

PGIMER B.SC NURSING SAMPLE PAPER 04

A) Time Allowed: 1 Hour 30 Minutes.

B) Maximum Marks: 100

C) Total Questions: 100

General Instructions:

- This question paper consists of five sections: Physics, Chemistry, Biology, English, and General Knowledge.
- Each section contains objective type questions with four multiple-choice options (A, B, C, D).
- +1 mark is awarded for each correct answer and 0.25 marks are deducted for each wrong answer.
- The question paper is available in English language only.

SECTION 1 - BIOLOGY

- Q1. Which specific region of the human brain acts as the primary master thermostat responsible for regulating physiological body temperature and thirst mechanisms?
- (a) Medulla oblongata
 - (b) Thalamus
 - (c) Hypothalamus
 - (d) Cerebellum
- Q2. During standard skeletal muscle contraction, which specific structural zone or band within the sarcomere shortens and completely disappears when maximum sliding occurs?
- (a) A-band
 - (b) H-zone
 - (c) M-line
 - (d) Z-disc boundary
- Q3. The condition known as "Diabetes Insipidus" is clinically caused by the hyposecretion of which vital endocrine hormone?
- (a) Insulin
 - (b) Glucagon
 - (c) Antidiuretic Hormone (ADH / Vasopressin)
 - (d) Aldosterone
- Q4. Which specialized immune cell type matures within the thymus gland and is fundamentally responsible for executing cell-mediated immunity?
- (a) B-lymphocyte
 - (b) T-lymphocyte
 - (c) Plasma cell
 - (d) Eosinophil
- Q5. In the nitrogen cycle, which genus of soil bacteria is primarily responsible for converting toxic nitrites (NO_2^-) into usable nitrates (NO_3^-)?
- (a) Nitrosomonas
 - (b) Nitrobacter
 - (c) Rhizobium
 - (d) Azotobacter
- Q6. What unique structural polysaccharide forms the rigid, protective cell wall matrix of most fungal species?

- (a) Cellulose
 - (b) Chitin
 - (c) Peptidoglycan
 - (d) Glycogen
- Q7. Which structural component of the human ear houses the "Organ of Corti", the true mechanoreceptor structure responsible for hearing?
- (a) Semicircular canals
 - (b) Cochlea
 - (c) Tympanic membrane
 - (d) Vestibule
- Q8. The classic epidemiological test known as the "Westergren method" is standardly used in medical laboratories to measure which blood parameter?
- (a) Hemoglobin concentration
 - (b) Erythrocyte Sedimentation Rate (ESR)
 - (c) Bleeding time duration
 - (d) Total leucocyte count
- Q9. Which metabolic pathway yields the highest net number of ATP molecules during the complete aerobic oxidation of a single molecule of glucose?
- (a) Glycolysis
 - (b) Electron Transport Chain / Oxidative Phosphorylation
 - (c) Krebs Cycle (Citric Acid Cycle)
 - (d) Lactic acid fermentation
- Q10. The biological phenomenon of "Double Fertilization" involving triple fusion is a unique diagnostic reproductive characteristic restricted to which plant group?
- (a) Bryophytes
 - (b) Pteridophytes
 - (c) Gymnosperms
 - (d) Angiosperms
- Q11. Which blood coagulation factor is genetically deficient or missing in individuals suffering from classic "Hemophilia A"?
- (a) Factor VII
 - (b) Factor VIII (Anti-hemophilic factor)
 - (c) Factor IX (Christmas factor)
 - (d) Factor XI

- Q12. The specialized physiological state of suspended animation or metabolic arrest entered by many zooplankton species to survive unfavorable seasonal conditions is termed—
- (a) Hibernation
 - (b) Aestivation
 - (c) Diapause
 - (d) Regeneration
- Q13. Which enzyme is explicitly utilized during recombinant DNA technology to cut open double-stranded DNA strands at highly specific palindromic nucleotide sequences?
- (a) DNA Ligase
 - (b) Restriction Endonuclease
 - (c) DNA Polymerase III
 - (d) Alkaline Phosphatase
- Q14. The dynamic visual pigment "Rhodopsin", essential for low-light vision within the rod cells of the human retina, contains a derivative of which vitamin?
- (a) Vitamin C
 - (b) Vitamin A
 - (c) Vitamin D
 - (d) Vitamin K
- Q15. Which specialized cell organelle contains its own autonomous circular DNA molecule and 70S ribosomes, supporting the endosymbiotic theory of evolution?
- (a) Golgi apparatus
 - (b) Mitochondrion
 - (c) Endoplasmic reticulum
 - (d) Lysosome
- Q16. What toxic nitrogenous waste product requires the absolute maximum volume of water for its safe physiological elimination from an animal's body?
- (a) Urea
 - (b) Uric acid
 - (c) Ammonia
 - (d) Creatinine
- Q17. The primary site for the mechanical and enzymatic digestion of fats and the subsequent absorption of nutrients within the human digestive tract is the—
- (a) Stomach cavity
 - (b) Duodenum and Jejunum (Small Intestine)

