1.(c)

Sol. By comparing the coefficient of x in given equation with standard equation

$y = x\tan\theta - \dfrac{gx^2}{2u^2\cos^2\theta}$ $\tan\theta = \sqrt{3}$

$\therefore\ \theta = 60°$

2.(b)

Sol. $\vec{v} = \vec{\omega}\times\vec{r} = \begin{vmatrix} \hat{i} & \hat{J} & \hat{k} \\ 3 & -4 & 1 \\ 5 & -6 & 6 \end{vmatrix}$

$\vec{v} = (-24+6)i - (18-5)\hat{J} + (-18+20)\hat{k}$

$= 18\,\hat{i} + 13\,\hat{J} - 2\hat{k}$

3.(b)

Sol. $\tan\theta = \dfrac{v^2}{rg} \Rightarrow p = \dfrac{v^2}{rg}$ $\quad\therefore\ v = \sqrt{prg}$

4.(b)

Sol. $\omega = 1.5\,t - 3t^2 + 2$ and $\alpha = \dfrac{d\omega}{dt} = 1.5 - 6t$

$\Rightarrow 0 = 1.5 - 6t \ \therefore t = \dfrac{1.5}{6} = 0.25 \text{ sec}$

5.(d)

Sol. $\omega_1 = 0,\ \omega_2 = 20\ rad/sec,\ t = 5\ sec$

$\alpha = \dfrac{\omega_2 - \omega_1}{t} = \dfrac{20-0}{5} = 4\ rad/sec^2$ From the equation $\theta = \omega_1 t + \dfrac{1}{2}\alpha t^2 = 0 + \dfrac{1}{2}(4).(5)^2 = 50\ rad$

$2\pi\, rad$ means 1 revolution.

$\therefore$ 50 Radian means $\dfrac{50}{2\pi}$ or $\dfrac{25}{\pi}$ rev.

6.(a)

Sol. $\omega_1 = 600\ rev/\min = 10\,rev/sec$, $\omega_2 = 0$ and $\theta = 60\ rev$ From the equation $\omega_2^2 = \omega_1^2 - 2\alpha\theta \Rightarrow 0 = (10)^2 - 2\alpha 60$

$\therefore \alpha = \frac{100}{120} = \frac{5}{6}$

Again $\omega_2 = \omega_1 - \alpha t \Rightarrow 0 = \omega_1 - \alpha t$

$t = \frac{\omega_1}{\alpha} = \frac{10 \times 6}{5} = 12\ sec$.

7.(a)

Sol. From the formula of instantaneous velocity

$v = \sqrt{u^2 + g^2 t^2 - 2ugt\sin\theta}$

$v = \sqrt{(30)^2 + (10)^2 \times 1^2 - 2 \times 30 \times 10 \times 1 \times \sin 30^o}$

$= 10\sqrt{7}\ m/s$

8.(b)

Sol. $T = \frac{2u\sin\theta}{g} = \frac{2 \times 9.8 \times \sin 30^o}{9.8} = 1\sec$

9.(c)

Sol. $R = \frac{u^2 \sin 2\theta}{g}$ and $T = \frac{2u\sin\theta}{g}$

$\therefore\ R \propto u^2$ and $T \propto u$ (If θ and g are constant).

In the given condition to make range double, velocity must be increased upto $\sqrt{2}$ times that of previous value. So automatically time of flight will becomes $\sqrt{2}$ times.

10. (b)

Sol. Because range

$= \frac{(\text{Velocity of projection})^2 \times \sin 2(\text{Angle of projection})}{g}$

11. (a)

Sol. $H = \dfrac{u^2 \sin^2\theta}{2g}$ and $T = \dfrac{2u\sin\theta}{g}$

$\therefore \dfrac{H}{T^2} = \dfrac{u^2 \sin^2\theta / 2g}{4u^2 \sin^2\theta / g^2} = \dfrac{g}{8} = \dfrac{10}{8} = \dfrac{5}{4}$

12. (c)

Sol. $R_{max} = \dfrac{u^2}{g} = 100$ (when $\theta = 45°$)

$\therefore\ u = \sqrt{1000} = 31.62\, m/s.$

13. (a)

Sol. Because these are complementary angles.

