21/03/2024

CODE-A

Aakash
Medical | IIT-JEE | Foundations

***Corporate Office*:** Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2024

MM : 720 **Test - 1** **Time : 3 Hrs. 20 Mins.**

Answers

1. (3)	41. (3)	81. (4)	121. (2)	161. (4)
2. (2)	42. (2)	82. (1)	122. (1)	162. (2)
3. (2)	43. (1)	83. (4)	123. (2)	163. (3)
4. (3)	44. (3)	84. (2)	124. (2)	164. (1)
5. (4)	45. (1)	85. (2)	125. (2)	165. (2)
6. (2)	46. (4)	86. (2)	126. (2)	166. (3)
7. (2)	47. (4)	87. (2)	127. (3)	167. (4)
8. (4)	48. (1)	88. (1)	128. (2)	168. (3)
9. (4)	49. (3)	89. (4)	129. (1)	169. (2)
10. (4)	50. (3)	90. (2)	130. (1)	170. (4)
11. (3)	51. (4)	91. (2)	131. (3)	171. (3)
12. (1)	52. (3)	92. (2)	132. (4)	172. (2)
13. (2)	53. (3)	93. (4)	133. (1)	173. (3)
14. (1)	54. (2)	94. (4)	134. (2)	174. (4)
15. (3)	55. (3)	95. (1)	135. (2)	175. (4)
16. (1)	56. (3)	96. (3)	136. (3)	176. (4)
17. (2)	57. (1)	97. (4)	137. (2)	177. (3)
18. (3)	58. (2)	98. (2)	138. (1)	178. (4)
19. (3)	59. (2)	99. (2)	139. (3)	179. (2)
20. (2)	60. (2)	100. (3)	140. (2)	180. (2)
21. (3)	61. (1)	101. (4)	141. (2)	181. (2)
22. (2)	62. (2)	102. (2)	142. (1)	182. (3)
23. (4)	63. (3)	103. (1)	143. (4)	183. (4)
24. (3)	64. (2)	104. (2)	144. (1)	184. (2)
25. (3)	65. (4)	105. (3)	145. (3)	185. (1)
26. (4)	66. (3)	106. (4)	146. (1)	186. (3)
27. (4)	67. (2)	107. (1)	147. (3)	187. (4)
28. (3)	68. (1)	108. (3)	148. (2)	188. (2)
29. (3)	69. (3)	109. (4)	149. (3)	189. (2)
30. (4)	70. (1)	110. (3)	150. (3)	190. (1)
31. (3)	71. (3)	111. (2)	151. (3)	191. (2)
32. (2)	72. (2)	112. (2)	152. (1)	192. (2)
33. (4)	73. (2)	113. (4)	153. (2)	193. (2)
34. (2)	74. (2)	114. (4)	154. (3)	194. (4)
35. (3)	75. (2)	115. (4)	155. (4)	195. (4)
36. (2)	76. (2)	116. (3)	156. (4)	196. (4)
37. (3)	77. (2)	117. (3)	157. (1)	197. (4)
38. (4)	78. (1)	118. (3)	158. (2)	198. (4)
39. (2)	79. (4)	119. (4)	159. (2)	199. (2)
40. (1)	80. (3)	120. (3)	160. (2)	200. (1)

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FINAL TEST SERIES for NEET-2024

MM : 720 **Test - I** **Time : 3 Hrs. 20 Mins.**

Answers and Solutions

PHYSICS

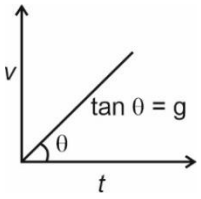
SECTION - A

1. Answer (3)
Distance = |displacement| for a particle moving along straight line.

2. Answer (2)
Average speed = $\frac{d}{\frac{d}{3\times3}+\frac{2d}{3\times6}}$
$= \frac{3\times3\times6}{2\times3+6} = \frac{3\times3\times6}{12} = \frac{9}{2}$ m/s

3. Answer (2)
For option (2)
Slope is decreasing with time.
So, acceleration is decreasing with time
i.e., acceleration goes on decreasing with time.

4. Answer (3)
For a body dropped from some height,

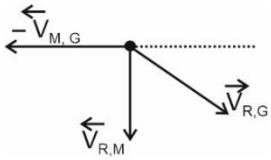


5. Answer (4)
Effective distance up in 2 s = 2 cm
So, 18 cm up moved in 18 s
Next time, insect moves 6 cm and reaches into hole without sliding back and took = 1 s
T = 18 s + 1 s = 19 s

6. Answer (2)
$\theta = \frac{\ell}{r}$
$\ell = r$
$\therefore$ θ = 1 radian

7. Answer (2)
[a] = [MLT^{-2}]
$\frac{[b]}{[x]} = \left[M^0L^0T^0\right]$
[b] = [L]

8. Answer (4)



$|\vec{V}_{R,G}| = \sqrt{3^2+4^2} = 5$ m/s

9. Answer (4)
[y] = [Ax] = [B]
[Cz] = [M^{0}L^{0}T^0]
[C] =[z^{-1}]

10. Answer (4)
Least count errors within a limited size occurs both in systematic and random errors

11. Answer (3)
$t = \frac{S_{rel}}{v_{rel}} = \frac{120}{10} = 12$ s
Distance covered by jeep = 30 × 12 = 360 m

12. Answer (1)

ω = constant

= 2 rad/s.

