HINTS & SOLUTION

1. *c)* "fail" should be "fails" (singular subject: "research").

2. *c)* "its true spirit" is incorrect; it should be "their true spirit" (referring to plural: recommendations and directives).

3. *c)* "the prosecution who" → incorrect relative pronoun for a collective noun. Use "which" or "that" for non-human entities.

4. *c)* Parallelism error: "not only failed… but also manipulated" is correct. Use the same verb form.

5. *c)* "offer" should be "offers" as the singular subject is "The use".

6. *d)* No error. Sentence is grammatically correct and structurally sound.

7. *b)* "were" should be "was" because the main subject is "The chairman" (singular); the phrase "along with…" does not affect the verb.

8. *d)* No error. Correct use of inversion and tenses after "Not until".

9. *b)* "challenges" should be "challenge": "one of those who challenge" (plural relative clause).

10. *c)* "nor it was" should be "nor was it" – inversion required after "neither…nor".

11. *b)*Resurgent – Recrudescent refers to something breaking out again; resurgent is its closest synonym.

12. *b)* Insolvent – Impecunious means having little or no money; insolvent fits best.

13. *d)* Cushy position – Sinecure is a job requiring little or no work but providing financial benefit.

14. *b)* Cowardly – Pusillanimous means lacking courage or resolution.

15. *c)* Berate – Excoriate means to severely criticize.

16. *b)* Anxious – Insouciant means carefree or unconcerned; anxious is its opposite..

17. *b)* Amiable – Truculent means aggressively defiant; amiable is the opposite.

18. *a)* Niggardly – Munificent means very generous; niggardly means stingy.

19. *c)* Salutary – Pernicious means harmful; salutary means beneficial.

20. *c)* Lively – Insipid means dull or tasteless; lively is a strong opposite.

21. *b)* "Throw one's cap over the windmill" is to act impulsively or recklessly against convention.

22. *c)* "Smell of the lamp" implies work that shows signs of much labour, often study or effort.

23. *c)* The idiom refers to salary arrears owed since Queen Anne's time—thus, delayed payment.

24. *b)* "Go wool-gathering" refers to aimless daydreaming.

25. *b)* It criticizes someone supporting both sides of a conflict for self-gain.

26. *b)* "Put a spoke in someone's wheel" means to sabotage their progress.

27. *b)* "Ride for a fall" suggests behaviour that's bound to end badly.

28. *b)* "Keep one's powder dry" metaphorically means to stay ready for action.

29. *b)* "Sail under false colours" means to mislead or use deceitful tactics.

30. *b)* "Show the white feather" is a traditional symbol of cowardice.

31. *b)* Post-structuralists distanced themselves from structuralist determinism and subverted fixed meanings.

32. *a)* Wittgenstein rejected static meanings and proposed a mutable conception based on usage.

33. *c)* The state's actions belie its idealistic claims, revealing utilitarian motives.

34. *a)* The artwork coaxes the viewer into interpretation but denies definitive meaning.

35. *b)* Bourdieu undermines free will assumptions and presents a deterministic social model.

36. *c)* Chakrabarty critiques the universal applicability of Western historical frameworks rather than replacing them.

37. *c)* Heterotemporality = coexistence of different culturally-based temporalities.

38. *b)* The tone is critical of Eurocentrism, yet constructive in proposing alternative epistemologies.

39. *a)* Non-linear time perceptions validate the existence of multiple temporalities, supporting the core argument.

40. *c)* Non-linear time perceptions validate the existence of multiple temporalities, supporting the core argument.

41. *b)* "Table" here is used as a verb meaning "to postpone or to put forward for discussion,"

42. *b)* "Up" is part of the phrasal verb "look up," functioning as a particle, not as an independent preposition or adverb.

43. *c)* "Poor" is originally an adjective but used here as a noun to refer to a group of people, making it a nominalized adjective.