- (c) Large intestine
 - (d) Esophageal tube
- Q18. Which structural tissue layer in a dicotyledonous root gives rise directly to lateral roots and parts of the vascular cambium during secondary growth?
- (a) Endodermis
 - (b) Pericycle
 - (c) Cortex
 - (d) Epidermis
- Q19. The hereditary disease "Cystic Fibrosis" is characterized by abnormal mucus accumulation and is caused by mutations affecting a membrane transport channel for which ion?
- (a) Sodium ion (Na^+)
 - (b) Potassium ion (K^+)
 - (c) Chloride ion (Cl^-)
 - (d) Calcium ion (Ca^{2+})
- Q20. Which law of genetics states that alleles controlling different distinct traits are distributed into gametes completely independently of one another during meiosis?
- (a) Law of Dominance
 - (b) Law of Segregation
 - (c) Law of Independent Assortment
 - (d) Law of Purity of Gametes
- Q21. The structural protein "Collagen", which provides immense tensile strength to connective tissues and tendons, belongs to which basic biochemical group?
- (a) Fibrous protein
 - (b) Globular protein
 - (c) Conjugated lipo-protein
 - (d) Nucleoprotein
- Q22. Which physical structural component serves as the primary pathway for the trans-location of synthesized organic food materials from leaves throughout a plant?
- (a) Xylem vessels
 - (b) Tracheids
 - (c) Phloem sieve tubes
 - (d) Cambium layers
- Q23. The industrial production of human insulin (Humulin) using genetically engineered microorganisms relies on inserting the target genes into which specific host organism?

- (a) *Saccharomyces cerevisiae*
- (b) *Escherichia coli*
- (c) *Bacillus thuringiensis*
- (d) *Agrobacterium tumefaciens*

Q24. In the human respiratory cycle, what direct mechanical action causes air to rush into the lungs during inspiration?

- (a) Relaxation of the diaphragm muscle
- (b) Contraction of the diaphragm moving it downward, increasing thoracic volume
- (c) Relaxation of the external intercostal muscles
- (d) Positive pressure generation within the atmospheric environment

Q25. The ecological interaction observed between an orchid plant growing as an epiphyte on the branch of a massive mango tree is classified as—

- (a) Mutualism
- (b) Parasitism
- (c) Commensalism
- (d) Amensalism

SECTION 2 - CHEMISTRY

- Q26. Which of the following sets of quantum numbers is physically impossible for an electron residing in a ground-state atom?
- (a) $n = 3, \quad l = 2, \quad m_l = -2, \quad m_s = +\frac{1}{2}$
(b) $n = 4, \quad l = 0, \quad m_l = 0, \quad m_s = -\frac{1}{2}$
(c) $n = 3, \quad l = 3, \quad m_l = +1, \quad m_s = +\frac{1}{2}$
(d) $n = 2, \quad l = 1, \quad m_l = -1, \quad m_s = -\frac{1}{2}$
- Q27. Which of the following molecules features a central atom that is sp^3d^3 hybridized, exhibiting a pentagonal bipyramidal geometry?
- (a) SF_6
(b) PCl_5
(c) IF_7
(d) XeF_4
- Q28. According to the molecular orbital theory (MOT), which of the following diatomic molecules possesses a bond order of exactly 3 and exhibits diamagnetic behavior?
- (a) O_2
(b) B_2
(c) N_2
(d) C_2
- Q29. What is the total number of subatomic components consisting of σ (sigma) and π (pi) bonds present in a single molecule of benzene (C_6H_6)?
- (a) 6 σ and 3 π
(b) 9 σ and 3 π
(c) 12 σ and 3 π
(d) 6 σ and 6 π
- Q30. At a given temperature, a mixture of gases contains 4 grams of Hydrogen (H_2) and 16 grams of Methane (CH_4). If the total pressure of the system is 9 atm , what is the partial pressure exerted by the Methane gas?
- (a) 3 atm
(b) 4.5 atm
(c) 6 atm
(d) 1.5 atm
- Q31. The root-mean-square velocity (u_{rms}) of a gas molecule at an absolute temperature T is mathematically proportional to—

- (a) T
- (b) T^2
- (c) $\sqrt{T}$
- (d) $\frac{1}{T}$

Q32. For an endothermic reaction where the enthalpy change (ΔH) is positive, under what thermodynamic conditions will the reaction become completely spontaneous?

- (a) Only at exceptionally low temperatures, provided ΔS is negative.
- (b) Only at high temperatures, provided the entropy change (ΔS) is positive.
- (c) Spontaneous at all operational temperatures.
- (d) It can never become spontaneous under any thermal conditions.

Q33. What is the pH value of a $1 \times 10^{-3} M$ aqueous solution of a strong monobasic acid like Hydrochloric acid (HCl)?

- (a) 1
- (b) 2
- (c) 3
- (d) 11

Q34. Which of the following aqueous salt solutions will undergo anionic hydrolysis, resulting in a net basic solution with a pH greater than 7?

- (a) NH_4Cl
- (b) $NaCl$
- (c) CH_3COONa
- (d) $CuSO_4$

Q35. What are the respective oxidation numbers of the Sulfur atoms in the thiosulfate ion ($S_2O_3^{2-}$)?