$a_t = 0$

$a_c = R\omega^2$

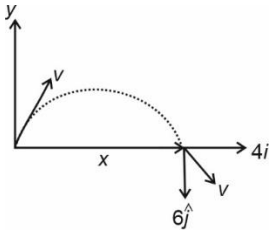
$= 3 \times 4 = 12$ rad/s^2

$(\vec{a}_c) = a_c \cos 60°(-\hat{i}) + a_c \sin 60°(-\hat{j})$

$= \frac{12}{2}(-\hat{i}) + 12 \times \frac{\sqrt{3}}{2}(-\hat{j}) = -6\hat{i} - 6\sqrt{3}\hat{j}$

13. Answer (2)

Horizontal velocity remains same, $\vec{v}_B = 4\hat{i} - 6\hat{j}$.



14. Answer (1)

$M = 3.3 + (10.15 + 10.17) \times 10^{-3}$

$= 3.3 + 0.02032 = 3.3$ kg

15. Answer (3)

Angular momentum	$[ML^2T^{-1}]$
Density	$[ML^{-3}]$
Pressure	$[ML^{-1}T^{-2}]$
Energy	$[ML^2T^{-2}]$

16. Answer (1)

Time of flight = 3 s ($S_1 : S_2 : S_3 :: 1 : 3 : 5$)

$v = gt = 10 \times 3 = 30$ m/s

17. Answer (2)

$H = \frac{R_{max}}{4} = \frac{240}{4} = 60$ m

18. Answer (3)

$R \propto \sin(2\theta)$ for same u.

$\frac{R'}{R} = \frac{\sin(90°)}{\sin 30°} = 2 \Rightarrow R' = 2 \times 30 = 60$ m

19. Answer (3)

$\vec{v}_{A/B} = \vec{v}_A - \vec{v}_B = -10\hat{i} - (-10\hat{j})$

$\vec{v}_{AB} = -10\hat{i} + 10\hat{j}$

20. Answer (2)

$v_m = \frac{16}{1} = 16$ km/h

$t_{up} = \frac{5}{12} = \frac{5}{12}$ hr $\qquad t_{down} = \frac{5}{20} = \frac{1}{4}$ hr

$t = t_{up} + t_{down} = \left(\frac{5}{12} + \frac{1}{4}\right) = \frac{2}{3}$hr

21. Answer (3)

$d = \frac{m}{\pi r^2 \ell}$

$\frac{\Delta d}{d} = \frac{\Delta m}{m} + \frac{2\Delta r}{r} + \frac{\Delta \ell}{\ell}$

$\frac{\Delta d}{d} = \frac{0.003}{0.3} + 2 \times \frac{0.005}{0.5} + \frac{0.06}{6}$

$\Rightarrow 0.01 + 0.02 + 0.01$

$\Rightarrow 0.04$

% error = 4%

22. Answer (2)

1 V.S.D = $\frac{4}{5}$ M.S.D

L.C = 1 M.S.D – 1V.S.D

= 1 M.S.D – $\frac{4}{5}$M.S.D

= $\frac{1}{5}$ M.S.D = $\frac{1}{5}$ unit

23. Answer (4)

Momentum is the product of mass and velocity.

24. Answer (3)

$s = 5t^2 + 5t - 10$

$v = 10t + 5$

$v_{t=0} = 5$ cm/s

25. Answer (3)

$R = \frac{2u_x u_y}{g} = \frac{2 \times 10 \times 20}{10} = 40$.

26. Answer (4)

Pressure gradient

$= \frac{P}{L} = \frac{F}{A \times L} = \frac{MLT^{-2}}{L^2 L} = [ML^{-2}T^{-2}]$

27. Answer (4)

Accurate measurement may have less precision.

28. Answer (3)

u = speed of boat

v = velocity of river

x = distance between spots

For downstream, $u + v = \frac{x}{8}$

For upstream,

$u - v = \frac{x}{12}$

$2u = \frac{x}{8} + \frac{x}{12} = \frac{20x}{96} = \frac{10x}{48}$

$u = \frac{10x}{96}$

So $t = \frac{x}{u} = \frac{x}{\frac{10x}{96}} = 9.6$ h

29. Answer (3)

When a body is dropped from some height then distance travelled is in the ratio 1 : 4 : 9 : 16 : ...: (n^2) in First 1s : First 2s : First 3s:

$\therefore$ Distance of 2nd drop = 6 m from ground.

