

SOLUTION & ANSWER FOR CUSAT-2009 A SERIES

[PHYSICS & CHEMISTRY]

PHYSICS

1. A motor car of mass 300 kg is moving with a velocity of 30 km/h -----

Ans : No correct answer
Nearest answer 563 N

$$\text{Sol: } FS = \frac{1}{2}mv^2 \Rightarrow F = \frac{mv^2}{2S}$$

$$= \frac{300 \times \left(30 \times \frac{5}{18}\right)^2}{2 \times 15} = 694 \text{ N}$$

2. If a particle moves in a circle, describing equal angles at -----

Ans : Changes in direction

Sol: Uniform circular motion. Hence velocity changes only in direction.

3. The difference of pressure between the inside and outside of spherical -----

Ans : 146 N/sq.m

$$\text{Sol: } \Delta P = \frac{2T}{r} = \frac{2 \times 0.073}{1 \times 10^{-3}} = 146 \text{ N/Sq. m}$$

4. The lowest possible temperature that can be measured by -----

Ans : -20°C

5. The Bunsens' ice calorimeter is based on -----

Ans : Ice contracts on melting

6. The rms velocity of the molecule of a gas at 15°C -----

Ans : 2100 m/s

$$\text{Sol: } v_2 = v_1 \sqrt{\frac{T_2}{T_1}} = 1.8 \times 10^3 \sqrt{\frac{392}{288}}$$

$$= 2100 \text{ m/s}$$

7. The law of equipartition of energy was -----

Ans : Maxwell

8. The efficiency of a Carnot cycle is -----

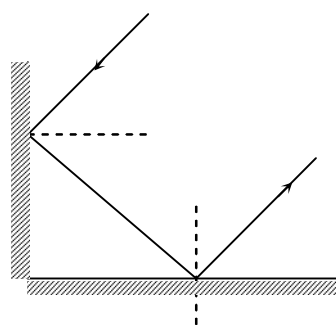
Ans : The temperature of the sink is zero.

$$\text{Sol: } \eta = 1 - \frac{T_2}{T_1} \text{ is maximum when } T_2 = 0$$

9. Two plane mirrors are placed perpendicular to each other. A ray strikes the first mirror -----

Ans : Parallel to the original ray

Sol:



10. A lens of power +2 dioptre is placed in contact with a lens of power -----

Ans : Convergent lens of focal length 100 cm

$$\text{Sol: } P = P_1 + P_2 = 2 - 1 = 1 \text{ D}$$

$$\therefore f = \frac{1}{P} = \frac{1}{1} \text{ m} = +100 \text{ cm}$$

11. Spherical aberration can be removed by -----

Ans : Plane convex lens

12. Fraunhofer's lines are found in ----

Ans : Absorption spectra

13. A capacitor stores $5.3 \times 10^{-5} \text{ C}$ of charge when connected -----

Ans : No correct answer

$$\text{Sol: } Q_2 = Q_1 \frac{V_2}{V_1} = 5.3 \times 10^{-5} \times \frac{9}{6}$$