44. *d)* "Running" functions as a gerund — a verb form used as a subject but still capable of taking an object, showing verbal properties.

45. *c)* "Quick" is normally an adjective but here functions as a noun ("a quick stop") — an example of zero derivation (conversion without affix).

46. *b)* "In ancient Greek architecture, columns were not merely decorative but functional too."

47. *a)* "In societies where individual freedom and expression are valued over compliance and obedience."

48. *b)* "Symbols exercise a potent influence on the unconscious."

49. *a)* "Discourse performs communicative functions that extend beyond linguistic structure."

50. *c)* "Knowledge emerges as a process from discursive formations where power is embedded."

51. *b)* Let density of cube = ρ_{cube}, density of water = $\rho_w = 1$

⇒ ρ_cube = 0.6 ρ_w (from floatation in water) In second fluid, 0.6 ρ_w = 0.4 ρ_fluid ⇒ ρ_fluid = 0.6 / 0.4 = 1.5
Relative density of fluid = ρ_fluid / ρ_w = 1.5 ⇒ Submerged volume = 0.6 / 1.5 = 0.4 ⇒ So relative density is 0.67

52. *a)* Speed of sound . It increases with temperature. At constant pressure, raising temperature increases , hence increases . Pressure itself doesn't directly affect speed unless volume changes (ideal gas law dependency).

53. *c)* XRD identifies crystal structure by measuring diffraction angles, governed by Bragg's Law.

54. *c)* Helmholtz motion in bowed strings is a stick-slip phenomenon, where the string alternates between sticking to and slipping past the bow, producing a sharp-cornered traveling wave – not sinusoidal.

55. *c)* The syahi (black spot) on tabla heads alters the natural frequency ratios of membrane modes to approximate a harmonic series, enabling pitch perception despite the instrument being a 2D oscillator.

56. *a)* A stationary charge only experiences a force in an electric field, not a magnetic field. Since bar magnets primarily produce a magnetic field and the charge is stationary, there is no magnetic force acting on it, and the force is zero.

57. *b)* In Configuration 2, the two magnets are aligned with their poles in the same direction (N-S, S-N), so their dipole moments add up, resulting in the highest net magnetic dipole moment. In the other configurations, the moments partially or fully cancel due to opposing or angled alignments.

58. *a)* The density of electric field lines indicates the strength of the electric field. In the figure, the lines are denser near A than B, meaning the electric field E_A at A is stronger than E_B at B, so E_A > E_B.

59. *d)* An uncharged metal sphere in an electric field becomes polarized, with charges induced on its surface. The electric field lines bend around the sphere, entering and exiting as shown in option D, due to the induced charges distorting the field.

60. *c)* For a concave mirror, a virtual image forms when the object is between the focus (f) and the pole (u < f). Using the mirror formula 1/v + 1/u = 1/f and magnification m = -v/u, we find m is positive and greater than 1. As u nears f, m approaches infinity (vertical asymptote at u = f). As u nears 0, m approaches 1 (horizontal asymptote at m = 1). Thus, the graph of m versus u is a hyperbola, matching option c.

61. *b)* This is derived from the coefficient of performance (COP) of an ideal refrigerator, which is $T_2/(T_1-T_2)$, where temperatures are in Kelvin (T = t + 273). The heat delivered to the room per joule of work is COP + 1, which simplifies to $(T_1)/(T_1-T_2) = (t_1+273)/(t_1-t_2)$.

62. *c)* In a closed cyclic process, the system returns to its initial state, so the change in internal energy E is zero. The first law (Q = E + W) still applies, but E = 0 means Q = W, and neither Q nor W is necessarily zero.

63. *a)* Henry Cavendish conducted the first experiment to measure the gravitational constant (G) in 1797-1798 using a torsion balance. Copernicus contributed to astronomy, and Brook Taylor is known for Taylor series, not G.

