ANSWER KEY & SOLUTIONS

SET 1

NEET (UG) 2027 PRACTICE EXAMINATION — TEST BOOKLET SET 1

Candidate	Aamirah Fathima	**Total Questions**	180
Maximum Marks	720	**Marking Scheme**	+4 / −1 / 0

KEY

1	2	**2**	2	**3**	2	**4**	3	**5**	3	**6**	3	**7**	2	**8**	2	**9**	3	**10**	2
11	3	**12**	2	**13**	3	**14**	2	**15**	3	**16**	3	**17**	1	**18**	3	**19**	2	**20**	3
21	3	**22**	1	**23**	3	**24**	1	**25**	3	**26**	3	**27**	2	**28**	3	**29**	2	**30**	2
31	1	**32**	3	**33**	3	**34**	3	**35**	3	**36**	2	**37**	1	**38**	2	**39**	2	**40**	2
41	3	**42**	2	**43**	2	**44**	2	**45**	3	**46**	2	**47**	2	**48**	4	**49**	3	**50**	1
51	4	**52**	3	**53**	2	**54**	2	**55**	1	**56**	3	**57**	2	**58**	3	**59**	3	**60**	1
61	3	**62**	4	**63**	3	**64**	1	**65**	2	**66**	1	**67**	2	**68**	4	**69**	3	**70**	2
71	2	**72**	3	**73**	2	**74**	2	**75**	3	**76**	2	**77**	4	**78**	1	**79**	2	**80**	2
81	2	**82**	1	**83**	2	**84**	4	**85**	3	**86**	4	**87**	2	**88**	2	**89**	1	**90**	4
91	2	**92**	2	**93**	2	**94**	2	**95**	2	**96**	4	**97**	2	**98**	2	**99**	3	**100**	3
101	2	**102**	2	**103**	2	**104**	3	**105**	2	**106**	2	**107**	2	**108**	3	**109**	2	**110**	2
111	2	**112**	3	**113**	2	**114**	3	**115**	3	**116**	1	**117**	2	**118**	4	**119**	2	**120**	3
121	2	**122**	3	**123**	3	**124**	3	**125**	2	**126**	2	**127**	2	**128**	2	**129**	2	**130**	2
131	3	**132**	2	**133**	2	**134**	1	**135**	2	**136**	3	**137**	1	**138**	2	**139**	2	**140**	2
141	2	**142**	4	**143**	3	**144**	2	**145**	2	**146**	2	**147**	3	**148**	1	**149**	3	**150**	3
151	2	**152**	1	**153**	2	**154**	2	**155**	2	**156**	2	**157**	2	**158**	2	**159**	2	**160**	2
161	3	**162**	3	**163**	3	**164**	2	**165**	2	**166**	3	**167**	2	**168**	3	**169**	2	**170**	2
171	2	**172**	2	**173**	2	**174**	2	**175**	2	**176**	2	**177**	2	**178**	2	**179**	2	**180**	2

PHYSICS — SOLUTIONS

1. (2) Angular momentum
h has units J·s = kg m^2 s^{-1} = [ML^2T^{-1}], identical to angular momentum L = mvr.
[Units & Dimensions]

2. (2) 8%
KE = ½mv^2 ⇒ %error = 2% + 2(3%) = 8%.
[Errors]

3. (2) 45 m
Time up = 3 s, u = 30 m/s, H = $u^2/2g$ = 900/20 = 45 m.
[Kinematics]

4. (3) 45°
H/R = tanθ/4 = 1/4 ⇒ tanθ = 1 ⇒ θ = 45°.
[Kinematics]

5. (3) 100 N
F = Δp/Δt = (2×5)/0.1 = 100 N.
[Laws of Motion]

6. (3) 0.58
For equilibrium μ ≥ tanθ = tan30° = 1/√3 ≈ 0.58.
[Laws of Motion]

7. (2) Comes to rest
In a 1-D elastic collision between equal masses the velocities are exchanged.
[Work, Energy & Power]

8. (2) 10 kW
P = mgh/t = 100×10×10 = 10^4 W = 10 kW.
[Work, Energy & Power]

9. (3) 4 : 1
(ML^2/3)/(ML^2/12) = 4 : 1.
[Rotational Motion]