- (a) $+2$ and $+2$
- (b) $+6$ and -2
- (c) $+4$ and 0
- (d) $+5$ and -1

Q36. The phenomenon of permanent hardening of municipal water supplies is fundamentally caused by the presence of dissolved—

- (a) Calcium and Magnesium bicarbonates
- (b) Sodium and Potassium carbonates
- (c) Calcium and Magnesium chlorides or sulfates
- (d) Iron and Zinc oxides

- Q37. What is the absolute maximum number of structural isomers possible for an aromatic compound containing the molecular formula C_7H_8O that can react directly with neutral $FeCl_3$ solution (indicating a phenolic nature)?
- (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- Q38. Which of the following structural groups acts as a strong activating, ortho-, and para-directing substituent during electrophilic aromatic substitution reactions of a benzene ring?
- (a) $-NO_2$
 - (b) $-C \equiv N$
 - (c) $-NH_2$
 - (d) $-COOH$
- Q39. The temporary polarization effect observed within a molecule containing a multiple bond when an attacking electrophilic reagent approaches is called the—
- (a) Inductive effect
 - (b) Electromeric effect
 - (c) Resonance effect
 - (d) Mesomeric effect
- Q40. A crystalline solid element crystallizes in a face-centered cubic (fcc) lattice arrangement. What is the net number of atoms belonging exclusively to a single unit cell?
- (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- Q41. During the electrolysis of an aqueous solution of $AgNO_3$ using inert platinum electrodes, what chemical species is liberated at the anode?
- (a) Silver metal (Ag)
 - (b) Hydrogen gas (H_2)
 - (c) Oxygen gas (O_2)
 - (d) Nitrogen dioxide gas (NO_2)
- Q42. If a chemical reaction follows pseudo-first-order kinetics, such as the acid-catalyzed inversion of cane sugar, the rate of the reaction depends primarily on—

- (a) The concentrations of both the sugar and water molecules equally.
 - (b) The concentration of the sugar molecule alone, as water is in large excess.
 - (c) The concentration of water alone.
 - (d) The surface area of the reaction container.
- Q43. The minimum threshold kinetic energy that colliding reactant molecules must possess to undergo a successful transformation into product species is called—
- (a) Potential energy
 - (b) Activation energy
 - (c) Threshold energy
 - (d) Internal thermal energy
- Q44. The practical formation of a delta geographic landscape where a river meets the sea is an industrial-scale example of which colloidal phenomenon?
- (a) Peptization
 - (b) Coagulation / Flocculation
 - (c) Dialysis purification
 - (d) Electrophoresis migration
- Q45. Which of the following transition metal ions exhibits the highest magnetic moment value calculated via the spin-only formula ($\mu = \sqrt{n(n+2)}$)?
- (a) Cu^{2+} ($Z = 29$)
 - (b) Ni^{2+} ($Z = 28$)
 - (c) Fe^{3+} ($Z = 26$)
 - (d) Co^{2+} ($Z = 27$)
- Q46. According to the crystal field theory, what is the correct d-orbital splitting pattern and electronic configuration for a high-spin octahedral d^6 complex ion?
- (a) $t_{2g}^6 e_g^0$
 - (b) $t_{2g}^4 e_g^2$
 - (c) $t_{2g}^3 e_g^3$
 - (d) $t_{2g}^5 e_g^1$
- Q47. When an optically active alkyl halide undergoes a unimolecular nucleophilic substitution reaction (S_N1), the final product typically demonstrates—
- (a) Complete inversion of configuration
 - (b) Complete retention of configuration
 - (c) Racemization with slight net inversion

- (d) Intramolecular rearrangements only
- Q48. Which of the following organic compounds will yield a positive test result when treated with the haloform/iodoform reagent ($I_2 + NaOH$)?
- (a) Methanol
 - (b) Pentan-3-one
 - (c) Pentan-2-one
 - (d) Benzaldehyde
- Q49. The conversion of an amide directly into a primary amine containing exactly one less carbon atom than the starting material is achieved via which named reaction?
- (a) Reimer-Tiemann reaction
 - (b) Hofmann bromamide degradation
 - (c) Cannizzaro reaction
 - (d) Friedel-Crafts alkylation
- Q50. Which of the following vitamins is highly soluble in water and functions as an essential antioxidant within intracellular fluid systems?
- (a) Vitamin A
 - (b) Vitamin D
 - (c) Vitamin C
 - (d) Vitamin E

SECTION 3 - PHYSICS

- Q51. A particle is thrown vertically upward with an initial velocity u . What is the total time of flight taken by the particle to return to the exact point of projection? (Neglect air resistance; g is the acceleration due to gravity)
- (a) $\frac{u}{g}$
 - (b) $\frac{2u}{g}$
 - (c) $\frac{u^2}{2g}$
 - (d) $\frac{\sqrt{2u}}{g}$
- Q52. When a constant, uniform torque acts on a rotating body, the body experiences a constant—
- (a) Angular momentum
 - (b) Angular velocity
 - (c) Angular acceleration
 - (d) Linear velocity
- Q53. If a modern artificial satellite is moving in a stable circular orbit around the Earth at a constant speed, the net work done by the gravitational force on the satellite during one complete orbit is—
- (a) Infinite
 - (b) Zero
 - (c) Equal to its kinetic energy
 - (d) Equal to its potential energy
- Q54. According to Pascal's Law, any change in pressure applied to an enclosed, incompressible fluid at rest is transmitted—
- (a) Only to the bottom of the container
 - (b) Undiminished to every single point of the fluid and the walls of the container
 - (c) Inversely proportional to the density of the fluid
 - (d) Only in the direction of gravity
- Q55. What change occurs to the fundamental frequency of a vibrating stretched string if its absolute tension is increased by four times while keeping its length constant?
- (a) It remains unchanged
 - (b) It is halved
 - (c) It is doubled
 - (d) It increases by four times