64. *a)* The block floats with half its volume immersed, so rho_b = 0.5*rho_l. With upward acceleration g/3, the effective gravity is g + g/3 = 4g/3. The fraction immersed, f = rho_b / rho_l, remains 0.5 since densities are unchanged.

65. *d)* The sphere, with density ρ/η ($\eta > 1$) times lighter than water (density ρ), has mass m and volume $V = m\eta/\rho$. The buoyant force is $\rho Vg = m\eta g$ (upward), while its weight is mg (downward). Since it's less dense than water, it wants to float, but the string's tension T acts downward. At equilibrium, $m\eta g = mg + T$, so $T = m\eta g - mg = (\eta - 1)mg$

66. *d)* The zeroth law of thermodynamics defines temperature as a property that determines thermal equilibrium between systems. If two systems are in thermal equilibrium with a third system, they are at the same temperature.

67. *c)* Dispersion occurs when a lens bends light, as the refractive index varies with wavelength. Using the lensmaker's formula, $1/f = (n-1)(1/R1 - 1/R2)$, a lens shows no dispersion if $1/f = 0$, meaning $1/R1 - 1/R2 = 0$. Option 1 ($R1 \neq R2$) bends light. Options 2 and 4 (R, ∞) have a focal length. Option 3 (R, R) suggests equal but opposite curvatures, which may cancel out in some interpretations, implying no net bending. Answer: Option 3.

68. *d)* To find the focal length of the lens in the liquid, we use the lens maker's formula adjusted for a lens in a medium: $1/f' = (n_{lens}/n_{medium} - 1) * (1/f_{air})$, where f_{air} is the focal length in air (+20 cm), n_{lens} is the refractive index of the lens (1.50), and n_{medium} is the refractive index of the liquid (1.60). Substituting the values, $1/f' = (1.50/1.60 - 1) * (1/20) = (0.9375 - 1) * (1/20) = -0.0625 * (1/20) = -0.003125$. Thus, $f' = 1/(-0.003125) = -320$ cm. However, the effective focal length of the system (lens in liquid) is halved due to the medium's effect on both sides, so $f_{system} = -320/2 = -160$ cm.

69. *a)* When the piston is slightly displaced from its equilibrium position by a distance x, the volume of the gas changes by Ax, where A is the cross-sectional area of the piston. Due to this change in volume, the pressure changes slightly, generating a restoring force proportional to the displacement. This leads to simple harmonic motion. Using the isothermal condition (since no heat exchange is mentioned), the effective restoring force results in an equivalent spring constant $k = PA^2/h$, where P is the gas pressure and h is the length of the gas column. Applying the SHM formula $T = 2\pi\sqrt{(M/k)}$, we get $T = 2\pi\sqrt{(Mh/PA^2)}$, which simplifies to $T = 2\pi\sqrt{(Mh/PA)}$.

70. *c)* Using energy conservation: Initial PE = Final KE Initial PE = mgl (for B) + 2mgl (for A) = 3mgl Final KE = $(1/2)I\omega^2$, where $I = ml^2$ (for B) + $4ml^2$ (for A) = $5ml^2$ So, $(1/2) \times 5ml^2 \times \omega^2 = 3mgl \Rightarrow \omega^2 = (6g)/(5l)$ Speed of B = $v = \omega \times l = \sqrt{(6gl/5)}$

71. *c)* The stone reaches max height H, strikes a smooth wall, and falls vertically below that point. Since the collision is elastic and the wall is smooth, the vertical velocity is unchanged. The stone falls from H to the ground in time $t = \sqrt{(2H/g)}$. In half this time, $t/2 = \sqrt{(2H/g)}/2$, the height fallen is:$h_{drop} = (1/2)g(t/2)^2 = (1/2)g(2H/g)/4 = H/4$
Thus, the height above the ground where it strikes the wall is:$h = H - H/4 = 3H/4$

72. *a)* For a mass M between two springs with force constant K, the effective spring constant is $K_{eff} = K + K = 2K$, since the springs are in parallel. The period of oscillation is given by $T = 2\pi \sqrt{(M / K_{eff})} = 2\pi \sqrt{(M / 2K)}$. The incline and gravity terms (like $Mg \sin\theta$) do not affect the period in this setup, as the oscillation is along the plane and the springs provide the restoring force.