$$= 7.95 \times 10^{-5} \text{ C}$$

14. In a radioactive decay experiment, 10 counts are recorded in a 100 sec -----

Ans : 0.113

$$\text{Sol: } f(k, \lambda) = \frac{\lambda^k e^{-\lambda}}{k!}$$

$$= \frac{8^{10} \times e^{-8}}{10!} = 0.113$$

15. A pi-meson will always decay -----
 Ans : Two leptons
16. The stem or leaves of the plant are periodically tested -----
 Ans : Photographic plates
17. 1 keV -----
 Ans : 1.6×10^{-16}
 Sol: $1 \text{ keV} = 1 \times 10^3 \times 1.6 \times 10^{-19} \text{ J}$
 $= 1.6 \times 10^{-16} \text{ J}$
18. The top layer of 33 km thickness of the earth -----
 --
 Ans : Crust
19. A body of mass is measured many times and the value is given -----
 Ans : 0.02%
 Sol: Fractional error = $\frac{0.01}{4736} \times 100 = 0.02\%$
20. Varactors are special diodes with -----
 Ans : Voltage variable capacitors
21. Electromagnetic equivalent of a mechanical spring -----
 Ans : $\frac{1}{C}$
 Sol: Force constant $k = \text{reciprocal capacitance}$
 $\frac{1}{C}$
22. If nuclear accident happens in a nearby nuclear power plant -----
 Ans : Sprinkle water all over the room.
23. Which of the following forms of energy released is -----
 Ans : Kinetic energy of the fission fragments
24. Any two terminal network can be replaced by an equivalent -----
 Ans : Thevenin
25. The dimension of magnetic field in M, L, T and C -----
 Ans : $MT^{-1}C^{-1}$
 Sol: Tesla = $ML^{\circ}T^{-2}A^{-1} = ML^{\circ}T^{-1}C^{-1}$
26. A body of mass $m = 3.513 \text{ kg}$ is moving along the x-axis -----
 Ans : 17.6 kg ms^{-1}
 Sol: Number of significant figures is 3
27. A bomb of mass 16 kg at rest explodes into two pieces of masses of 4 kg and 12 kg -----
 Ans : 288 J
 Sol: $K.E = \frac{p^2}{2m} = \frac{(12 \times 4)^2}{2 \times 4} = 288 \text{ J}$
28. An electric dipole is placed at an angle of 30° ----
 --
 Ans : A torque as well as a translational force
29. Needles N1, N2 and N3 are made of a ferromagnetic, -----
 Ans : Attract N1 strongly, N2 weakly and repel N3 weakly
30. A player caught a cricket ball of mass 150 g moving at a rate of 20 m/s -----
 Ans : 30 N
 Sol: Impulse = Change in momentum
 $F = \frac{\Delta p}{t} = \frac{0.15 \times 20}{0.1} = 30 \text{ N}$
31. The resistance of a bulb filament is 100Ω at a temperature of $100^{\circ}C$. If its temperature coefficient -----
 Ans : $400^{\circ}C$
 Sol: $\alpha = \frac{R_2 - R_1}{R_1 t_2 - R_2 t_1}$
 $\Rightarrow 0.005 = \frac{200 - 100}{100 \times t_2 - 200 \times 100}$
 $= \frac{1}{t_2 - 200}$
 $\Rightarrow t_2 = \frac{1}{0.005} + 200 = 400^{\circ}C$
32. Ball pen works on the principle -----
 Ans : Gravitational force
33. An artificial satellite can be tracked very precisely -----
 Ans : Doppler effect
34. A quark is an elementary particle, and is -----
 Ans : Fermion

35. A diffraction pattern is obtained using a beam of red light -----

Ans : Diffraction bands become narrower

Sol: Wavelength decreases

36. Force between two charges each of one coulomb that are -----

Ans : 9×10^9 N

Sol: Assuming the medium as vacuum

$$F = \frac{1}{4\pi\epsilon_0} \frac{q^2}{r^2} = 9 \times 10^9 \text{ N}$$

37. The mass liberated during electrolysis depends -- -----

Ans : Current and time for which it is passed

Sol: $m = Zit$

38. The resistance of a copper wire of length 1 metre is 0.1 ohm -----

Ans : 1.59 micro ohm-cm

$$\begin{aligned} \text{Sol: } \rho &= \frac{12 A}{\ell} = 0.1 \times \frac{\pi}{4} \times \frac{(0.045 \times 10^{-2})^2}{1} \\ &= 1.59 \times 10^{-8} \Omega \text{m} \\ &= 1.59 \times 10^{-6} \Omega \text{ cm} \end{aligned}$$

39. The path of cathode rays in an electric field can be approximated -----

Ans :

Sol: Path of cathode rays will be parabolic in an electric field or a straight line.