30. Answer (4)

$v = xt_1$ [For first part of ascent] and $xt_1 = 2x\,(t - t_1)$

$$\Rightarrow t_1 = \frac{2t}{3} \text{ at } t - t_1 = \frac{t}{3}$$

In first part

$$s = ut + \frac{1}{2}at^2$$

Since $u = 0$

$$h_1 = \frac{1}{2}xt_1^2 = \frac{2xt^2}{9} \qquad \ldots(1)$$

In the second part

$$2 \times 2x \times h_2 = \left[\frac{x \times 2t}{3}\right]^2$$

$$\Rightarrow h_2 = \frac{xt^2}{9}$$

$$h = h_1 + h_2$$

$$= \frac{2xt^2}{9} + \frac{xt^2}{9}$$

$$= \frac{1}{3}xt^2$$

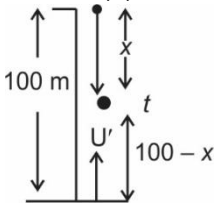
31. Answer (3)

From point of projection

$$h_{max} = \frac{u^2}{2g} = \frac{(20)^2}{2 \times 10} = 20 \text{ m}$$

Height from ground $= 20 + 25 = 45$ m

32. Answer (2)



For dropped ball $x = \frac{1}{2} \times g \times t^2 = 4.9\,t^2$

t = time of meet.

For upward motion

$$(100 - x) = 40t - \frac{1}{2}gt^2$$

$\therefore \quad 100 = 40t \quad \therefore \quad t = 2.5$ s

$x = 4.9 \times (2.5)^2 = 30.62$ m below top

33. Answer (4)

Light year is the unit of distance, that light can travel in one year.

34. Answer (2)

$$\int dv = \int a\,dt$$

$$\int_0^v dv = \int_0^2 (3t + 4)dt = \frac{3}{2}\left[t^2\right]_0^2 + 4\left[t\right]_0^2$$

$$= \frac{3}{2} \times (4 - 0) + 4(2 - 0)$$

= 6 + 8 = 14 m/s

35. Answer (3)

Area of v-t graph = Displacement

$$\frac{1}{2} \times 2 \times 10 + 2 \times 10 + \frac{1}{2} \times 2 \times 10 = 40 \text{ m}$$

$$v_{av} = \frac{40}{T} = \frac{40}{7} = 5.7 \text{ m/s}$$

SECTION - B

36. Answer (2)

$$v_m^2 = u^2 + 2a\frac{x}{2} = u^2 + ax$$

Also $ax = \frac{v^2 - u^2}{2}$

$$\therefore \quad v_m = \sqrt{\frac{u^2 + v^2}{2}} = \sqrt{\frac{12^2 + 24^2}{2}}$$

$$= \sqrt{\frac{144 + 576}{2}} = \sqrt{360} \simeq 19 \text{ m/s}$$

37. Answer (3)

$\Delta v = \int a\,dt$ i.e. it gives change in velocity.

38. Answer (4)

$$v^2 = 49 + x$$

$$2.v.\frac{dv}{dt} = \frac{dx}{dt}$$

$$\frac{dv}{dt} = \frac{1}{2} \text{ m s}^{-2}$$

$$a = \frac{1}{2} = 0.5 \text{ m/s}^2 \text{ (constant)}$$

39. Answer (2)

$$R = \frac{\left(\vec{A} + \vec{B}\right)}{\left|\left(\vec{A} + \vec{B}\right)\right|} = \frac{-\hat{i} + 5\hat{j} - 3\hat{k}}{\sqrt{35}}$$

40. Answer (1)

$$\vec{v} = \frac{d\vec{r}}{dt} = 3\hat{i} + 4t\,\hat{j}$$

$v_x = 3$ and $v_y = 4 \times 1 = 4$ at $t = 1$ s

$$\tan\theta = \frac{v_y}{v_x} = \frac{4}{3}; \qquad \theta = 53^\circ \text{ with } x\text{-axis}$$