14. (a)

Sol. Velocity at the highest point is given by $u\cos\theta = \dfrac{u}{\sqrt{2}}$ (given) $\therefore\ \theta = 45^o$

Horizontal range $R = \dfrac{u^2 \sin 2\theta}{g} = \dfrac{u^2 \sin(2\times 45^o)}{g} = \dfrac{u^2}{g}$

15. (b)

Sol. Initial velocity $= (6\hat{i} + 8\hat{j})\, m/s$ (given)

Magnitude of velocity of projection $u = \sqrt{u_x^2 + u_y^2}$

$= \sqrt{6^2 + 8^2} = 10$ m/s

Angle of projection $\tan\theta = \dfrac{u_y}{u_x} = \dfrac{8}{6} = \dfrac{4}{3}$ $\therefore\ \sin\theta = \dfrac{4}{5}$ and $\cos\theta = \dfrac{3}{5}$

Now horizontal range $R = \dfrac{u^2 \sin 2\theta}{g}$ $\sqrt{\dfrac{r \quad F}{m}}$

$= \dfrac{(10)^2 \times 2 \times \frac{4}{5} \times \frac{3}{5}}{10} = 9.6\, meter$

16. (a)

Sol. $R_{max} = 400\,m$ [when $\theta = 45°$]

So from the Relation $R = 4H\cot\theta \Rightarrow 400 = 4H\cot 45°$

$\Rightarrow H = 100\,m.$

17. (a)

Sol. $T = \frac{2u\sin\theta}{g} = 10\text{ sec} \Rightarrow u\sin\theta = 50$ so a

$= \frac{(50)^2}{2\times 10} = 125\,m$.

18. (d)

Sol. The problem is different from problem no. (54). In that problem for a given angle of projection range was given and we had find maximum height for that angle.

But in this problem angle of projection can vary, $R_{\max} = \frac{u^2}{g} = 80\,m$ [for $\theta = 45°$]

But height can be maximum when body projected vertically up $H_{\max} = \frac{u^2\sin^2 90^o}{2g} = \frac{u^2}{2g} = \frac{1}{2}\left(\frac{u^2}{g}\right) = 40$ m

19. (c)

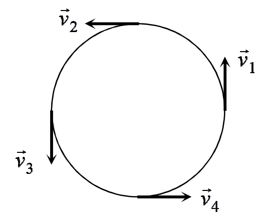
Sol. Same ranges can be obtained for complementary angles i.e. θ and $90^o - \theta$

$y_1 = \frac{u^2\sin^2\theta}{2g}$ and $y_2 = \frac{u^2\cos^2\theta}{2g}$

$\therefore\ y_1 + y_2 = \frac{u^2\sin^2\theta}{2g} + \frac{u^2\cos^2\theta}{2g} = \frac{u^2}{2g}$

20. (c)

Sol. In uniform circular motion velocity vector changes in direction but its magnitude always remains constant.



$|\overrightarrow{v_1}| = |\overrightarrow{v_2}| = |\overrightarrow{v_3}| = |\overrightarrow{v_4}| =$ constant

21. (b)

Sol. Angular accelerati on $= \dfrac{\text{linear accelerati on}}{\text{radius}} = \dfrac{10}{0.5}$

$= 20\ rad/sec^2$

22. (d)

Sol. Centripetal acceleration $= \dfrac{v_1^2}{r_1} = \dfrac{v_2^2}{r_2}$ (given)

$\therefore\ \dfrac{r_1}{r_2} = \left(\dfrac{v_1}{v_2}\right)^2 = \left(\dfrac{90}{15}\right)^2 = \dfrac{36}{1}$

23. (c)

Sol. $\Delta p = m(v_f - v_i) = m\left[(6\hat{i} - 8\hat{j}) - (6\hat{i} + 8\hat{j})\right] = -16m\hat{j}$.

$|\Delta p| = 16$ m

24. BONUS

25. (a)
Sol. x = at, y = bt^2 or y = $b(x/a)^2$.

26. (a)

Sol. $R = \frac{u^2}{g} \Rightarrow \text{Height } H = \frac{u^2 \sin^2 45°}{2g} = \frac{u^2}{4g} = \frac{R}{4}$

$\boxed{R = 4H}$

27. (d)

Sol. $\text{No. of revolution (n)} = \frac{\text{Total time of motion}}{\text{Time period}} = \frac{140\,\text{sec}}{40\,\text{sec}} = 3.5$ Distance covered by an athlete in revolution $= n(2\pi r) = 3.5(2\pi r) = 3.5 \times 2 \times \frac{22}{7} \times 10 = 220$ m.