40. ORTHORHOMBIC system is defined -----

Ans : $a \neq b \neq c$

Sol: Orthorhombic structure results when a cubic structure is stretched by two orthogonal pairs.

41. If $\vec{A} \cdot \vec{B} = A \times B$ the resultant -----

Ans : No correct answer

Sol: $\vec{A} \cdot \vec{B} = A \times B$
 $\Rightarrow \theta = 45^\circ$

$$\text{i.e., } R = \sqrt{A^2 + B^2 + \sqrt{2}(AB)}$$

42. Two bodies are thrown up with initial velocities in the ratio -----

Ans : 4 : 25

$$\text{Sol: } \frac{H_1}{H_2} = \frac{n_1^2}{n_2^2} = \left(\frac{2}{5}\right)^2 = \frac{4}{25}$$

43. Which one of the following forces is non-conservative?

Ans : Viscous force

44. An artificial satellite is orbiting the earth at an altitude 400 km -----

Ans : Orbit the earth along with the satellite

45. If two electrons are forced to come closer to each other, the P.E -----

Ans : Increase

Sol: Work done is positive

46. A car and a bus are moving with the same kinetic energy. They are brought to rest -----

Ans : Equal

$$\begin{aligned} \text{Sol: } FS &= \Delta K.E \Rightarrow S = \frac{\Delta K.E}{F} \\ &\Rightarrow \text{same } S \text{ for both} \end{aligned}$$

47. A sphere, disc and a ring each having same mass M and radius -----

Ans : Sphere

$$\text{Sol: Acceleration } a = \frac{g \sin \theta}{1 + \frac{K^2}{R^2}}$$

sp here.

48. If the earth shrinks to half of its radius without change in mass -----

Ans : 6 hr

$$\text{Sol: } T_2 = T_1 \frac{I_2}{I_1} = T_1 \cdot \frac{R_2^2}{R_1^2} = 24 \cdot \frac{1}{4} = 6 \text{ hr}$$

49. An iron bar of length 1 and cross-section A is heated from 0°C -----

Ans : Independent of length

Sol: $F = Y\alpha A\Delta\theta$

50. A liquid tends to assume a spherical shape -----

Ans : The surface tension force

51. When two tubes of different diameters are dipped -----

Ans : More in tube of smaller diameter

Sol: $h \propto \frac{1}{r}$

52. Which of the following substances has largest value -----

Ans : Glycerine

53. Lissajous figure obtained by combining -----

Ans : An ellipse

54. A mass M is suspended from a light spring. An additional mass m added -----

Ans : $T = 2\pi \sqrt{\frac{(M+m)x}{mg}}$

Sol: $k = \frac{mg}{x}$ $T = 2\pi \sqrt{\frac{M}{k}}$
 $M' = M + m$
 $\therefore T = 2\pi \sqrt{\frac{(M+m)x}{mg}}$

55. The intensity of plane progressive wave of frequency 100 Hz is -----

Ans : No correct answer

Sol: $I = \frac{P_0^2}{2\rho v}$ gives $P_0 = \sqrt{2\rho v I}$
 $= 92.38 \text{ Pa}$

Note: If displacement amplitude in m is required

then $A = \left(\frac{I}{2\pi^2 f^2 \rho v}\right)^{1/2} = 3 \times 10^{-4} \text{ m}$

56. When sound travels from air to water the quantity -----

Ans : Frequency

57. The internal energy of the ideal gas does not change -----

Ans : Isothermal process

58. Compressed air coming out of punctured football -----

Ans : Adiabatic

Note: Joule Thomson effect can also be considered as correct answer.