41. Answer (3)
In uniform circular motion acceleration vector is opposite to position vector.

42. Answer (2)
$y = x\tan\theta\left[1-\frac{x}{R}\right]$

$y = \sqrt{3}x\left[1-\frac{x}{\frac{1}{2\sqrt{3}}}\right]$

θ with horizontal = 60°

θ with vertical = 30°

43. Answer (1)
$[b] = [L^2]$

$[a] = \frac{[L^2]}{[Pt]} = \frac{[L^2]}{[ML^2T^{-3}][T]} = [M^{-1}L^0T^2]$

$\left[\frac{b}{a}\right] = \frac{[L^2]}{[M^{-1}L^0T^2]} = [ML^2T^{-2}]$

44. Answer (3)
Shortest distance between any two points is straight line. Therefore |displacement| = 2*r*.

45. Answer (1)
$v \propto t \rightarrow$ straight line

$\frac{dv}{dt} \propto t^0 \rightarrow$ straight line parallel to time axis

46. Answer (4)
$x = 15t + 3t^2$

$v = \frac{dx}{dt} = \frac{d}{dt}(15t + 3t^2) = 15 + 6t$

At t = 3 s

v (t = 3 s) = 15 + 6 × 3 = 33 cm/s

47. Answer (4)
Total distance = 3+3 = 6 km.
Total time taken = (30 + 20 + 30) = 80 min

$v_{av} = \frac{6}{80/60} = \frac{6\times60}{80} = \frac{36}{8}$ = 4.5 km/h

48. Answer (1)
$x = 9t^2 - t^3$

$v = \frac{dx}{dt} = 18t - 3t^2$

For max speed a = 0, $\frac{dv}{dt} = 0$

$18 - 6t = 0 \therefore t = 3$ s

Position $x = 9(3)^2 - (3)^3 = 81 - 27 = 54$ m

49. Answer (3)
$R = 4H\cot\theta$, $u\cos\theta = u/\sqrt{2}$

Given $R = NH$ $\cos\theta = 1/\sqrt{2}$ so $\theta = 45°$

$\therefore$ $NH = 4H \cot 45°$

$N = 4$

50. Answer (3)
$v_{\text{Horizontal}} = |4\cos53° - 3\cos37°| = 0$

and the relative acceleration is zero.

CHEMISTRY

SECTION - A

51. Answer (4)
Number of urea molecules

$= 200 \times 10^{-3} \times 6.02 \times 10^{23} = 12.04 \times 10^{22}$

$= 1.2 \times 10^{23}$

52. Answer (3)
%H = 20, %C = 100 – 20 = 80

	H	C
Mass	20	80
Mole	$\frac{20}{1}$	$\frac{80}{12}$
	20	6.66
Simplest ratio	$\frac{20}{6.66}$	$\frac{6.66}{6.66}$

Empircal formula = CH_3

53. Answer (3)
$\frac{\text{Number of atoms in } CO_2}{\text{Number of atoms in } CH_4} = \frac{5\times3\times16}{44\times3\times5} = 4:11$

54. Answer (2)

Series	**Spectral region**
Lyman	Ultraviolet
Balmer	Visible
Paschen	Infrared
Brackett	Infrared
Pfund	Infrared

55. Answer (3)
Energies of the orbitals in the same subshell decrease with increase in the atomic number. (Z_{eff})

56. Answer (3)
s and *p* block elements are called representative elements

57. Answer (1)
Work function of copper is greater than magnesium.

58. Answer (2)

$$E = h\frac{c}{\lambda}N_A = \frac{6.6\times10^{-34}\times3\times10^{8}\times6.02\times10^{23}}{440\times10^{-9}}$$

$= 0.2709 \times 10^6$

$E = 2.7 \times 10^5$ J

59. Answer (2)

Atom	Atomic radius (pm)
S	104
Cl	99
O	66
F	64

60. Answer (2)

Mass of $HNO_3 = 800 \times 1.6 \times 10^{-3} \times 63 = 80.64$ g

70 g HNO_3 is present 100 g of solution

80.64 g HNO_3 is present in $\frac{100}{70}\times80.64 = 115.2$ g of solution.

61. Answer (1)

$$CaCO_3 + 2HCl \longrightarrow CaCl_2 + CO_2 + H_2O$$

Mole of HCl = $400 \times 1.5 \times 10^{-3} = 0.6$

Mass of $CaCO_3 = \frac{0.6}{2}\times100 = 30$ g

62. Answer (2)

Cathode rays travel from cathode to anode.

63. Answer (3)

Atleast 1 Mg atom should be present in the molecule.

$$x \times \frac{0.24}{100} = 24$$

$$x = \frac{2400}{0.24} = 10000 \text{ amu}$$

64. Answer (2)

Atomic number	IUPAC official name
102	Nobelium
104	Rutherfordium
105	Dubnium
107	Bohrium

65. Answer (4)

The nature of emission of radiation from hot bodies (black-body radiation) is explained by particle nature of electromagnetic radiation

66. Answer (3)

	CH_4	+	$2O_2$	→	CO_2	+	$2H_2O$
(i)	$\frac{32}{16}=2$		$\frac{64}{32}=2$		0		0
(f)	1		0		1		2

$\because$ O_2 is limiting reagent

Mol of CO_2 formed = 1

Volume of CO_2 formed at STP = 22.4 L

67. Answer (2)

$$\text{Moles of } H_2O = \frac{18\times10^{-3}}{18} = 10^{-3}\text{mol}$$

$$\text{Moles of } H_2O \text{ removed} = \frac{10^{20}}{6.02\times10^{23}}$$

$= 1.66 \times 10^{-4}$ mol

Moles of H_2O left = 8.3×10^{-4} mol

68. Answer (1)

NO (Neutral)

Al_2O_3(Amphoteric)

Na_2O (Basic)

Cl_2O_7 (Acidic)