- Q56. Which of the following thermodynamic parameters defines a state function that represents the microscopic degree of randomness or disorder within a system?
- (a) Enthalpy
 - (b) Work done
 - (c) Internal energy
 - (d) Entropy
- Q57. The specific heat capacity of a gas during an isothermal thermodynamic process is mathematically—
- (a) Zero
 - (b) Infinite
 - (c) Equal to C_v
 - (d) Negative
- Q58. Two parallel, long straight wires carry electric currents flowing in the exact same direction. What mechanical action do these wires exert on one another?
- (a) They exert zero force on each other
 - (b) They repel each other structurally
 - (c) They attract each other magnetically
 - (d) They begin to rotate clockwise
- Q59. An alternating current (AC) circuit contains only a pure capacitor connected across an AC voltage source. What is the phase relationship between the current and the voltage?
- (a) Current leads voltage by 90°
 - (b) Current lags voltage by 90°
 - (c) Current and voltage are in identical phase
 - (d) Current leads voltage by 180°
- Q60. What is the equivalent capacitance when two identical capacitors, each of capacitance C , are connected together in a simple series arrangement?
- (a) $2C$
 - (b) C
 - (c) $\frac{C}{2}$
 - (d) $\frac{C}{4}$
- Q61. The core working mechanism of a modern optical fiber cable, used to transmit high-speed data signals over immense distances with negligible loss, relies on—
- (a) Total internal reflection
 - (b) Optical diffraction

- (c) Polarization of light waves
 - (d) Photoelectric absorption
- Q62. What specific adjustment must be made to the distance between the two slits in a Young's Double Slit Experiment to cause the observed fringe width to double?
- (a) The distance must be doubled
 - (b) The distance must be quadrupled
 - (c) The distance must be reduced to half
 - (d) The distance must be reduced to one-fourth
- Q63. According to Einstein's photoelectric equation, what is the effect on the maximum kinetic energy of emitted photoelectrons when the intensity of the incident light beam is doubled?
- (a) The maximum kinetic energy is doubled
 - (b) The maximum kinetic energy is quadrupled
 - (c) The maximum kinetic energy remains completely unchanged
 - (d) The maximum kinetic energy is halved
- Q64. The de Broglie wavelength (λ) associated with a moving material particle of mass m traveling at a velocity v is given by—
- (a) $\lambda = \frac{mv}{h}$
 - (b) $\lambda = \frac{h}{mv}$
 - (c) $\lambda = hmv$
 - (d) $\lambda = \frac{h^2}{mv}$
- Q65. In a typical radioactive alpha (α) decay process, the daughter nucleus experiences what structural changes compared to the parent nucleus?
- (a) Mass number drops by 2, atomic number drops by 2
 - (b) Mass number drops by 4, atomic number drops by 2
 - (c) Mass number drops by 4, atomic number increases by 1
 - (d) Mass number remains unchanged, atomic number drops by 1
- Q66. What is the primary majority charge carrier responsible for electrical conduction within an n-type semiconductor material?
- (a) Holes
 - (b) Free electrons
 - (c) Trivalent ions
 - (d) Bound protons

- Q67. Which of the following parameters represents the SI unit used for measuring the luminous intensity of a light source?
- (a) Lumen
 - (b) Lux
 - (c) Candela
 - (d) Watt
- Q68. A physical quantity is represented by the formula $X = \frac{A^2 B}{C^3}$. If the percentage errors in measuring A , B , and C are 1%, 2%, and 1% respectively, what is the maximum percentage error in the calculated value of X ?
- (a) 4%
 - (b) 5%
 - (c) 7%
 - (d) 3%
- Q69. When a body slides down a rough inclined plane at a perfectly uniform velocity, the net mechanical force acting along the plane is—
- (a) Equal to the weight of the body
 - (b) Zero
 - (c) Equal to the kinetic friction force alone
 - (d) Directed vertically upwards
- Q70. What is the dimensional formula for mechanical power?
- (a) $[ML^2T^{-2}]$
 - (b) $[MLT^{-3}]$
 - (c) $[ML^2T^{-3}]$
 - (d) $[ML^{-1}T^{-2}]$
- Q71. Why does an open container filled with hot water lose heat much faster when placed directly underneath a running ceiling fan?
- (a) Due to accelerated thermal radiation
 - (b) Due to enhanced forced convection and evaporation
 - (c) Due to a rapid decrease in atmospheric pressure
 - (d) Due to increased thermal conduction through the air layers
- Q72. The electric potential V at any arbitrary point situated at a distance r from an isolated positive point charge scales as—
- (a) $V \propto \frac{1}{r^2}$
 - (b) $V \propto \frac{1}{r}$

- (c) $V \propto r$
- (d) $V \propto \frac{1}{r^3}$

Q73. Which basic electronic component is used to construct a standard rectifier circuit designed to convert alternating current (AC) into direct current (DC)?

- (a) Bipolar Junction Transistor
- (b) Semiconductor Diode
- (c) Air-core Inductor
- (d) Electrolytic Capacitor

Q74. What optical phenomenon occurs when light waves bend around the sharp edges of an obstacle or pass through a tiny aperture, spreading into regions of geometrical shadow?

- (a) Polarization
- (b) Dispersion
- (c) Diffraction
- (d) Total internal reflection

Q75. If the absolute temperature of a blackbody radiator is doubled, by what factor does its total emitted radiant energy increase per unit area according to the Stefan-Boltzmann law?