28. (c)

Sol. $\omega_{Minute\ \ hand} = \frac{2\pi}{60}\frac{rad}{\min}$ and

$$\omega_{Earth} = \frac{2\pi}{24}\frac{Rad}{hr} = \frac{2\pi}{24 \times 60}\frac{rad}{\min} \quad \therefore \frac{\omega_{Minute\ \ hand}}{\omega_{Earth}} = 24 : 1$$

29. (d)
Sol. As we have derived this formula in class room.

$$h = \frac{2u^2h}{gb^2} = \frac{2(4.5)^2 \times 0.2}{10(0.3)^2} = 9$$

30. (a)

Sol. $\tan\alpha = \frac{u\sin\theta - gt}{u\cos\theta}$

31. (a)

Sol. $v_x = u = 20$ m/s

$v_y = u_y + gt = 0 + 10 \times 5 = 50$ m/s

$v = \sqrt{u_x^2 + u_y^2} = \sqrt{(20)^2 + (50)^2}$

32. (b)

Sol. $\tan\theta = \frac{y}{x} = \frac{4H}{R}$,

33. (d)

Sol. Given that

$H = R$

i.e. $\frac{u_y^2}{2g} = \frac{2.u_x u_y}{g}$

or $\frac{u_y}{u_x} = 4$ or $\tan\theta = 4$ or $\theta = \tan^{-1}(4)$

34. (b)

Sol. $\because$ $u\cos\theta = \frac{u}{2} \Rightarrow \cos\theta = \frac{1}{2} \Rightarrow \theta = 60^0$.

35. (a)

Sol. Time to reach maximum height $= t_m$

Time to reach back to ground $= t_m$

Total time of flight, $T_f = t_m + t_m = 2t_m$

36. (c)
Sol. $F_{Net} = F - f_k = 2t - \mu mg$

37. (b)
Sol. u = 10, v = 0, a = – μg
Now $v^2 = u^2 + 2as$

38. (b)
Sol. $a = \frac{\text{Net force}}{\text{Mass}}$

39. (b)
Sol. $V = \sqrt{\mu rg}$

40. (d)
Sol. Resultant can be zero if

$|F_1 - F_2| \le F_3 \le F_1 + F_2$

41. (b)
Sol. Range of 6 kgf and 8 kgf is $|8 - 6| \le |\vec{R}| \le |8 + 6|$

42. (a)
Sol. Let the angle between the forces P and 2P be α. Since the resultant of P and 2P is perpendicular to P. Therefore,

$$\tan \pi/2 = \frac{2P\sin\alpha}{P + 2P\cos\alpha} \Rightarrow P + 2P\cos\alpha = 0 \Rightarrow \cos\alpha = \frac{-1}{2} \Rightarrow \alpha = \frac{2\pi}{3}$$

43. (a)

Sol. Given $\vec{F} = 6\hat{i} - 8\hat{j}\,N, a = 5ms^{-2}$
$\therefore F = \sqrt{(6)^2 + (-8)^2} = 10N$
Mass of body is
$m = \frac{F}{a} = \frac{10N}{5ms^{-2}} = 2kg$

44. (a)

Sol. Here $y = ut + \frac{1}{2}gt^2$

$\therefore$ velocity $v = \frac{dy}{dt} = u + gt$

Acceleration, $a = \frac{dv}{dt} = g$

The force acting on the particle is

$F = ma = mg$

45. (a)

Sol. Here, F = -50 N

(-ve sing for retardation

$\mathrm{m = 10\,kg, u = 10\,ms^{-1}, v = 0}$

As F = ma+ +++++

$\therefore \mathrm{a} = \frac{\mathrm{F}}{\mathrm{m}} = \frac{-50}{10\mathrm{kg}} = -5\mathrm{ms}^{-2}$

$\mathrm{v = u + at}$

Using $\therefore \mathrm{t} = \frac{\mathrm{v-u}}{\mathrm{a}} = \frac{0 - 10\mathrm{ms}^{-1}}{-5\,\mathrm{ms}^{-2}} = 2\mathrm{s}$

46. (b)

Sol. Here, mass of the stone , m = 1kg

As the stone is lying on the floor of the train, its acceleration is same as that of train

$\therefore$ Force acting on the stone,

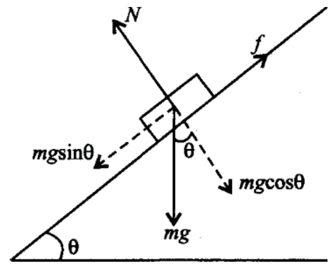
$F = ma = (1kg)(1ms^{-2}) = 1N$

47. (d)

Sol. For equilibrium under the effect of the three concurrent force all the properties mentioned are required

48. (a)

Sol. The various forces acting on the block are as shown in the figure.