69. Answer (3)

$$\frac{1}{\lambda} = R_H\left(\frac{1}{n_1^2}-\frac{1}{n_2^2}\right)$$

or, $$\frac{1}{\lambda} = R_H\left(\frac{1}{1^2}-\frac{1}{3^2}\right)$$

or, $$\frac{1}{\lambda} = R_H\frac{8}{9}$$

or, $$\lambda = \frac{9}{8R_H}$$

70. Answer (1)

Element	O	S	Se	Te
ΔH_{eg}(kJ mol^{-1})	–141	–200	–195	–190

71. Answer (3)

Mass of solution = $1000 \times 1.25 = 1250$ g

Mass of NaOH = $40 \times 4 = 160$ g

$$\text{Mass\%} = \frac{160}{1250}\times100 = 12.8\%$$

72. Answer (2)

$$\text{Molality} = \frac{0.08\times1000}{0.92\times18} = 4.8 \text{ m}$$

73. Answer (2)

Zero preceding to first non-zero digits are not significant

74. Answer (2)

Number of protons = 77

Number of electrons = 77

Number of neutrons = 193 – 77 = 116

75. Answer (2)

$$\text{Average atomic mass} = \frac{35\times75+37\times25}{100} = 35.5 \text{ u}$$

76. Answer (2)

Mass of C in CO_2 = $\frac{12}{44} \times 8.8 = 2.4$ g

Mass of H in H_2O = $\frac{2}{18} \times 5.4 = 0.6$ g

Mole of C = $\frac{2.4}{12} = 0.2$

Mole of H = $\frac{0.6}{1} = 0.6$

C : H = 1 : 3, molecular formula could be : C_2H_6

77. Answer (2)

- Possible values of m are from –l to +l
- For l = 1, m = –2 is not possible

78. Answer (1)

Energy of photon = $h\nu$

$= 6.6 \times 10^{-34} \times 2 \times 10^{15}$

$= 13.2 \times 10^{-19}$ J

Work function = 5 eV

$= 5 \times 1.6 \times 10^{-19}$ J

$= 8 \times 10^{-19}$ J

KE = $h\nu - \phi$

$= 13.2 \times 10^{-19} - 8 \times 10^{-19}$

$= 5.2 \times 10^{-19}$ J

79. Answer (4)

$\lambda = \frac{h}{mv} = \frac{6.6 \times 10^{-34}}{100 \times 10^{-6} \times 20} = 3.3 \times 10^{-31}$ m

80. Answer (3)

Angular momentum $= \sqrt{l(l+1)}\,\hbar$

$= \sqrt{2(2+1)}\,\hbar$

$= \sqrt{6}\,\hbar$

81. Answer (4)

For multielectronic species higher is the value of (n + l) higher is the energy of orbital. For same value of (n + l) higher is the value of n, higher is the energy of orbital.

82. Answer (1)

e/m of electron is maximum among the given options as the mass of electron is minimum.

83. Answer (4)

Fourth excited state means 5th shell

No. of spectral lines $= \frac{n(n-1)}{2} = \frac{5(5-1)}{2} = 10$

84. Answer (2)

Cr has configuration $[Ar]4s^1 3d^5$ therefore it contains maximum number of unpaired electron, which is 6.

85. Answer (2)

Negative electron gain enthalpy of chlorine is more than negative electron gain enthalpy of fluorine.

SECTION - B

86. Answer (2)

No. of radial nodes = n – l – 1

= 4 – 1 – 1 = 2

No. of angular nodes = l = 1

87. Answer (2)

Shape of atomic orbital depends upon azimuthal quantum number *i.e*. l.

88. Answer (1)

Transition of electron from 3rd energy shell to 2nd energy shell corresponds to the line of Balmer series.

89. Answer (4)

$r_n = a_0 \frac{n^2}{Z}$

$= \frac{a_0 \times 4^2}{3} = \frac{16}{3} a_0$

90. Answer (2)

$E \propto \bar{\nu}$

$\frac{E_1}{E_2} = \frac{\bar{\nu}_1}{\bar{\nu}_2} = \frac{1}{2}$

91. Answer (2)

$\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$

$2\Delta p \cdot \Delta p \geq \frac{h}{4\pi}$

$\Delta p^2 = \frac{h}{8\pi}$

$\Delta v^2 = \frac{h}{8\pi m^2}$

$\Delta v = \sqrt{\frac{h}{8\pi m^2}}$

92. Answer (2)

No. of moles of Al^{3+} ion $= \frac{27}{27} = 1$ mol

$\because$ 1 Al^{3+} ion contains 10 electrons

$\therefore$ 1 mol Al^{3+} ion contains $10N_A$ electron

93. Answer (4)

Correct order of ionisation enthalpy is

Li < B < Be < C < O < N < F

94. Answer (4)
Number of degenerate orbitals in third shell of hydrogen atom is 9.

95. Answer (1)
Metallic nature increases down the group and decreases along the period from left to right.
Order of metallic nature is
K > Mg > Al > B