- (a) 2 times
- (b) 4 times
- (c) 8 times
- (d) 16 times

SECTION 4 - ENGLISH

- Q76. Identify the specific segment of the sentence that contains a grammatical error: “The panel of senior medical experts / have decided to postpone / the publication of the final clinical guidelines / until further data validation is complete.”
- (a) The panel of senior medical experts
 - (b) have decided to postpone
 - (c) the publication of the final clinical guidelines
 - (d) until further data validation is complete.
- Q77. Choose the option that provides the most accurate grammatical improvement for the underlined segment: If the surgical team had practiced the robotic procedure beforehand, the operation will be completed in half the time.
- (a) will be completed
 - (b) would have been completed
 - (c) would be completing
 - (d) was completed
- Q78. Select the most appropriate meaning for the highlighted idiomatic expression: The hospital administrator decided to take the bull by the horns and address the acute nursing shortage by directly increasing the baseline compensation package.
- (a) To delay an administrative decision until a crisis resolves itself.
 - (b) To deal with a difficult or dangerous situation in a direct, brave, and determined way.
 - (c) To delegate a complex problem to an external corporate third party.
 - (d) To find flaws in an existing operational framework without offering an alternative.
- Q79. Identify the specific segment of the sentence that contains a grammatical error: “Hardly had the anesthesia taken effect / when the power grid failed, / forcing the emergency backup generators / to immediately operationalize.”
- (a) Hardly had the anesthesia taken effect
 - (b) when the power grid failed,
 - (c) forcing the emergency backup generators
 - (d) to immediately operationalize.
- Q80. Choose the word that is closest in meaning (SYNONYM) to the underlined word: The lead researcher’s meticulous recording of daily laboratory temperatures prevented any external tampering with the control samples.
- (a) Haphazard
 - (b) Extremely careful and precise

- (c) Sporadic
 - (d) Negligent
- Q81. Choose the option that provides the most accurate grammatical improvement for the underlined segment: The new hospital software is not only slower than the previous iteration, but it is also less intuitive for incoming interns.
- (a) slower than the previous iteration, but it is also less intuitive
 - (b) slower than the previous iteration, but also less intuitive
 - (c) more slow than the previous iteration, but also intuitive less
 - (d) not only slow compared to the previous iteration, but less intuitive too
- Q82. Choose the word that is most opposite in meaning (ANTONYM) to the given word: EPHEMERAL
- (a) Transient
 - (b) Permanent
 - (c) Fleeting
 - (d) Short-lived
- Q83. Identify the specific segment of the sentence that contains a grammatical error: “Between the three competing research groups, / the local pharmaceutical team / was declared to have produced / the most economically viable vaccine candidate.”
- (a) Between the three competing research groups,
 - (b) the local pharmaceutical team
 - (c) was declared to have produced
 - (d) the most economically viable vaccine candidate.
- Q84. Select the option that displays the correct spelling of the word meaning “an official medical recommendation or administrative authorization given for a specific treatment or drug usage”:
- (a) Prescription
 - (b) Percrption
 - (c) Prascrption
 - (d) Prescrition
- Q85. Choose the correct passive voice conversion for the given active sentence: “The public health department regularly distributes informative pamphlets regarding seasonal viral vectors across suburban clinics.”
- (a) Informative pamphlets regarding seasonal viral vectors were regularly distributed across suburban clinics by the public health department.

- (b) Informative pamphlets regarding seasonal viral vectors are regularly distributed across suburban clinics by the public health department.
- (c) Informative pamphlets regarding seasonal viral vectors are being regularly distributed across suburban clinics by the public health department.
- (d) Informative pamphlets regarding seasonal viral vectors have been regularly distributed across suburban clinics by the public health department.



SECTION 5 - GENERAL KNOWLEDGE

- Q86. The specialized clinical procedure known as the “Schick Test” was historically designed as a reliable skin test to determine a patient’s level of immunity against which serious bacterial infection?
- (a) Pertussis
 - (b) Tetanus
 - (c) Diphtheria
 - (d) Cholera
- Q87. Under the specific emergency frameworks of the Constitution of India, who retains the ultimate legal authority to officially declare a state of National Emergency under Article 352?
- (a) The Prime Minister of India
 - (b) The Chief Justice of India
 - (c) The President of India
 - (d) The Union Home Minister
- Q88. The global organization known as the “World Trade Organization” (WTO), which officially oversees international trade rules and disputes, is headquartered in which European city?
- (a) Paris, France
 - (b) Vienna, Austria
 - (c) Geneva, Switzerland
 - (d) Brussels, Belgium
- Q89. The famous “Kaziranga National Park”, celebrated worldwide for hosting the single largest population of the great Indian one-horned rhinoceros, is situated in which north-eastern Indian state?
- (a) West Bengal
 - (b) Arunachal Pradesh
 - (c) Assam
 - (d) Meghalaya
- Q90. By which landmark Constitutional Amendment Act was the “Right to Education” officially inserted into the Constitution of India as a fundamental right under Article 21A?
- (a) 42nd Amendment Act
 - (b) 44th Amendment Act
 - (c) 86th Amendment Act