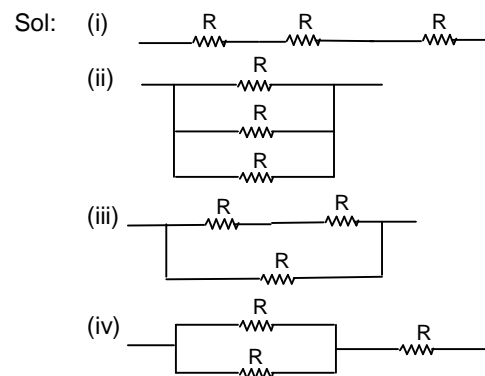
59. Find the electric field strength if the potential of field depends -----

Ans : $E = 2a\sqrt{x^2 + y^2}$

Sol: $\frac{\delta V}{\delta x} = 2ax$, $\frac{\delta V}{\delta y} = -2ay$
 $\therefore E = 2a\sqrt{x^2 + y^2}$

60. Given three equal resistances, how many combinations of -----

Ans : 4



61. A house wiring supplied with a 220 V supply line is protected by a 9 amp -----

Ans : 33

Sol: $I = \frac{60}{220} = 0.27 \text{ A}$
 $\therefore n = \frac{9}{0.27} = 33$

62. Two protons move parallel to each other with equal speeds -----

Ans : 10^{-6}

Sol: $\frac{F_M}{F_E} = \frac{v^2}{c^2} = \left(\frac{3 \times 10^5}{3 \times 10^8}\right)^2 = 10^{-6}$

63. Two concentric coils of 10 turns each are situated in the same plane -----

Ans : $\frac{5}{4} \mu_0$

Sol: $B_{\text{net}} = B_1 - B_2$
 $= \frac{\mu_0 N}{2} \left(\frac{I_1}{r_1} - \frac{I_2}{r_2}\right)$
 $= \frac{\mu_0 \cdot 10}{2} \left(\frac{0.2}{0.2} - \frac{0.3}{0.4}\right)$
 $= \frac{5}{4} \mu_0$

64. If a particle is moving in a uniform magnetic field -----

Ans : Both momentum and total energy remains the same.

Sol: Here we have assumed that the particle is not charged.

65. Which of the following substances has negative permeability -----

Ans : None of the above

Sol: No material can have negative permeability. Permeability of a perfectly diamagnetic material is zero.

66. Permanent magnets are made of steel -----

Ans : High retentivity and high coercive field

67. When a diamagnetic substance is brought near north -----

Ans : Repelled by the poles

68. The voltage of A.C. source varies with time according to -----

Ans : 50 Hz

Sol: $V = (120 \cos \pi t) \sin 100\pi t$

$$f = \frac{100\pi}{2\pi} = 50 \text{ Hz}$$

69. The equivalent inductance of two inductors is 2.4 H -----

Ans : 6H, 4H

Sol: $L_1 + L_2 = 10$

$$\frac{L_1 L_2}{L_1 + L_2} = 2.4$$

$$\therefore L_1 - L_2 = \sqrt{(L_1 + L_2)^2 - 4L_1 L_2}$$

$$= \sqrt{100 - 96} = 2$$

$$\therefore L_1 + L_2 = 10$$

$$L_1 - L_2 = 2$$

$$2L_1 = 12 \Rightarrow L_1 = 6 \text{ H}$$

$$L_2 = 4 \text{ H}$$

70. In a Huygen's eye-piece, the eye lens has a focal length f. the equivalent -----

Ans : $\frac{3}{2}f$

$$\text{Sol: } \frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 f_2} = \frac{1}{f} + \frac{1}{3f} - \frac{2f}{f \cdot 3f}$$

$$= \frac{1}{f} + \frac{1}{3f} - \frac{2}{3f} = \frac{2}{3f}$$

$$\therefore F = \frac{3f}{2}$$

71. If a narrow beam of white light goes through a slab -----

Ans : The light inside the slab is split into different colours

72. In Young's double slit experiment, if the widths of slit are in the -----

Ans : 25 : 1

$$\text{Sol: } \frac{I_{\max}}{I_{\min}} = \frac{(\sqrt{W_2} + \sqrt{W_1})^2}{(\sqrt{W_2} - \sqrt{W_1})^2}$$

$$= \left(\frac{\sqrt{9} + \sqrt{4}}{\sqrt{9} - \sqrt{4}} \right)^2 = \frac{25}{1}$$