96. Answer (3)
Correct order of wavelength
Radio waves > Microwaves > IR

97. Answer (4)
[Kr]$5s^2 4d^{10} 5p^2$ is tin(Sn)
Which belongs to 5th period and 14th group.

98. Answer (2)
Gallium is also known as eka-aluminium.

99. Answer (2)
Li shows similar properties like Mg therefore, Li and Mg show diagonal relation.

100. Answer (3)
General electronic configuration of *f*-block elements is
$(n-2)f^{1-14}\ (n-1)d^{0-1}\ ns^2$

BOTANY

SECTION - A

101. Answer (4)
Green algae are usually grass green in colour due to dominance of pigments chlorophyll a and b.

102. Answer (2)
Species of *Sphagnum*, a moss provides peat that have long been used as fuel and as packing material.

103. Answer (1)
Deuteromycetes is commonly known as imperfect fungi because only the asexual/vegetative phases of these fungi are known. *Colletotrichum* is a member of class deuteromycetes, in which only asexual phases of these fungi are known.

104. Answer (2)
Trypanosoma is a flagellated protozoan, belongs to kingdom protista.

105. Answer (3)
Rhizopus belongs to the class phycomycetes in which sporangiospores are formed inside the sporangia that are borne at the tips of special hyphae called sporangiophores. Fruiting body is absent in *Rhizopus*.

106. Answer (4)
Prions are similar in size to viruses. Viroids are smaller than viruses and cause potato spindle tuber disease. These are found to be free RNA and lack protein coat.

107. Answer (1)
Numerical taxonomy easily carried out using computers, is based on all observable characteristics. Number and codes are assigned to all the characters and the data is then processed. Unlike pteridophytes, in gymnosperms the male and female gametophytes do not have an independent free-living existence.

108. Answer (3)
In the life cycle of mosses, the first stage is the protonema stage which develops directly from a spore. It is a creeping, green, branched and frequently filamentous stage.

109. Answer (4)
Fucus, shows diplontic life cycle pattern. Sporophytic generation is represented by single celled zygote in haplontic life cycle pattern.

110. Answer (3)
Ustilago causes smut disease, tobacco mosaic virus has ssRNA. Dinoflagellates are also called whirling whips. *Claviceps* causes ergot disease

111. Answer (2)
Double fertilisation is seen in angiosperms.

112. Answer (2)
Fungi have chitinous cell wall and the cell wall of bacteria is made up of peptidoglycan.

113. Answer (4)
In fragmentation, the parent body which is filamentous, breaks into two or more fragments.

114. Answer (4)
Dinoflagellates reproduce both sexually as well as asexually.

115. Answer (4)
Both the words of a biological name should be printed in italics and underlined separately if handwritten.

116. Answer (3)
Protozoans lack cell wall and they were kept in Animalia in two kingdom classification

117. Answer (3)
Pteridophytes are the first terrestrial plants possessing xylem and phloem. Dominant phase in their life cycle is sporophytic plant body. Spores are produced by meiosis in spore mother cells. Water is required for fertilization.

118. Answer (3)
ICBN stands for International Code for Botanical Nomenclature.

119. Answer (4)
Both mosses and ferns show haplo-diplontic life cycle and internal fertilization.

120. Answer (3)
Heterocyst is responsible for N_2 fixation, which requires anaerobic environment, therefore to maintain anaerobic condition, PS II is absent. Heterocyst is present in *Nostoc*

121. Answer (2)
Order of wheat is Poales and order of mango is Sapindales.

122. Answer (1)
Herbaria serve as a quick referral systems in taxonomical studies.

123. Answer (2)
Gemmae are green, multicellular, asexual buds present in *Marchantia*.

124. Answer (2)
Cuscuta is a complete parasite.

125. Answer (2)
All plants, animals, fungi and microbes exhibit metabolism. Human being is the only organism who is aware of himself *i.e.* has self consciousness.

126. Answer (2)
Members of brown algae reproduce asexually by biflagellated zoospores that are pear-shaped and have two unequal laterally attached flagella.

127. Answer (3)
Sequoia is the largest gymnosperm. Stems are branched in *Pinus*, *Cedrus*. *Selaginella* belongs to the class Lycopsida. Members of red algae produce non-motile asexual spores.

128. Answer (2)
Mycoplasma can survive without oxygen. In lichens, phycobiont partner prepares food. Protista does not have well defined boundaries.

129. Answer (1)
Insects are preserved in insect boxes after killing and pinning. Museum is a place used for storage, preservation and exhibition of both plants and animals.

130. Answer (1)
The descending order of taxonomic categories is kingdom $\rightarrow$ phylum or division $\rightarrow$ class $\rightarrow$ order $\rightarrow$ family $\rightarrow$ genus $\rightarrow$ species.

131. Answer (3)
Egg apparatus is three celled structure *i.e.*, one egg cell and two synergids.

132. Answer (4)
Typhoid is a bacterial disease.

133. Answer (1)
Both statements are correct for brown alga.

Laminaria is a brown algae.

134. Answer (2)
The main plant body of bryophyte is haploid and produces gametes, hence is called a gametophyte.

135. Answer (2)
The leaves in pteridophytes are small (microphylls) as in *Selaginella* or large (macrophylls) as in ferns.