- (d) 91st Amendment Act
- Q91. The highly distinguished “B. C. Roy National Award”, instituted to honor eminent contributions of the highest order, is presented annually by the President of India exclusively in which professional field?
- (a) Journalism and Media
 - (b) Medical Science and Practice
 - (c) Classical Music Performance
 - (d) Aerospace Engineering
- Q92. Which massive geographical feature forms the deepest natural gorge on Earth, carved out over millennia by the continuous flow of the Colorado River in Arizona?
- (a) The Great Rift Valley
 - (b) The Grand Canyon
 - (c) Hell’s Canyon
 - (d) Kali Gandaki Gorge
- Q93. Which iconic Indian freedom fighter founded the modern political and military entity known as the “Azad Hind Fauj” (Indian National Army) during World War II?
- (a) Bhagat Singh
 - (b) Subhas Chandra Bose
 - (c) Chandrashekhar Azad
 - (d) Bal Gangadhar Tilak
- Q94. The prestigious international humanitarian body known as the “International Committee of the Red Cross” (ICRC) has been historically honored with the Nobel Peace Prize on how many separate occasions?
- (a) One
 - (b) Two
 - (c) Three
 - (d) Four
- Q95. Which primary structural body functions as the absolute highest judicial court of appeal and final interpreter of constitutional laws within the sovereign territory of India?
- (a) The High Court of Delhi
 - (b) The Supreme Court of India
 - (c) The Parliament of India
 - (d) The National Green Tribunal

- Q96. The monumental “Green Revolution”, which transformed Indian agricultural landscapes into self-sufficient systems during the late 1960s, focused primarily on expanding the high-yield production of which crop pair?
- (a) Rice and Sugarcane
 - (b) Wheat and Rice
 - (c) Maize and Barley
 - (d) Cotton and Jute
- Q97. Which imaginary lines of geographic coordinate orientation run completely parallel to the equator, measuring angular distances north or south of it?
- (a) Lines of Longitude
 - (b) Lines of Latitude
 - (c) Meridians
 - (d) Isobars
- Q98. The specialized regulatory authority known as the “Food Safety and Standards Authority of India” (FSSAI), which monitors and enforces food safety regulations across the country, functions under the administrative control of which Union Ministry?
- (a) Ministry of Agriculture and Farmers Welfare
 - (b) Ministry of Consumer Affairs, Food and Public Distribution
 - (c) Ministry of Health and Family Welfare
 - (d) Ministry of Food Processing Industries
- Q99. In the history of medical science and biotechnology, the successful development of the first effective inactivated vaccine against poliomyelitis (Polio) was achieved by which researcher in 1953?
- (a) Albert Sabin
 - (b) Jonas Salk
 - (c) Louis Pasteur
 - (d) Robert Koch
- Q100. The large geographic region known as the “Thar Desert”, which forms a sprawling arid ecosystem across northwestern India, is bordered to the southeast by which ancient mountain range?
- (a) Western Ghats
 - (b) Vindhya Range
 - (c) Aravalli Range
 - (d) Satpura Range

Q1. Correct Answer: (C)

The hypothalamus regulates body temperature, hunger, and thirst. It acts as the main homeostatic control center of the brain.

Q2. Correct Answer: (B)

The H-zone shortens and may disappear during muscle contraction. This occurs because actin filaments slide inward over myosin.

Q3. Correct Answer: (C)

Diabetes Insipidus is caused by deficiency of ADH or vasopressin. It results in excessive urination and intense thirst.

Q4. Correct Answer: (B)

T-lymphocytes mature in the thymus gland. They are responsible for cell-mediated immunity.

Q5. Correct Answer: (B)

Nitrobacter converts nitrites into nitrates in the nitrogen cycle. This process is called nitrification.

Q6. Correct Answer: (B)

Chitin forms the rigid cell wall of fungi. It provides structural strength and protection.

Q7. Correct Answer: (B)

The Organ of Corti is located inside the cochlea. It contains sensory hair cells for hearing.

Q8. Correct Answer: (B)

The Westergren method measures ESR in blood samples. ESR helps detect inflammation and infection.

Q9. Correct Answer: (B)

The Electron Transport Chain produces the maximum ATP during respiration. Oxidative phosphorylation occurs in mitochondria.

Q10. Correct Answer: (D)

Double fertilization is unique to angiosperms. It involves syngamy and triple fusion.

Q11. Correct Answer: (B)

Hemophilia A occurs due to deficiency of Factor VIII. It leads to impaired blood clotting.

Q12. Correct Answer: (C)

Diapause is a dormant state helping organisms survive harsh conditions. Metabolic activities become greatly reduced.

Q13. Correct Answer: (B)

Restriction endonucleases cut DNA at specific sequences. They are essential tools in genetic engineering.

Q14. Correct Answer: (B)

Rhodopsin contains retinal derived from Vitamin A. It is necessary for dim-light vision.

Q15. Correct Answer: (B)

Mitochondria possess their own DNA and ribosomes. This supports the endosymbiotic theory.

Q16. Correct Answer: (C)

Ammonia requires the largest amount of water for excretion. It is highly toxic to living cells.

Q17. Correct Answer: (B)

Most digestion and absorption occur in the small intestine. The duodenum and jejunum play major roles.

Q18. Correct Answer: (B)

The pericycle gives rise to lateral roots in dicot roots. It also contributes to secondary growth.

Q19. Correct Answer: (C)

Cystic fibrosis results from defective chloride ion channels. This causes thick mucus accumulation.

Q20. Correct Answer: (C)

Mendel's Law of Independent Assortment explains random distribution of traits. Different alleles assort independently during meiosis.

Q21. Correct Answer: (A)

Collagen is a fibrous protein found in connective tissues. It provides tensile strength and flexibility.

Q22. Correct Answer: (C)

Phloem sieve tubes transport prepared food in plants. They conduct sugars from leaves to other parts.

Q23. Correct Answer: (B)

Human insulin was commercially produced using *Escherichia coli*. Recombinant DNA technology made this possible.