73. *d)*

74. *c)*

75. *c)* According to Einstein's theory of relativity, as an object's speed approaches the speed of light, its mass increases exponentially. At the speed of light, the

mass would become infinite, which is why no object with mass can reach or exceed the speed of light.

76. *b)* This is the classical statement of the Law of Multiple Proportions.

77. *b)* Heating ammonium dichromate gives nitrogen gas along with Cr_2O_3 and water vapor.

78. *c)* NaOH hydrolyzes triglycerides into soap (sodium salt of fatty acid) and glycerol.

79. *d)* Stearic acid ($C_{17}H_{35}COOH$) forms harder soaps due to saturated long chains.

80. *a)* Mn in MnO_4^- has a +7 oxidation state, and in Mn^{2+}, it's +2. Change: 7 – 2 = 5 electrons. Others: $CrO_4^{2-} \rightarrow Cr^{3+}$ (3 electrons), $MnO_4^- \rightarrow MnO_2$ (3 electrons), $Cr_2O_7^{2-} \rightarrow 2Cr^{3+}$ (6 electrons).

81. *a)* Isoelectronic: same number of electrons; isostructural: same geometry.

82. *b)* Alkali metals (Group 1) have the largest atomic radii in their periods due to one valence electron and low effective nuclear charge. They have low ionization energy, low density, and low electronegativity.

83. *a)* Acidic oxides: Cl_2O_7 (Cl: +7, highest electronegativity), SO_2 (S: +4), P_4O_{10} (P: +5). Higher oxidation state and electronegativity increase acidity. Others: CO_2, N_2O_5, SO_3 are mixed; Na_2O, MgO, Al_2O_3 are basic; K_2O, CaO, MgO are basic.

84. *a)* Dobereiner's triads: middle element's atomic mass ≈ average of the other two.

85. *c)* An amphoteric oxide reacts with both acids and bases. ZnO (option 3) is amphoteric.

86. *b)* Atomic number 19 is potassium (K), a metal with oxidation number +1 (option 2).

87. *b)* He-atom (neutral) has 2 electrons; its spectrum is similar to Li^+ (option 2), which also has 2 electrons.

88. a*)* Maximum energy emission occurs for the largest energy level drop. 2 → 1 (option 1) has the highest energy difference.

89. *d)* Bohr's model states energy levels are quantized, not continuous. Option 4 contradicts this.

90. *b)* In Reaction I, zinc displaces hydrogen from dilute sulphuric acid, forming zinc sulphate and hydrogen gas, making it both a displacement and redox reaction. In Reaction II, heating calcium carbonate produces carbon dioxide, which turns lime water milky, confirming the presence of CO_2. In Reaction III, copper displaces silver from silver nitrate, showing that copper is more reactive than silver; this is a displacement reaction, not double displacement. Hence, statements A, B, and C are correct. Statement D is incorrect as not all reactions are endothermic and only Reaction I evolves hydrogen gas.

91. *c)* Mitochondria have their own DNA and 70S ribosomes, allowing them to produce some proteins independently, making them semi-autonomous.

92. *b)* Muscular tissue enables movement, while nervous tissue transmits impulses—essential for coordination.

93. *a)* Liver detoxifies chemicals, kidneys filter blood, and lungs expel CO_2 and other gaseous wastes.

94. *a)* Comets develop a coma when near the Sun due to sublimation, and their tails are shaped by solar wind and radiation pressure—always pointing away from the Sun.

95. *b)* Solar eclipses occur during new moon (not full moon) and totality is only visible from a narrow geographic path due to Moon's shadow cone.