10. (2) Solid cylinder
a = g sinθ/(1 + k^2/R^2); solid cylinder has smaller k^2/R^2 (½ vs 1) ⇒ larger a.
[Rotational Motion]

11. (3) 3.0 m
x_cm = (2×0 + 3×5)/5 = 3 m.
[Rotational Motion]

12. (2) W/2
g_d = g(1 − d/R) = g/2 at d = R/2.
[Gravitation]

13. (3) 8T
T ∝ r^{3/2} ⇒ T' = 4^{3/2} T = 8T.
[Gravitation]

14. (2) x
Δl = FL/AY; doubling both L and A leaves the ratio L/A unchanged.
[Elasticity]

15. (3) 4T/r
A soap bubble has two surfaces, so ΔP = 4T/r.
[Fluids]

16. (3) $2K_1K_2/(K_1 + K_2)$
Thermal resistances add in series ⇒ K_eq = $2K_1K_2/(K_1 + K_2)$.
[Thermal Properties]

17. (1) Q = 0 and internal energy decreases
Adiabatic ⇒ Q = 0, so W = −ΔU; gas does work at the cost of internal energy and cools.
[Thermodynamics]

18. (3) 600 K
η = 1 − T_2/T_1 ⇒ 0.5 = 1 − $300/T_1$ ⇒ T_1 = 600 K.
[Thermodynamics]

19. (2) 4 : 1
v_rms ∝ 1/√M ⇒ √(32/2) = 4 ⇒ 4 : 1.
[Kinetic Theory]

20. (3) A/√2
½$k(A^2 - x^2)$ = ½kx^2 ⇒ x = A/√2.
[Oscillations]

21. (3) T/2
Each half has 2k; in parallel k_eff = 4k ⇒ T' = T/2.
[Oscillations]

22. (1) 1 : 2
Closed: v/4L, Open: v/2L ⇒ 1 : 2.
[Waves]

23. (3) 1.25 f
f' = f·v/(v − v/5) = 5f/4 = 1.25 f.
[Waves]

24. (1) Zero
Charge resides on the surface; field inside a conductor is zero.
[Electrostatics]

25. (3) 2pE
W = pE(cos0° − cos180°) = 2pE.
[Electrostatics]

26. (3) q/6ε₀
Total flux q/ε₀ is shared equally by 6 faces.
[Electrostatics]

27. (2) V/K
Q constant, C → KC, so V = Q/KC = V/K.
[Capacitors]

28. (3) One-fourth
v_d = I/(nAe); A ∝ r², so doubling r makes A four times and v_d one-fourth.
[Current Electricity]

29. (2) 1 Ω
r = (E − V)/I = (12 − 10)/2 = 1 Ω.
[Current Electricity]

30. (2) n²
r ∝ 1/n and B = μ₀nI/2r ⇒ B ∝ n².
[Moving Charges & Magnetism]

31. (1) 2 × 10⁻⁷ N m⁻¹, attractive
F/l = μ₀I₁I₂/2πd = 2 × 10⁻⁷ N/m; parallel currents attract.
[Moving Charges & Magnetism]

32. (3) Small and negative
Diamagnets have small negative χ, nearly independent of temperature.
[Magnetism & Matter]

33. (3) 1 V
ε = Bvl = 0.5 × 10 × 0.2 = 1 V.
[Electromagnetic Induction]

34. (3) Four times
L = μ₀n²Al ⇒ L ∝ n².
[Electromagnetic Induction]

35. (3) Power factor is unity
X_L = X_C ⇒ Z = R (minimum), current maximum, cosφ = 1.
[Alternating Current]

36. (2) 10 turns
Ns = Np·Vs/Vp = 100 × 22/220 = 10.
[Alternating Current]

37. (1) c
E₀/B₀ = c = 3 × 10⁸ m s⁻¹.
[Electromagnetic Waves]

38. (2) 20 cm
1/f = 1/10 − 1/20 = 1/20 ⇒ f = +20 cm.
[Ray Optics]

39. (2) 42°
sin C = 1/1.5 = 0.667 ⇒ C ≈ 41.8° ≈ 42°.
[Ray Optics]

40. (2) 3β/4
λ decreases by μ ⇒ β' = β/μ = 3β/4.
[Wave Optics]

41. (3) −3.4 eV
Eₙ = −13.6/n² eV = −13.6/4 = −3.4 eV.
[Atoms]

