) Presence of liquid surface water, breathable oxygen, and protective magnetic field/atmosphere
- (B) Having a single moon
- (C) Orbiting the Sun
- (D) Having a spherical shape

Correct Answer: (A) Presence of liquid surface water, breathable oxygen, and protective magnetic field/atmosphere

Q29. Excessive accumulation of greenhouse gases leads to global warming, which causes:

- (A) Melting of polar ice caps and rising sea levels
- (B) Extreme weather events
- (C) Shift in climate zones
- (D) All of the above

Correct Answer: (D) All of the above

Q30. Earth's internal layer that lies directly beneath the crust and above the core is the:

- (A) Lithosphere
- (B) Mantle
- (C) Atmosphere
- (D) Inner core

Correct Answer: (B) Mantle

RAMAN SPACE
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