73. A parallel beam of light of wavelength 50000 Å is incident normally on a -----

Ans : 30°

$$\text{Sol: } \theta = \frac{\lambda}{d} = \frac{5000 \times 10^{-10}}{1 \times 10^{-6}} = 0.5 \text{ rad} = 30^\circ$$

74. When a gun is shot in the front of a cliff and the echo of the sound is -----

Ans : 445 m

$$\text{Sol: } S = \frac{vt}{2} = \frac{330 \times 3}{2} = 445 \text{ m}$$

75. Half life of a substance is 20 minutes. What is the time between 33% -----

Ans : 20 minutes

CHEMISTRY

76. The emission of a beta particle.....

Ans: 1

Sol : β emission increases atomic number by one unit.

77. Which paramagnetic character?

Ans: NO

Sol : 'NO' molecules has an unpaired electron in π^* antibonding molecular orbital.

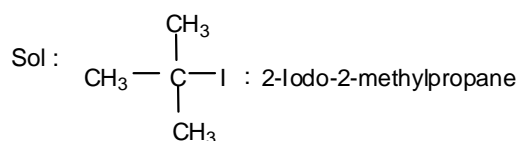
78. Which represent an organometallic compound?

Ans: Mg acetate

Sol: Magnesium acetate is $\text{CH}_3\text{COO} - \text{Mg} - \text{OOCCH}_3$. It does not contain carbon metal bond.

79. The IUPAC name.....

Ans: 2-iodo-2-methylpropane



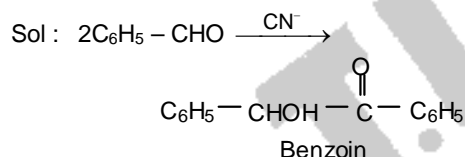
80. Which greatest value for the bond dissociation energy?

Ans: O_2^{2+}

Sol: The bond order is 3 for O_2^{2+} hence the highest bond dissociation energy.

81. The compound that

Ans: Benzoin



82. In B_2H_6

Ans: the boron atoms are linked through hydrogen bridges

Sol: Boron atoms in B_2H_6 are linked through hydrogen bridge bonds.

83. oxides will give the metal on heating?

Ans: HgO

Sol: HgO is thermally unstable.

84. pairs have the same electronic configuration of F^- ?

Ans: Na^+ & Mg^{2+}

Sol: Mg^{2+} & Na^+ are isoelectronic with F^- .

85. sets of quantum numbers is acceptable?

Ans: $(3, 0, 0, +\frac{1}{2})$

Sol: $n = 3, l = 0, m = 0, s = \frac{1}{2}$ is an acceptable set of quantum numbers.

86. The number of coulombs of charge required

Ans: 5×96500

Sol: In the conversion of KMnO_4 to Mn^{2+} , there is a change in oxidation number by five units.

87. The osmotic pressures of 0.005 M of KI

Ans: 2

Sol: $\pi = iCRT$ $\frac{\pi_1}{\pi_2} = \frac{i_1 CRT}{i_2 CRT}$

Since the two solutions are at same concentration & temperature

$\frac{i_1}{i_2} = \frac{\pi_1}{\pi_2}$

88. The most unstable free radical is

Ans: $\text{CH}_3\bullet$

Sol: The stability order of alkyl free radical is $3^\circ > 2^\circ > 1^\circ > \text{CH}_3\bullet$.

89. The ionization energies of in the order

Ans: $\text{Al} < \text{Mg} < \text{Si} < \text{P}$

Sol: I.E of the species in kJ/mol are
Mg - 736, Al - 577, Si - 786,
P - 1060

90. correct order of strengths of Lewis acids

Ans: $\text{BBr}_3 > \text{BCl}_3 > \text{BF}_3$

Sol: Back bonding make BF_3 the weakest Lewis acid

91. The R M S velocities

Ans: $H_2 > CH_4 > NH_3 > CO_2$

Sol:
$$\mu_{rms} = \sqrt{\frac{3RT}{M}}$$

RMS velocity is inversely proportional to square root of molar mass.