SECTION - B

136. Answer (3)
No virus contains both RNA and DNA. They can have either RNA or DNA

137. Answer (2)
Monograph contains information of any one taxon.

138. Answer (1)
Slime moulds are usually free living, creeping over debris like fallen leaves and rotting logs of wood. They lack chlorophyll and form a connecting link with plants, animals and fungi.

139. Answer (3)
Slime moulds produce fruiting bodies under unfavourable conditions

140. Answer (2)
In *Cycas,* coralloid roots are associated with N_2 fixing cyanobacteria.

141. Answer (2)
Recognising the characteristic features of an organism is called identification.

142. Answer (1)
Nitrosomonas and *Nitrobacter* are nitrifying bacteria. *Rhizobium* is a symbiotic N_2-fixing bacterium.

143. Answer (4)
The main criteria for five kingdom system of classification given by Whittaker are cell structure, thallus organisation, mode of nutrition, reproduction and phylogenetic relationships.

144. Answer (1)
Chlorella is a unicellular alga rich in proteins and is used as food supplement by space travellers.

145. Answer (3)
Member of kingdom Animalia do not have cell wall.

146. Answer (1)
In green algae, inner layer of cell wall is made of cellulose and outer layer of pectose.

147. Answer (3)

Ectocarpus is filamentous brown alga.

Chlamydomonas is unicellular green algae. *Porphyra* shows oogamous sexual reproduction

148. Answer (2)

Red dinoflagellates multiply so rapidly that they make the sea appear red.

149. Answer (3)

Nostoc is a BGA which has chlorophyll a, cell wall and fixes atmospheric CO_2 as well as N_2.

150. Answer (3)

DNA sequencing is included in chemotaxonomy.

ZOOLOGY

SECTION - A

151. Answer (3)

Animals placed in same phylum, class or family may have different habit and habitat. So habit and habitat are not the basis of animal classification.

152. Answer (1)

Organ level of organisation is exhibited by the members of Platyhelminthes and other higher phyla where tissues are grouped together to form organs, each specialised for a particular function. *Obelia* is a coelenterate having only tissue level of organisation.

153. Answer (2)

In an open type of circulatory system, the blood is pumped out of the heart and the cells and tissues are directly bathed in it. In closed type of circulatory system, the blood is circulated through a series of blood vessels of varying diameters.

154. Answer (3)

In asymmetrical animals, any plane that passes through the centre does not divide them into equal halves. *Spongilla* is an asymmetrical animal placed in phylum Porifera.

155. Answer (4)

Members of the phylum Porifera are considered as most primitive multicellular animals. Coelenterates and ctenophores are diploblastic, radially symmetrical, acoelomate animals in which mesoderm is absent in between ectoderm and endoderm.

156. Answer (4)

All members placed in the phylum Annelida to Chordata are coelomates. *Locusta* is an arthropod and thus is a coelomate. Coelenterates and ctenophores are diploblastic acoelomates and Aschelminthes are triploblastic pseudocoelomates.

157. Answer (1)

In some animals the body is externally and internally divided into segments with a serial repetition of at least some organs. It is called metameric segmentation and the phenomenon is known as metamerism.

158. Answer (2)

Notochord is a mesodermally derived rod-like structure formed on the dorsal side during embryonic development in all chordates. So it is a unique feature of all chordates.

159. Answer (2)

Members of phylum Echinodermata show radial symmetry in their adult stage and bilateral symmetry in their larval stage. Porifers are mostly asymmetrical but some are also radially symmetrical. Hemichordates and annelids show bilateral symmetry.

160. Answer (2)

In sponges, water enters through ostia present in the body wall into a central cavity, spongocoel, from where it goes out through the osculum. They are monoecious as sexes are not separate in them.

161. Answer (4)

Name 'Cnidaria' is derived from the cnidoblasts or cnidocytes which contain the stinging capsules or nematocysts.

162. Answer (2)

Bioluminescence (the property of a living organism to emit light) is present in ctenophores.

Pleurobrachia is a ctenophore and bears a pair of tentacles. *Hydra* possesses multiple tentacles. *Limulus* is an arthropod and is devoid of tentacles.

163. Answer (3)

Ascaris, Taenia and *Fasciola* are endoparasites whereas *Hirudinaria* is an ectoparasite. Both hooks and suckers are present in *Taenia.* Only suckers are found in *Hirudinaria* and *Fasciola*. *Ascaris* lacks both hooks and suckers.

164. Answer (1)

Complete alimentary canal with well developed muscular pharynx and presence of excretory pore for removal of metabolic wastes are characteristic features of Aschelminthes. Annelids possess nephridiopores. Incomplete alimentary canal is found in platyhelminths.

165. Answer (2)

Parapodia are unjointed appendages present in *Nereis* for swimming. Statocyst is a balancing organ in aquatic insects. *Bombyx* is not aquatic. *Locusta* is an insect having 3 pairs of jointed legs. *Anopheles* is a vector for *Plasmodium* which is a protozoan and the causative agent for malaria.