42. (2) h/e
$eV_0 = h\nu - \varphi \Rightarrow V_0 = (h/e)\nu - \varphi/e$, slope = h/e.
[Dual Nature of Matter]

43. (2) ^{56}Fe
The BE/nucleon curve peaks near mass number 56 (≈8.8 MeV for Fe).
[Nuclei]

44. (2) Decreases
Forward bias opposes the barrier field, so majority carriers narrow the depletion layer.
[Semiconductors]

45. (3) A NOT gate
Y = (A·A)' = A' — the inverted input, i.e. a NOT gate.
[Semiconductors]

46. (2) 6.022×10^{22}
4.4/44 = 0.1 mol ⇒ $0.1 \times 6.022 \times 10^{23} = 6.022 \times 10^{22}$.
[Some Basic Concepts]

47. (2) CH_2O
Moles ratio 40/12 : 6.7/1 : 53.3/16 = 3.33 : 6.7 : 3.33 = 1 : 2 : 1.
[Some Basic Concepts]

48. (4) 6
Cr: $3d^5 4s^1$ — five 3d and one 4s electron are unpaired.
[Structure of Atom]

49. (3) 10
l = 2 is the d sub-shell: 5 orbitals × 2 electrons = 10.
[Structure of Atom]

50. (1) $Al^{3+} < Mg^{2+} < Na^+ < F^- < O^{2-}$
For isoelectronic species, radius decreases as nuclear charge increases.
[Classification & Periodicity]

51. (4) Ne
Ne has a completely filled stable configuration and the highest Z_eff in period 2.
[Classification & Periodicity]

52. (3) BF_3
BF_3 is trigonal planar and symmetrical, so bond moments cancel.
[Chemical Bonding]

53. (2) 1.5
O_2^- has 17 electrons: BO = (10 − 7)/2 = 1.5.
[Chemical Bonding]

54. (2) O_2
O_2 has two unpaired electrons in its π* antibonding orbitals.
[Chemical Bonding]

55. (1) 7 σ and 3 π
3 C–C sigma + 4 C–H sigma = 7 σ; triple bond gives 2 π and double bond 1 π.
[Chemical Bonding]

56. (3) $\Delta H = \Delta U - 2RT$
$\Delta ng = 2 - 4 = -2$, so $\Delta H = \Delta U + \Delta ngRT = \Delta U - 2RT$.
[Thermodynamics]

57. (2) $\Delta H < 0, \Delta S > 0$
$\Delta G = \Delta H - T\Delta S$ is negative at every T only when ΔH is negative and ΔS positive.
[Thermodynamics]

58. (3) $Kp = Kc(RT)^{-2}$
Kp = Kc(RT)^Δn with Δn = −2.
[Equilibrium]

59. (3) 11
pOH = 3 ⇒ pH = 14 − 3 = 11.
[Equilibrium]

60. (1) pKa
Henderson equation: pH = pKa + log([salt]/[acid]) = pKa when the ratio is 1.
[Equilibrium]

61. (3) +6
2(+1) + 2x + 7(−2) = 0 ⇒ x = +6.
[Redox Reactions]

62. (4) $C_6H_5CH_2^+$
The benzyl cation is stabilised by resonance with the ring, which outweighs hyperconjugation in t-butyl.
[Organic Chemistry – Basic Principles]

63. (3) 3
Three α-hydrogens on the $–CH_3$ group give three hyperconjugative structures.
[Organic Chemistry – Basic Principles]

64. (1) 2,4-Dimethylpentane
The longest chain has 5 carbons with methyl groups at C-2 and C-4.
[Organic Chemistry – Basic Principles]

65. (2) 2-Bromopropane
Markovnikov addition places Br on the more substituted carbon via the stabler 2° carbocation.
[Hydrocarbons]

66. (1) Ethanal only
$CH_3CH{=}CHCH_3$ cleaves symmetrically to give two molecules of CH_3CHO.
[Hydrocarbons]

67. (2) NO_2^+
H_2SO_4 protonates HNO_3, which loses water to give the nitronium ion NO_2^+.
[Hydrocarbons]

68. (4) 5
It gives 4 K^+ and one $[Fe(CN)_6]^{4-}$ ⇒ i = 5.
[Solutions]