From figure

$mg\sin\theta = f$ …… (i)

$mg\cos\theta = N$ ….. (ii)

Divide (i) by (ii) we get

$\tan\theta = \frac{f}{N} = \frac{\mu N}{N}\, or\, \theta = \tan^{-1}(\mu)$

49. (c)

Sol. Here $r = 10m, v = 5ms^{-1}, a = 2ms^{-2}$

$a_r = \frac{v^2}{r} = \frac{5\times5}{10} = 2.5ms^{-2}$

The net acceleration is

$a = \sqrt{a_r^2 + a_t^2} = \sqrt{(2.5)^2 + 2^2}$

$= \sqrt{10.25} = 3.2ms^{-1}$

50. (b)

Sol. If mass m_1 travels s, m_2 travels by s/2.

$\therefore$ if acceleration of m_1 is a, then acceleration of mass m_2 is $\frac{1}{2}$ a

Here T = m_1 a and $m_2g - 2T = m_2\frac{a}{2}$

Solving a = $\frac{2m_2g}{4m_1 + m_2}$

51. (b)

Sol. $\Delta x.\Delta p \geq \frac{h}{4\pi}$ This equation shows Heisenberg's uncertainty principle. According to this principle the product of uncertainty in position and momentum of particle is greater than equal to $\frac{h}{4\pi}$.

52. (c)

Sol. Given that mass of electron $= 9.1 \times 10^{-31}\,kg$

Planck's constant $= 6.63 \times 10^{-34}\,kg\,m^2 s^{-1}$

By using $\Delta x \times \Delta p = \frac{h}{4\pi}$; $\Delta x \times \Delta v \times m = \frac{h}{4\pi}$

Where: Δx = uncertainity in position

Δv = uncertainity in velocity

$$\Delta x \times \Delta v = \frac{h}{4\pi \times m}$$

$$= \frac{6.63 \times 10^{-34}}{4 \times 3.14 \times 9.1 \times 10^{-31}} = 5.8 \times 10^{-5}\,m^2 s^{-1}.$$

53. (a)

Sol. Electronic configuration of $Rb_{(37)}$ is

$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 5s^1$

So for the valence shell electron $(5s^1)$

$$n = 5, l = 0, m = 0, s = +\frac{1}{2}$$

54. (a)

Sol. Principal quantum no. tells about the size of the orbital.

55. (c)

Sol. $Cr_{24} = (Ar)3d^5\,4s^1$ Electronic configuration because half filled orbital are more stable than other orbitals.

56. (b)

Sol. Hund's rule states that pairing of electrons in the orbitals of a subshell (orbitals of equal energy) starts when each of them is singly filled.

57. (d)

Sol. As a result of attraction, some energy is released. So at infinite distance from the nucleus energy of any electron will be maximum. For bringing electrons from ∞ to the orbital of any atom some work has to be done be electrons hence it bill loose its energy for doing that work.

58. (b)

Sol. Circumference of 3^{rd} orbit = $2\pi r_3$

According to Bohr angular momentum of electron in 3^{rd} orbit is

$mvr_3 = 3\frac{h}{2\pi}$ or $\frac{h}{mv} = \frac{2\pi r_3}{3}$

by De-Broglie equation, $\lambda = \frac{h}{mv}$

$\therefore \lambda = \frac{2\pi r_3}{3}$ $\quad \therefore 2\pi r_3 = 3\lambda$

i.e. circumference of 3^{rd} orbit is three times the wavelength of electron or number of waves made by Bohr electron in one complete revolution in 3^{rd} orbit is three.