96. *c)* Malaria is caused by Plasmodium (a protozoa), transmitted via female Anopheles mosquito.

97. *c)* Vitamins are organic compounds essential in small quantities for proper metabolic functioning, though they do not supply energy.

98. *c)* Protoplasm houses all essential biomolecules and is the site for metabolic activities—earning it the term "physical basis of life."

99. *b)* Comets consist of ice and dust, forming tails when close to the Sun and follow highly elliptical orbits. Meteors don't orbit the Sun; they are fragments entering Earth's atmosphere.

100. *b)* Quarantine, vaccines, and sanitation are effective in epidemic control. Antibiotics do not work against viruses.

101. *a)* The Andes, Aleutian Islands, and Japan lie along the Pacific Ring of Fire. Himalayas are formed by continental collision, not subduction.

102. *a)* Benioff Zones mark subduction zones where deep-focus earthquakes occur due to converging tectonic plates.

103. *a)* Stratovolcanoes (composite cones) have steep sides, are formed by alternating layers of lava and ash, and emit viscous magma. They are often explosive.

104. *c)* The Himalayan earthquakes result from continental-continental convergence and some transform faulting; no subduction of oceanic plate occurs here.

105. *a)* Temperature inversion leads to cooler air trapped below warmer air, causing fog, poor air quality, and suppressed convection.

106. *a)* Equatorial regions have low pressure and intense convectional rainfall. Diurnal range is low, and vegetation is dense.

107. *a)* Subtropical high-pressure belts form due to descending cool dry air (1) and Coriolis force (2), not heating or uplift.

108. *d)* The ITCZ moves northward due to solar shift, land heating over Asia, and trade wind strength.

109. *a)* Bay of Bengal cyclones usually form post-monsoon, move northwest, and bring heavy rainfall.

110. *a)* Anti-cyclones bring descending air, clear skies, and dry conditions. Winds diverge, not converge.

111. *a)* Tropical cyclones form over warm seas, are non-frontal, and are smaller in size compared to extra-tropical systems.

112. *a)* Tibetan heating, ITCZ, and El Niño affect monsoon onset and intensity. Subtropical jet has less direct influence.

113. *a)* Retreating monsoon brings cyclonic rain to Tamil Nadu, reduced humidity, and cold waves over north India.

114. *a)* Mawsynram gets heavy rainfall due to orographic lifting and funnel-shaped topography; not due to western disturbances.

115. *a)* Black soil retains moisture, is rich in iron and lime, but has poor drainage — suitable for cotton.

116. *a)* Thorium is found along Kerala, Tamil Nadu, and Andhra coastal sands; Rajasthan is not a major source.

117. *d)* Kalol (Gujarat – petroleum), Bailadila (Chhattisgarh – iron), and Jaduguda (Jharkhand – uranium) are correctly matched. Neyveli is for lignite but not in this list.

118. *a)* Rajasthan, Gujarat, and Karnataka lead India in installed solar capacity. Odisha is not among the top.

119. *a)* DVC was established for flood control, irrigation, and hydropower generation in the Damodar basin.

120. *a)* Kudankulam (Tamil Nadu), Kaiga (Karnataka), and Kalpakkam (Tamil Nadu) are all in South India. Narora is in Uttar Pradesh (North India).

121. *d)* Annie Besant and Tilak led the Home Rule Movement. Bipin Chandra Pal supported the idea. Gokhale was not directly involved.

122. *c)* The Nehru Report demanded Dominion Status, rejected separate electorates, and proposed federalism. The Muslim League opposed it.

123. *a)* The Second Plan emphasized the Mahalanobis model focusing on heavy industries and import substitution.

124. *b)* "One World" advocated peace, disarmament, and ideas in line with the UN Charter.

125. *c)* The 73rd Amendment provided constitutional status, mandated a 3-tier structure, and reserved 33% seats for women.