69. (3) 0.1 m $BaCl_2$
$\Delta Tb \propto i \times m$; $BaCl_2$ gives i = 3, the largest particle count.
[Solutions]

70. (2) 1.10 V
$E°cell = E°cathode - E°anode = 0.34 - (-0.76) = 1.10$ V.
[Electrochemistry]

71. (2) 63.5 g
$Cu^{2+} + 2e^- \rightarrow Cu$, so 2 F deposits 1 mol = 63.5 g.
[Electrochemistry]

72. (3) Molar conductivity increases and conductivity decreases
Degree of dissociation rises so Λm increases, while fewer ions per unit volume lower κ.
[Electrochemistry]

73. (2) 100 s
$t_{½} = 0.693/k = 0.693/6.93 \times 10^{-3} = 100$ s.
[Chemical Kinetics]

74. (2) Twice the time for 90% completion
$t_{99} = (2.303/k)\log 100$ and $t_{90} = (2.303/k)\log 10$ ⇒ $t_{99} = 2t_{90}$.
[Chemical Kinetics]

75. (3) Sc^{3+}
Sc^{3+} is $3d^0$ — no d–d transition is possible.
[d- and f-Block Elements]

76. (2) Poor shielding by 4f electrons
Diffuse 4f orbitals shield poorly, so effective nuclear charge grows and size shrinks.
[d- and f-Block Elements]

77. (4) 5.92 BM
Fe^{3+} is d^5 with n = 5 ⇒ $\mu = \sqrt{(5\times7)} = 5.92$ BM.
[d- and f-Block Elements]

78. (1) Pentaamminechloridocobalt(III) chloride
Cobalt is +3; ligands are named alphabetically as ammine before chlorido.
[Coordination Compounds]

79. (2) d^2sp^3, 1
CN^- is a strong-field ligand: d^5 pairs to t_2g^5 ⇒ inner-orbital d^2sp^3 with one unpaired electron.
[Coordination Compounds]

80. (2) 2
Octahedral MA_4B_2 exists as cis and trans forms only.
[Coordination Compounds]

81. (2) 3° > 2° > 1°
SN1 rate follows carbocation stability, greatest for the tertiary substrate.
[Haloalkanes & Haloarenes]

82. (1) CH_3Br
SN2 needs backside attack; methyl bromide has the least steric hindrance.
[Haloalkanes & Haloarenes]

83. (2) Phenol > water > ethanol
Phenoxide is resonance stabilised; ethanol is the weakest acid due to +I of the ethyl group.
[Alcohols, Phenols & Ethers]

84. (4) 2-Methylpropan-2-ol
Tertiary alcohols form the stable 3° carbocation instantly with Lucas reagent.
[Alcohols, Phenols & Ethers]

85. (3) Benzaldehyde
Benzaldehyde has no α-hydrogen, so no enolate can form.
[Aldehydes, Ketones & Carboxylic Acids]

86. (4) Pentan-3-one
The test needs a CH_3CO– group (or $CH_3CH(OH)$–); pentan-3-one has ethyl groups on both sides.
[Aldehydes, Ketones & Carboxylic Acids]

87. (2) $FCH_2COOH > ClCH_2COOH > CH_3COOH$
Stronger –I of fluorine stabilises the carboxylate more than chlorine; methyl is electron releasing.
[Aldehydes, Ketones & Carboxylic Acids]

88. (2) $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3 > C_6H_5NH_2$
Aniline is weakest (lone pair delocalised); in water the 2° amine is the strongest of the ethylamines.
[Amines]

89. (1) Primary amines
Only 1° amines with $CHCl_3$/alcoholic KOH give foul-smelling isocyanides.
[Amines]

90. (4) Sucrose
In sucrose both anomeric carbons are involved in the glycosidic linkage, so no free aldehyde group remains.
[Biomolecules]

91. (2) Specific epithet
Binomial nomenclature: first word is the genus, second is the specific epithet.
[The Living World]

92. (2) Mycoplasma
Mycoplasmas are the smallest living cells and can survive without oxygen; they have no cell wall.
[Biological Classification]

93. (2) Dinoflagellates
Red dinoflagellates such as Gonyaulax multiply rapidly and make the sea appear red.
[Biological Classification]