92. The sugar that will not reduce.....

Ans: Sucrose

Sol: Sucrose does not contain a free aldehyde or keto group. So it is a non-reducing sugar.

93. The increasing order for the values of

Ans: n, α , p

Sol: $\frac{e}{m}$ ratio is zero for neutron since charge is zero. It is less for α particle than for proton.

94. The energy of an electron

Ans: -5.45×10^{-19} J

Sol:
$$E = \frac{-2\pi^2me^4}{n^2h^2} \quad E_2 = \frac{E_1}{4} = -5.45 \times 10^{-19} \text{ J}$$

95.dimensions represent a hexagonal unit cell?

Ans: $a = b \neq c \quad \alpha = \beta = 90 \quad \gamma = 120$

Sol: $a = b \neq c \quad \alpha = \beta = 90 \quad \gamma = 120$ corresponds to hexagonal unit cell.

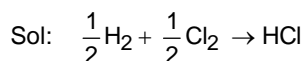
96. The coordination numbers of cation and anion.....

Ans: six and six

Sol: In NaCl both Na^+ & Cl^- are six co-ordinated.

97. The bond dissociation energies

Ans: -92



$$\Delta H_{formation} = \Sigma B.E \text{ of reactants} - \Sigma B.E \text{ of products}$$
$$= \frac{1}{2} (435 + 243) - 431$$
$$= -92 \text{ kJ mol}^{-1}$$

98. constitute a buffer solution when dissolved

Ans: 0.05 mol sodium acetate and 0.05 mol acetic acid

Sol: A weak acid and a salt of weak acid strong base in solution behave as a buffer.

99. For a reaction $N_2 + 3H_2 \rightarrow 2NH_3$, The rate of consumption of H_2 is

Ans: $3 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$

Sol:
$$-\frac{1}{3} \frac{d[H_2]}{dt} = \frac{1}{2} \frac{d[NH_3]}{dt}$$
$$-\frac{d[H_2]}{dt} = \frac{3}{2} \frac{d[NH_3]}{dt}$$
$$= \frac{3}{2} \times 2 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1}$$

100. An aqueous solution containing

Ans: 0.0512

Sol: $\Delta T_f = k_f m$
 $\Delta T_b = k_b .m$
For solutions of same molality
$$\frac{\Delta T_f}{\Delta T_b} = \frac{k_f}{k_b} \text{ ie. } \frac{0.186}{\Delta T_b} = \frac{1.86}{0.512}$$

101. Identify the TRUE statement

Ans: Only Al_4C_3 reacts with water liberating methane

Sol: Only Al_4C_3 produce CH_4 with water

102. Among gives metal on heating is

Ans: $AgNO_3$

Sol: On strong heating $AgNO_3$ produce metallic silver.

103..... mixture of ions can be
excess of sodium hydroxide solution?

Ans: Al^{3+} & Fe^{3+}

Sol: $\text{Fe}(\text{OH})_3$ is insoluble in excess of NaOH
while $\text{Al}(\text{OH})_3$ is soluble.

104..... statement is not true?

Ans: Alkaline earth metals are more reactive
than alkali metals.

Sol: Alkaline earth metals are less reactive than
alkali metals.

105.The correct order of increasing oxidation state....

Ans: NH_3 , N_2 , NO

Sol: The oxidation number of nitrogen in
 $\text{NH}_3 = -3$, $\text{N}_2 = 0$ and $\text{NO} = +2$

106..... increasing acidity among the following
is

Ans: p-methoxybenzoic acid < benzoic acid <
p-nitrobenzoic acid

Sol: Presence of electron donating group such
as $-\text{OCH}_3$ decreases the acid strength
while presence of electron withdrawing
group such as $-\text{NO}_2$ increases the acid
strength of benzoic acid.