Q24. Correct Answer: (B)

During inspiration, the diaphragm contracts and moves downward. Thoracic cavity volume increases, drawing air into lungs.

Q25. Correct Answer: (C)

In commensalism, one organism benefits while the other is unaffected. The orchid gains support from the mango tree.

Q26. Correct Answer: (C)

For any principal quantum number n , the azimuthal quantum number l ranges from 0 to $n - 1$. Hence for $n = 3$, $l = 3$ is impossible.

Q27. Correct Answer: (C)

IF_7 exhibits sp^3d^3 hybridization with pentagonal bipyramidal geometry. Iodine accommodates seven fluorine atoms around it.

Q28. Correct Answer: (C)

N_2 has bond order 3 according to Molecular Orbital Theory. All electrons are paired, making it diamagnetic.

Q29. Correct Answer: (C)

Benzene contains 12 sigma bonds and 3 pi bonds. Sigma bonds arise from C–C and C–H overlap.

Q30. Correct Answer: (C)

Moles of $H_2 = \frac{4}{2} = 2$ and moles of $CH_4 = \frac{16}{16} = 1$. Partial pressure of methane $= \frac{1}{3} \times 9 = 3 \text{ atm}$.

Q31. Correct Answer: (C)

The rms velocity is proportional to $\sqrt{T}$. Higher temperature increases molecular speed.

Q32. Correct Answer: (B)

For an endothermic process, spontaneity requires positive entropy and high temperature. Then Gibbs free energy becomes negative.

Q33. Correct Answer: (C)

For strong acid HCl , $[H^+] = 10^{-3} M$. Thus $pH = -\log(10^{-3}) = 3$.

Q34. Correct Answer: (C)

Sodium acetate undergoes anionic hydrolysis producing basic solution. Acetate ion reacts with water forming OH^- ions.

Q35. Correct Answer: (B)

In $S_2O_3^{2-}$, sulfur shows oxidation states +6 and –2. Average oxidation state becomes +2.

Q36. Correct Answer: (C)

Permanent hardness is caused by calcium and magnesium chlorides or sulfates. These salts do not decompose on boiling.

Q37. Correct Answer: (C)

Three phenolic isomers are possible for formula C_7H_8O . These are ortho-, meta-, and para-cresol.

Q38. Correct Answer: (C)

The amino group activates the benzene ring strongly. It directs incoming electrophiles to ortho and para positions.

Q39. Correct Answer: (B)

The electromeric effect involves temporary electron displacement in multiple bonds. It occurs only in the presence of attacking reagents.

Q40. Correct Answer: (D)

An FCC unit cell effectively contains 4 atoms. Atoms are shared among corners and faces.

Q41. Correct Answer: (C)

At inert anodes, water gets oxidized during electrolysis of $AgNO_3$. This liberates oxygen gas.

Q42. Correct Answer: (B)

Pseudo-first-order reactions depend mainly on one reactant concentration. Water remains in large excess and effectively constant.

Q43. Correct Answer: (B)

Activation energy is the minimum energy required for effective collisions. Without it, reactants cannot form products.

Q44. Correct Answer: (B)

Delta formation occurs due to coagulation of colloidal particles. Electrolytes in seawater precipitate river colloids.

Q45. Correct Answer: (C)

Fe^{3+} has five unpaired electrons, giving maximum magnetic moment. More unpaired electrons mean stronger paramagnetism.

Q46. Correct Answer: (B)

A high-spin octahedral d^6 complex has configuration $t_{2g}^4 e_g^2$. Electrons occupy higher orbitals before pairing.

Q47. Correct Answer: (C)

S_N1 reactions proceed through planar carbocation intermediates. This causes racemization with slight inversion.

Q48. Correct Answer: (C)

Pentan-2-one contains the CH_3CO- group needed for iodoform test. Hence it gives a positive haloform reaction.

Q49. Correct Answer: (B)

Hofmann bromamide degradation converts amides into amines with one less carbon. It uses bromine and alkali.

Q50. Correct Answer: (C)

Vitamin C is water-soluble and acts as a powerful antioxidant. It protects cells from oxidative damage.

Q51. Correct Answer: (B)

The total time of flight for vertical projection is $\frac{2u}{g}$. The body takes equal time to rise and fall back.

Q52. Correct Answer: (C)

Torque produces angular acceleration in a rotating body. It is the rotational analogue of force.

Q53. Correct Answer: (B)

Gravitational force is always perpendicular to satellite displacement in circular motion. Hence the work done over one complete orbit is zero.

Q54. Correct Answer: (B)

Pascal's Law states that applied pressure is transmitted equally throughout a confined fluid. This principle is used in hydraulic machines.

Q55. Correct Answer: (C)

Frequency of a stretched string is proportional to $\sqrt{T}$. Increasing tension four times doubles the frequency.

Q56. Correct Answer: (D)

Entropy measures randomness or disorder in a thermodynamic system. Greater entropy means greater molecular disorder.

Q57. Correct Answer: (B)

During an isothermal process, temperature remains constant. Thus heat supplied equals work done, making heat capacity infinite.

Q58. Correct Answer: (C)

Parallel currents flowing in the same direction attract each other. This attraction is magnetic in nature.

Q59. Correct Answer: (A)

In a purely capacitive AC circuit, current leads voltage by 90° . Capacitors oppose changes in voltage.