94. (2) Ascomycetes and Basidiomycetes
In both Ascomycetes and Basidiomycetes plasmogamy is followed by a prolonged dikaryophase.
[Biological Classification]

95. (2) A haploid gametophyte
The fern prothallus is the free-living, photosynthetic haploid gametophyte.
[Plant Kingdom]

96. (4) Angiosperms
Only angiosperms show syngamy plus triple fusion within the same embryo sac.
[Plant Kingdom]

97. (2) Twisted
In twisted aestivation one margin of each petal overlaps the next in a regular direction.
[Morphology of Flowering Plants]

98. (2) Dianthus
In Dianthus and Primrose ovules are borne on a central axis with no septa.
[Morphology of Flowering Plants]

99. (3) Fabaceae
Fabaceae: papilionaceous corolla, vexillary aestivation, stamens (9) + 1, marginal placentation.
[Morphology of Flowering Plants]

100. (3) Endodermis
Suberin deposits on radial and tangential walls of endodermal cells form Casparian strips.
[Anatomy of Flowering Plants]

101. (2) Conjoint, closed and scattered
Monocot stems have scattered, closed (no cambium) conjoint bundles.
[Anatomy of Flowering Plants]

102. (2) Adaxial epidermis of grass leaves
These large empty cells in grass leaf upper epidermis help the leaf curl inwards to reduce water loss.
[Anatomy of Flowering Plants]

103. (2) 70S with 50S and 30S subunits
Bacterial ribosomes are 70S, built from 50S and 30S subunits.
[Cell: The Unit of Life]

104. (3) Calcium pectate
Calcium pectate cements neighbouring cells together.
[Cell: The Unit of Life]

105. (2) Ribosome
Ribosomes are naked ribonucleoprotein particles with no surrounding membrane.
[Cell: The Unit of Life]

106. (2) Competitive inhibitor
Malonate resembles succinate in structure and competes for the active site.
[Biomolecules]

107. (2) Rubber
Rubber, alkaloids, essential oils and gums are secondary metabolites of plants.
[Biomolecules]

108. (3) Pachytene
Recombination nodules appear at pachytene and recombinase mediates crossing over.
[Cell Cycle & Cell Division]

109. (2) Zygotene
Synapsis of homologous chromosomes at zygotene forms the synaptonemal complex.
[Cell Cycle & Cell Division]

110. (2) Oxaloacetic acid
PEP carboxylase in mesophyll cells fixes CO_2 into the 4-carbon OAA.
[Photosynthesis]

111. (2) 18 ATP and 12 NADPH
Each CO_2 needs 3 ATP and 2 NADPH ⇒ 18 ATP and 12 NADPH for six.
[Photosynthesis]

112. (3) There is no synthesis of sugar or ATP
The C_2 pathway releases CO_2 without producing ATP, NADPH or carbohydrate.
[Photosynthesis]

113. (2) P700
PS I absorbs maximally at 700 nm and its reaction centre is P700.
[Photosynthesis]

114. (3) 36
NCERT's balance sheet gives a net of 36 ATP per glucose under ideal assumptions.
[Respiration in Plants]

115. (3) Less than 1
Fats are poor in oxygen and consume more O_2, giving RQ around 0.7.
[Respiration in Plants]

116. (1) Auxin
Auxins promote fruit development without fertilisation.
[Plant Growth & Development]

117. (2) Vernalisation
Vernalisation prevents premature flowering and depends on a cold treatment.
[Plant Growth & Development]

118. (4) Tapetum
Tapetal cells are dense, multinucleate and supply nutrition to microspores.
[Sexual Reproduction in Flowering Plants]

119. (2) 8-nucleate and 7-celled
Three successive free nuclear divisions give 8 nuclei organised into 7 cells.
[Sexual Reproduction in Flowering Plants]

120. (3) Triploid
Triple fusion of one male gamete with two polar nuclei gives a triploid PEN.
[Sexual Reproduction in Flowering Plants]

121. (2) Nucellar cells developing into embryos
Nucellar cells protrude into the embryo sac and form adventive embryos.
[Sexual Reproduction in Flowering Plants]

122. (3) 1 : 1 : 1 : 1
Crossing F_1 with the double recessive parent gives four equally frequent classes.
[Principles of Inheritance]