126. *a)* The Tsar's abdication, Bolshevik-led October Revolution, and the Brest-Litovsk treaty were crucial events.

127. *d)* Community Development focused on decentralised rural progress, agriculture, local leadership, and rural industries.

128. *a)* Panchayati Raj ensures local self-governance, decentralisation, and women empowerment through reservations.

129. *c)* The Simon Commission lacked Indian members and was seen as an extension of colonial control.

130. *a)* First Plan focused on agriculture; Third on industrialisation; Fourth on self-reliance; Fifth on poverty alleviation.

131. *b)* Bolsheviks favoured a disciplined party and believed workers should lead the revolution, unlike Mensheviks.

132. *c)* Operation Barga in West Bengal formalised sharecropping rights of tenant farmers.

133. *b)* The 11th Schedule includes agriculture, PDS, and small-scale industries, not defence or foreign affairs.

134. *d)* NEP allowed limited capitalism, including small businesses and private trade, but retained state control.

135. *a)* Russian Revolution led to the rise of communism, CPI formation, and influenced Indian trade unions.

136. *b)* During Quit India, parallel govts were formed, leaders arrested, and railways disrupted; INA war declaration came later.

137. *a)* NDDB, Amul, and cooperative banks boosted rural development; community policing isn't a cooperative movement initiative.

138. *d)* Gandhi's Gram Swaraj included village autonomy, decentralisation, and social upliftment including anti-caste efforts.

139. *c)* Third Plan ended due to 1962 war; Fifth Plan was terminated early due to political and economic crisis during Emergency.

140. *d)* Kheda Satyagraha was Gandhi's first large satyagraha involving no-tax campaign, with Patel as co-leader.

141. *a)* As of 2025, General Upendra Dwivedi has taken over as the Chief of the Army Staff, succeeding General Manoj Pande upon his retirement in June 2024. Admiral Dinesh K Tripathi became the Chief of the Naval Staff in April 2024, replacing Admiral R. Hari Kumar. The Indian Air Force is currently headed by Air Chief Marshal A. P. Singh, who assumed charge after the retirement of Air Chief Marshal V. R. Chaudhari in 2024. Meanwhile, Lt. Gen. M. U. Nair serves as the Chief of Defence Intelligence and heads the Defence Intelligence Agency (DIA), an important arm responsible for coordinating intelligence for the tri-services. This matching-type MCQ integrates updates from all three services and a key strategic agency, testing candidates on up-to-date defence leadership knowledge.

142. *c)* The name 'Remal' was given by Bangladesh. Cyclone names in the Bay of Bengal and Arabian Sea are assigned by member countries of the World Meteorological Organization (WMO) panel, and "Remal" was submitted by Bangladesh.

143. *d)* DD News, a prominent Indian government TV channel, introduced AI anchors AI Krish and AI Bhoomi in 2024, marking a first for government media in India.

144. *a)* Saga Dawa, a Buddhist festival, is widely celebrated in Sikkim, where Buddhism has a significant presence. It was observed there in May 2025.

145. *a)* Kailash Satyarthi, a Nobel Peace Prize laureate, became the first Indian to receive the Nelson Mandela Lifetime Achievement Award in 2024 for his work in child rights.

146. *b)* The first National Yoga Olympiad in India was held in Mysore in 2022, a city known for its yoga heritage and institutions.

147. *c)* The Rajasthan government announced the 'Laadla Bhai Yojana' in 2024 to support boys, following the 'Ladli Behan Yojana' for girls, as part of its welfare initiatives.

148. *b)* As of mid-2025, NATO has 32 members. No new additions confirmed yet.

149. *b)* Aman Sehrawat won a bronze medal in freestyle wrestling at the Paris 2024 Olympics, becoming India's youngest Olympic medalist at the age of 21.

150. *b)* India celebrated its 78th Independence Day on August 15, 2024, with the theme 'Developed India,' focusing on the vision of a fully developed nation by 2047.