166. Answer (3)

The body of molluscs is covered by a calcareous shell. The body is unsegmented with a distinct head, a muscular foot and visceral hump. They are mostly dioecious, oviparous and show indirect development.

167. Answer (4)

Echnioderms possess complete digestive tract and have extracellular digestion within alimentary canal. So, digestion is not the function of water vascular system.

168. Answer (3)

Three distinct regions namely head, foot and visceral hump in molluscs and proboscis, collar and trunk are present in hemichordates. *Balanoglossus* exhibits bilateral symmetry. Feather-like gills in mantle cavity are present in *Pila*. Stomochord is present in *Balanoglossus*.

169. Answer (2)

Presence of ventral heart is a salient feature of chordates but it is not fundamental characteristic as heart is not found in cephalochordates.

170. Answer (4)

Chordates are divided into protochordates and vertebrates. Vertebrata is divided into Agnatha and Gnathostomata divisions. Gnathostomata is classified into two super classes-Pisces and Tetrapoda.

171. Answer (3)

Petromyzon is an anadromous fish which migrates to fresh water for spawning. After spawning within a few days, they die. Their larvae after metamorphosis return to the ocean.

172. Answer (2)

In cartilaginous fishes *e.g. Carcharodon*, teeth are modified placoid scales which are backwardly directed. *Labeo* and *Clarias* are bony fishes and *Myxine* is a cyclostome, devoid of scales.

173. Answer (3)

Ventrally located mouth and pelvic fins with claspers are the characteristic features of cartilaginous fishes. Operculated gills and air bladder are present in bony fishes.

174. Answer (4)

Presence of wings, crop and gizzard and dioecious condition are the common features of birds and insects. Air sacs connected to lungs supplement respiration in birds. In insects, tracheal tubes are present for respiration.

175. Answer (4)

Corvus – Pneumatic bones

Calotes – Crawling mode of locomotion

Ornithorhynchus – Homoiothermous

Pteropus (Flying fox) – Homoiothermous

176. Answer (4)

Blood capillaries are present only in closed type of circulation. Heart, heart chambers and blood are present in both open type and closed type of circulation.

177. Answer (3)

Presence of stinging cells is characteristic feature of coelenterates.

178. Answer (4)

Metameric segmentation is not found in molluscs.

179. Answer (2)

Flame cells are present in the members of phylum Platyhelminthes.

180. Answer (2)

Ctenophores exhibit external fertilization, *e.g.*, *Pleurobrachia* and *Ctenoplana*. Cartilaginous fishes, helminths and sponges show internal fertilization.

181. Answer (2)

Phylum Aschelminthes includes roundworms and Annelida includes segmented worms.

182. Answer (3)

Members of the phylum Annelida are considered as segmented worms. It includes both unisexual and bisexual animals and development may be direct or indirect.

183. Answer (4)

In birds, lungs are responsible for gaseous exchange. Air sacs connected to lungs only supplement respiration and never participate in gaseous exchange.

184. Answer (2)

Arthropoda is considered as the largest phylum in Kingdom Animalia.

185. Answer (1)

Radula is the rasping organ for feeding and found only in most of the members of phylum Mollusca.

SECTION - B

186. Answer (3)

Torpedo is commonly known as electric fish. It is placed in class Chondrichthyes. Pisces is superclass for all true fishes.

187. Answer (4)

Hydra is a freshwater polyp placed in phylum Coelenterata.

188. Answer (2)

Hippocampus – Sea horse

Betta – Fighting fish

Pterophyllum – Angel fish

189. Answer (2)

Notochord persists in cartilaginous fishes and cephalochordates. *Hyla* is the tree frog. *Pristis* is commonly called saw fish. *Trygon* is stingray and *Labeo* is a freshwater bony fish.

190. Answer (1)
Protozoans are considered as primitive relatives of animals and are unicellular.

191. Answer (2)
Animals have an endoskeleton of calcareous ossicles and hence the name Echinodermata (Spiny bodied).

192. Answer (2)
Internal fertilization is exhibited by sponges, reptiles, birds and mammals.

193. Answer (2)
Platyhelminths have dorsoventrally flattened body, so called flatworms.

194. Answer (4)
Aschelminthes may be free living or parasites on both animals and plants. They are unisexual with well defined sexual dimorphism.

195. Answer (4)
Arthophods have dorsal tubular heart.

196. Answer (4)
Echinoderms are coelomates with spiny skin and endoskeleton formed by bony plates.

197. Answer (4)
Cyclostomes have 6-15 pairs of gill slits. Operculated gills are found in bony fishes.

198. Answer (4)
Development is direct in all mammals.

199. Answer (2)
Members of the phylum Porifera are the primitive multicellular animals and have cellular level of organisation.

200. Answer (1)
Limulus (King crab) is a living fossil belonging to the phylum Arthropoda.

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