Q60. Correct Answer: (C)

For capacitors in series, equivalent capacitance becomes $\frac{C}{2}$. Series arrangement reduces total capacitance.

Q61. Correct Answer: (A)

Optical fibres operate using total internal reflection. Light signals remain confined within the core.

Q62. Correct Answer: (C)

Fringe width in YDSE is inversely proportional to slit separation. Halving slit distance doubles fringe width.

Q63. Correct Answer: (C)

Maximum kinetic energy depends only on frequency of incident light. Increasing intensity increases number of electrons, not their energy.

Q64. Correct Answer: (B)

De Broglie wavelength is given by $\lambda = \frac{h}{mv}$. It relates wave nature with momentum.

Q65. Correct Answer: (B)

Alpha decay decreases mass number by 4 and atomic number by 2. An alpha particle contains two protons and two neutrons.

Q66. Correct Answer: (B)

Electrons are the majority charge carriers in n-type semiconductors. Pentavalent impurities contribute extra electrons.

Q67. Correct Answer: (C)

Candela is the SI unit of luminous intensity. It measures light emitted in a particular direction.

Q68. Correct Answer: (C)

Percentage error in $X = \frac{A^2 B}{C^3}$ becomes $2(1) + 2 + 3(1) = 7\%$. Errors add according to powers.

Q69. Correct Answer: (B)

Uniform velocity implies zero acceleration. Hence the net force along the inclined plane is zero.

Q70. Correct Answer: (C)

Power equals work done per unit time. Its dimensional formula is $[ML^2T^{-3}]$.

Q71. Correct Answer: (B)

A ceiling fan enhances convection and evaporation. This increases the rate of heat loss from hot water.

Q72. Correct Answer: (B)

Electric potential due to a point charge varies inversely with distance. Thus $V \propto \frac{1}{r}$.

Q73. Correct Answer: (B)

Semiconductor diodes are used for rectification. They allow current flow mainly in one direction.

Q74. Correct Answer: (C)

Diffraction occurs when light bends around obstacles or apertures. It spreads into regions of shadow.

Q75. Correct Answer: (D)

According to Stefan-Boltzmann law, energy emitted is proportional to T^4 . Doubling temperature increases energy by $2^4 = 16$ times.

Q76. Correct Answer: (B)

The subject "The panel" is singular collective noun. Hence "have decided" should be replaced with "has decided".

Q77. Correct Answer: (B)

This sentence follows the third conditional structure for unreal past situations. Therefore "would have been completed" is grammatically correct.

Q78. Correct Answer: (B)

"To take the bull by the horns" means facing a difficult situation bravely. It implies direct and courageous action.

Q79. Correct Answer: (D)

The phrase "to immediately operationalize" is grammatically awkward in context. It should be replaced with "to be immediately operationalized".

Q80. Correct Answer: (B)

"Meticulous" means extremely careful and precise. It describes great attention to detail.

Q81. Correct Answer: (B)

Parallel structure is needed after "not only... but also". "Slower" correctly pairs with "less intuitive".

Q82. Correct Answer: (B)

"Ephemeral" means short-lived or temporary. Its opposite meaning is "permanent".

Q83. Correct Answer: (A)

"Between" is generally used for two entities only. For more than two groups, "among" is appropriate.

Q84. Correct Answer: (A)

“Prescription” is the correct spelling of the word. It refers to a medical recommendation or authorization.

Q85. Correct Answer: (B)

The sentence changes correctly into passive voice in option B. The tense remains in simple present form.

Q86. Correct Answer: (C)

The Schick Test was historically used to check immunity against diphtheria. It determined susceptibility to the diphtheria toxin.

Q87. Correct Answer: (C)

Under Article 352, the President of India declares National Emergency. The declaration is made on written advice of the Cabinet.

Q88. Correct Answer: (C)

The World Trade Organization (WTO) is headquartered in Geneva, Switzerland. It regulates international trade rules among nations.

Q89. Correct Answer: (C)

Kaziranga National Park is located in Assam. It is famous for the one-horned rhinoceros population.

Q90. Correct Answer: (C)

The 86th Constitutional Amendment inserted Article 21A. It made education a Fundamental Right for children.

Q91. Correct Answer: (B)

The B. C. Roy National Award is given in the field of medicine. It recognizes excellence in medical science and practice.

Q92. Correct Answer: (B)

The Grand Canyon was carved by the Colorado River over millions of years. It is one of the world's most famous natural gorges.

Q93. Correct Answer: (B)

Subhas Chandra Bose founded and led the Azad Hind Fauj. It fought against British rule during World War II.

Q94. Correct Answer: (C)

The International Committee of the Red Cross received the Nobel Peace Prize three times. It was honored for humanitarian services during wars.

Q95. Correct Answer: (B)

The Supreme Court of India is the highest judicial authority in the country. It is the final interpreter of the Constitution.

Q96. Correct Answer: (B)

The Green Revolution mainly increased wheat and rice production. High-yield varieties and irrigation played major roles.

Q97. Correct Answer: (B)

Lines of latitude run parallel to the equator. They measure angular distance north or south.

Q98. Correct Answer: (C)

FSSAI functions under the Ministry of Health and Family Welfare. It regulates food safety standards in India.

Q99. Correct Answer: (B)

Jonas Salk developed the first successful inactivated polio vaccine. It became widely used in global immunization programs.

Q100. Correct Answer: (C)

The Thar Desert is bordered by the Aravalli Range in the southeast. These ancient hills influence the desert's geography.