123. (3) Multiple allelism and codominance
Three alleles I^A, I^B and i exist, and I^A and I^B are codominant in AB individuals.
[Principles of Inheritance]

124. (3) 50%
Sons receive the X from the mother; half of her X chromosomes carry the recessive allele.
[Principles of Inheritance]

125. (2) Trisomy of chromosome 21
An additional copy of chromosome 21 gives a total of 47 chromosomes.
[Principles of Inheritance]

126. (2) Avery, MacLeod and McCarty
They showed that only DNase abolished transformation, proving DNA is the transforming principle.
[Molecular Basis of Inheritance]

127. (2) DNA ligase
Ligase seals the nicks between the discontinuously synthesised fragments.
[Molecular Basis of Inheritance]

128. (2) Allolactose
Allolactose binds the repressor produced by the i gene and inactivates it.
[Molecular Basis of Inheritance]

129. (2) 3.3×10^9
The Human Genome Project reported about 3164.7 million base pairs.
[Molecular Basis of Inheritance]

130. (2) Sigmoid
Resource limitation gives the Verhulst–Pearl S-shaped curve with a carrying capacity K.
[Organisms & Populations]

131. (3) Mutualism
The alga supplies food and the fungus supplies shelter, water and minerals — both benefit.
[Organisms & Populations]

132. (2) Always upright
Energy is lost at every transfer, so the energy pyramid can never be inverted.
[Ecosystem]

133. (2) GPP − respiration losses
NPP = GPP − R, and it is the biomass available to herbivores and decomposers.
[Ecosystem]

134. (1) 0.1 and 0.2
The regression slope Z is remarkably similar, 0.1–0.2, regardless of taxonomic group.
[Biodiversity & Conservation]

135. (2) In situ conservation
Sacred groves protect species in their natural habitat, hence in situ conservation.
[Biodiversity & Conservation]

136. (3) Echinodermata
Echinoderms use the water vascular system with tube feet for locomotion and feeding.
[Animal Kingdom]

137. (1) Platyhelminthes
Protonephridia or flame cells carry out osmoregulation and excretion in flatworms.
[Animal Kingdom]

138. (2) Arthropoda
In arthropods, blood flows through a haemocoel rather than closed vessels.
[Animal Kingdom]

139. (2) Cephalochordata
In Cephalochordata (Branchiostoma) the notochord extends from head to tail throughout life.
[Animal Kingdom]

140. (2) Loose connective tissue
Areolar tissue is loose connective tissue that acts as a support framework beneath the skin.
[Structural Organisation in Animals]

141. (2) Malpighian tubules
About 100–150 yellow Malpighian tubules at the junction of midgut and hindgut remove nitrogenous waste.
[Structural Organisation in Animals]

142. (4) pCO_2 and H^+ increase
Bohr effect: high CO_2, high H^+ and high temperature favour dissociation of oxyhaemoglobin.
[Breathing & Exchange of Gases]

143. (3) 70%
About 70% of CO_2 is carried as HCO_3^-, 20–25% as carbamino-haemoglobin and 7% dissolved.
[Breathing & Exchange of Gases]

144. (2) TV + IRV + ERV
Vital capacity is the maximum volume that can be exhaled after a maximal inspiration.
[Breathing & Exchange of Gases]

145. (2) SA node
The SA node in the right atrium generates about 70–75 impulses per minute.
[Body Fluids & Circulation]

146. (2) Fibrinogen to fibrin
Thrombin catalyses conversion of soluble fibrinogen into insoluble fibrin threads.
[Body Fluids & Circulation]

147. (3) Atrioventricular valves
Closure of the bicuspid and tricuspid valves at the start of ventricular systole gives 'lubb'.
[Body Fluids & Circulation]

148. (1) Proximal convoluted tubule
Nearly all essential nutrients and about 70–80% of electrolytes and water are reclaimed in the PCT.
[Excretory Products]

149. (3) Distal tubule and collecting duct
ADH increases facultative water reabsorption in the DCT and collecting duct.
[Excretory Products]

150. (3) Uricotelic
They excrete uric acid as a semi-solid paste, conserving water.
[Excretory Products]

151. (2) The I band shortens
Actin filaments slide inwards, so the I band narrows while the A band length is unchanged.
[Locomotion & Movement]