59. (b)

Sol. According to Bohr's model for hydrogen and hydrogen like atoms the velocity of an electron in an atom is quantised and is given by $v \propto \frac{2\pi Ze^2}{nh}$ so $v \propto \frac{1}{n}$ in this cases $n = 3$

60. (d)

Sol. $\lambda = \frac{c}{\nu}$

61. (d)

Sol. Apply $\nu = c\bar{\nu}$

62. (d)

Sol. KE = $h\nu - h\nu_0 = h(\nu - \nu_0)$

$= hc\left(\frac{1}{\lambda} - \frac{1}{\lambda_0}\right)$

$= hc\,(\bar{\nu} - \bar{\nu}_0)$

63. (a)

Sol. Factual

64. (a)

Sol. Factual

65. (d)

Sol. Numerical value of m cannot be greater than that of ℓ

66. (c)

Sol. $E = -13.6\ \frac{z^2}{n^2}$ Ev

67. (c)

Sol. For 4 orbital electrons, n = 4

ℓ = 3 (because) m = + 3, + 2, + 1, 0, –1, –2, –3 s = +
1/2.

68. (d)

Sol. $\lambda = \frac{hc}{\Delta E} \therefore \lambda \alpha \frac{1}{\Delta E}$

69. (c)

Sol. Visible lines $\Rightarrow$ Balmer series

$(5 \to 2, 4 \to 2, 3 \to 2)$. So, 3 lines.

70. (a)

Sol. Orbital angular momentum $= \sqrt{\ell(\ell+1)}\frac{h}{2\pi} = 0$.

$\therefore \quad \ell = 0$(s orbital)

71. (d)

Sol. Cu : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$.

$\therefore$ Cu^{2+} : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9$ or $[Ar]3d^9$.

72. (c)

Sol. Number of radial nodes = n – ℓ – 1 = 1, n = 3.

$\therefore$ ℓ = 1.

Orbital angular momentum $= \sqrt{\ell(\ell+1)}\frac{h}{2\pi} = \sqrt{2}\frac{h}{2\pi}$.

73. (a)

Sol. s orbital is spherical so non-directional.

74. (d)

Sol. $\lambda = v$

then $\lambda = \frac{h}{mV}$ or $\lambda^2 = \frac{h}{m}$ so, $\lambda = \sqrt{\frac{h}{m}}$.

75. (b)

Sol. $\frac{\lambda_y}{\lambda_x} = \frac{m_x v_x}{m_y v_y} \Rightarrow \frac{\lambda_y}{1} = \frac{m_x v_x}{(0.25m_X)(0.75V_X)} = \frac{16}{3}$.

76. (a)

Sol. After np orbital, (n + 1) s orbital is filled.

77. (a)

Sol. Cr : $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1\ 3d^5$

$n + \ell = 3$

so the combinations are 2p, 3s. So 8 electrons.

78. (c)

Sol. Phosphorus has atomic number 15.

Electronic configuration: $1s^2 2s^2 2p^6 3s^2 3p^3$ or $[Ne]3s^2 3p^3$

79. (c)

Sol. The electron will enter into an orbital with minimum value of n + l.

80. (b)

Sol. The correct representation of the ground state electronic configuration of Cu (29)is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

81. (c)

Sol. No. of angular nodes, = l

For 4d orbital,n = 4, l = 2

$\therefore$ No. of angular nodes for 4d orbital = 2

82. (c)

Sol. Total no. of orbitals in n^{th} shell $= n^2$

$\therefore$ Total no. of orbitals in 3^{rd} shell (n = 3) = $3^2 = 9$

83. (a)

Sol. Orbital angular momentum $=\sqrt{l(l+1)}\dfrac{h}{2\pi}$

Thus, it depends on 'l' only.

84. (a)

Sol. The charge on an electron was found by millikan's oil drop method. Oil drops in the form of mist produced by an atomizer were allowed to pass through a chamber with ionized air. The electrical charge on these oil droplets was acquired by collisions with gaseous ions. By carefully measuring the effects of an electrical field strength on the motion of oil droplets, millikan measured the charge on the droplet.

85. (a)

Sol. Mass of an electron $=9.1096\times10^{-31}\,kg$

$1\text{ g or }10^{-3}\,kg=\dfrac{1}{9.1096\times10^{-31}}\times10^{-3}$

$=1.098\times10^{27}$ electrons

SECTION-B

86. (a)

Sol. As a very few α- paricles were deflected by sharp angles it was concluded that the positive charge is concentrated in a very small volume of the atom.