152. (1) 80
Skull 22 + hyoid 1 + ear ossicles 6 + vertebral column 26 + sternum 1 + ribs 24 = 80.
[Locomotion & Movement]

153. (2) Uric acid crystals
Inflammation of joints follows deposition of uric acid crystals.
[Locomotion & Movement]

154. (2) The Na^+/K^+ pump moving 3 Na^+ out and 2 K^+ in
The electrogenic sodium–potassium pump keeps the inside negative at about −70 mV.
[Neural Control & Coordination]

155. (2) From one node of Ranvier to the next
In myelinated fibres, depolarisation jumps between nodes of Ranvier, speeding conduction.
[Neural Control & Coordination]

156. (2) Cerebellum
The cerebellum coordinates precise voluntary movement and body equilibrium.
[Neural Control & Coordination]

157. (2) Beta cells of islets of Langerhans
Beta cells secrete insulin; alpha cells secrete glucagon.
[Chemical Coordination]

158. (2) Synthesised by the hypothalamus and released from the posterior pituitary
The neurohypophysis stores and releases hormones made by hypothalamic neurons.
[Chemical Coordination]

159. (2) Hyposecretion of the adrenal cortex
Deficiency of glucocorticoids and mineralocorticoids causes Addison's disease.
[Chemical Coordination]

160. (2) Provide nutrition to germ cells
Sertoli cells nourish germ cells; Leydig cells secrete androgens.
[Human Reproduction]

161. (3) Ampullary–isthmic junction of the fallopian tube
Sperm and ovum meet at the ampullary–isthmic junction of the oviduct.
[Human Reproduction]

162. (3) Human chorionic gonadotropin
hCG from the trophoblast sustains the corpus luteum, which secretes progesterone.
[Human Reproduction]

163. (3) 1–2 million
About one to two million primary oocytes per ovary are present at birth.
[Human Reproduction]

164. (2) Suppressing sperm motility and fertilising capacity
Cu ions released by Cu-T and Multiload suppress sperm motility and fertilising capacity.
[Reproductive Health]

165. (2) 12 weeks
MTPs are comparatively safe during the first trimester, i.e. up to 12 weeks.
[Reproductive Health]

166. (3) A zygote or early embryo up to the 8-blastomere stage
Zygote intrafallopian transfer places the zygote or early embryo into the fallopian tube.
[Reproductive Health]

167. (2) Natural selection
Soot-darkened tree trunks favoured the dark moths, which then increased in frequency.
[Evolution]

168. (3) 0.48
$q = 0.4$, $p = 0.6 \Rightarrow 2pq = 2 \times 0.6 \times 0.4 = 0.48$.
[Evolution]

169. (2) Analogous and show convergent evolution
Different structural origins but the same function — analogy from convergent evolution.
[Evolution]

170. (2) 650–800 cc
Homo habilis had a brain capacity of about 650–800 cc and probably did not eat meat.
[Evolution]

171. (2) Haemozoin
Haemozoin, a toxin released when infected RBCs rupture, produces the periodic chill and fever.
[Human Health & Disease]

172. (2) Dengue
Dengue is viral; typhoid is bacterial, malaria protozoan and ringworm fungal.
[Human Health & Disease]

173. (2) H_2L_2
Each antibody has two heavy and two light polypeptide chains.
[Human Health & Disease]

174. (2) Helper T lymphocytes
After replicating in macrophages, HIV progressively destroys helper T cells.
[Human Health & Disease]

175. (2) GAATTC
EcoRI cuts between G and A in the palindrome GAATTC, producing sticky ends.
[Biotechnology – Principles]

176. (2) Taq polymerase
Taq polymerase from Thermus aquaticus remains active during denaturation at ~94 °C.
[Biotechnology – Principles]

177. (2) Controls the copy number of the linked DNA
The origin of replication initiates replication and governs the copy number.
[Biotechnology – Principles]

178. (2) In the alkaline gut of the insect
The alkaline pH of the insect gut solubilises the crystal and activates the toxin.
[Biotechnology – Applications]

179. (2) Meloidogyne incognita
dsRNA silences a specific nematode mRNA, protecting tobacco from Meloidogyne incognita.
[Biotechnology – Applications]

180. (2) Adenosine deaminase deficiency
ADA deficiency was treated by infusing lymphocytes carrying a functional ADA cDNA.
[Biotechnology – Applications]