87. (b)

Sol. In Balmer series, the lines appear in visible region.

88. (d)

Sol. $mvr=\dfrac{nh}{2\pi}=\dfrac{5h}{2\pi}=\dfrac{2.5h}{\pi}$

89. (b)

Sol. Nodal surfaces

90. (d)

Sol. The configuration does not follow Hund's rule of maximum multiplicity because 3p will be be fully filled before the electrons go to 4s.

91. (d)
Sol. When l = 3, magnetic quantum number has 7 values $m_l = (2l+1)$. These values are represented as
$-3, -2, -1, 0, +1, +2, +3$

92. (b)
Sol. The mass of electron (i.e., 9.10939×10^{-31} kg) is very small as compared to the mass of neutron (i.e., 1.67493×10^{-27} kg).

93. (a)
Sol. Only overall neutrality of an atom could be explained correctly be thomson model of atom.

94. (d)
Sol. Isobars are the atoms with same mass number (i.e., sum of protons and neutrons) but different atomic number (i.e., no. of protons).

95. (b)
Sol. Heisenberg's uncertainty principle rules out the existence of definite paths or trajectories of electrons and other similar particles.

96. (c)
Sol. Let relative abundance of Cl – 37 = x%
then relative abundance of Cl – 35 = (100 –x)%
Average atomic mass,
$$= \frac{x \times 37 + (100 - x)35}{100} = 35.5$$
$\Rightarrow$ 37x+ 3500 – 35 x = 3550
$\Rightarrow$ x = 25
$\therefore$ 100 – x = 75
Thus, the ratio of Cl – 37 and Cl – 35 is x : (100 –x) = 25: 75 = 1: 3

97. (b)
Sol. $\lambda = \frac{h}{mv}$ if v is same, then higher the value of m means lower will be the value of λ.

Name	Electron	Proton	Neutron	α - particle (He^{2+})
Mass/u	0.00054	1.00727	1.00867	4.0026

Thus, α - particle has the largest mass i.e., shortest wavelength.

98. (b)

Sol. The five d – orbitals are degenerate and have equal energy. The shape of first four orbitals is similar which are

$d_{xy,} d_{yz,} d_{zx} d_{x^2} - y^2$ but the fifth one, d_{z^2} has a different shape.

99. (a)

Sol. In 'X' one electron can exchange energy with 5 orbitals while in 'Y' energy exchange is between 3 orbitals hence half – filled orbitals are more stable.

100. (d)

Sol. For 1s orbital, the probability density is maximum at the nucleus and it decreases sharply as we move away from it. On the other hand, for 2s orbital, the probability density first decreases sharply to zero and again starts increasing.

BOTANY									
Q.	**ANS.**	**Q.**	**ANS.**	**Q.**	**ANS.**	**Q.**	**ANS.**	**Q.**	**ANS.**
101	**C**	**113**	**D**	**125**	**C**	**136**	**D**	**148**	**B**
102	**C**	**114**	**A**	**126**	**A**	**137**	**B**	**149**	**C**
103	**B**	**115**	**C**	**127**	**B**	**138**	**B**	**150**	**B**
104	**C**	**116**	**B**	**128**	**B**	**139**	**A**		
105	**C**	**117**	**A**	**29**	**B**	**140**	**C**		
106	**A**	**118**	**C**	**130**	**D**	**141**	**D**		
107	**C**	**119**	**C**	**131**	**C**	**142**	**A**		
108	**D**	**120**	**B**	**132**	**B**	**143**	**D**		
109	**D**	**121**	**D**	**133**	**C**	**144**	**B**		
110	**C**	**122**	**A**	**134**	**B**	**145**	**A**		
111	**B**	**123**	**B**	**135**	**C**	**146**	**C**		
112	**D**	**124**	**C**			**147**	**D**		

ZOOLOGY									
Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.	Q.	ANS.
151	C	163	B	175	C	186	A	198	C
152	B	164	A	176	B	187	D	199	B
153	B	165	B	177	C	188	C	200	D
154	D	166	A	178	D	189	A		
155	B	167	C	179	A	190	C		
156	C	168	B	180	C	191	D		
157	C	169	D	181	D	192	B		
158	C	170	A	182	B	193	B		
159	D	171	A	183	D	194	B		
160	B	172	C	184	A	195	D		
161	D	173	D	185	C	196	C		
162	B	174	B			197	A		