107.When propionic acid is treated with

Ans: bicarbonate

Sol: $\text{CH}_3 - \text{CH}_2 - \text{COOH} + \text{NaHCO}_3 \rightarrow$
 $\text{CH}_3 - \text{CH}_2 - \text{COONa} + \text{H}_2\text{O} + \text{CO}_2$

108.The reagent which can be used to reduce
.....

Ans: NaBH_4

Sol: NaBH_4 will not reduce double bonds.

109..... correct order with respect to the
acidic nature of phenols?

Ans: o-cresol < phenol < o-nitrophenol

Sol: Presence of electron donating groups such
as $-\text{CH}_3$ reduces the acidity while

presence of electron withdrawing groups
such as $-\text{NO}_2$ increases the acidity of
phenol.

110.An aqueous solution of 6.3 g of oxalic acid
.....

Ans: 40 mL

Sol: Normality of oxalic acid solution

$$= \frac{6.3 \times 4}{63} = 0.4 \text{ N}$$

$$V_1N_1 = V_2N_2$$

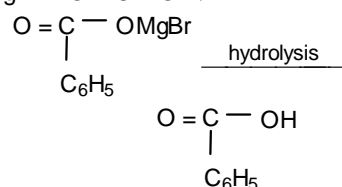
$$10 \times 0.4 = V_2 \times 0.1$$

$$V_2 = 40 \text{ mL}$$

111.Benzoic acid can be prepared by

Ans: CO_2

Sol: $\text{C}_6\text{H}_5\text{MgBr} + \text{O} = \text{C} = \text{O} \rightarrow$



112.The half life of a radioactive element

Ans: 0.0625 g

Sol: 24 minutes = 5 half lives

$$\begin{aligned} \text{Hence amount remaining} &= \frac{1}{32} \text{ of initial} \\ &= 0.0625 \text{ g} \end{aligned}$$

113.On adding CaCO_3 to the equilibrium

Ans: the equilibrium condition will not be
affected

Sol: Since CaCO_3 is a solid addition of it to the
system at equilibrium does not affect the
condition of equilibrium.

114.The order of reactivity of alcohols

Ans: primary > secondary > tertiary

Sol: Order of reactivity of alcohols in which
 $\text{O} - \text{H}$ bond undergoes cleavage is
 $1^\circ > 2^\circ > 3^\circ$

115..... the strongest base is

Ans: $C_6H_5CH_2NH_2$

Sol: The lone pair of electrons on nitrogen in benzylamine ($C_6H_5 - CH_2 - \overset{\bullet\bullet}{N}H_2$) is not involved in resonance. So it is completely available for protonation.

116. In a diatomic molecule, AB,

Ans: $2s(A)$ and $2p_x(B)$

Sol: Since bond axis is 'z' then cannot be an effective overlap between $2p_x$ of (B) & $2s$ of (A)

117. In the primitive cubic unit cell of closest packed atoms,

Ans: $r = a/2$

Sol: In primitive unit cell the atoms at the corners are in direct contact, hence edge length $a = 2$ times radius 'r' of the sphere

118. The K_{sp} for CaF_2 is 1.7×10^{-10}

Ans: $10^{-2} M Ca^{2+}$ and $10^{-3} M F^-$

Sol: The ionic product is 1.25×10^{-9} which is higher than $K_{sp} = 1.7 \times 10^{-10}$

119..... order of H-X-H bond angles

Ans: $NH_3 > PH_3 > AsH_3$

Sol: H X H bond angles are
 $NH_3 = 107.8^\circ$ $PH_3 = 93.6^\circ$ $AsH_3 = 91.8^\circ$

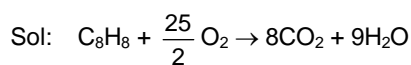
120. reactivity towards a nucleophile?

Ans: Acid anhydride > ester > amide

Sol: The reactivity order of acid derivatives towards nucleophile is
Acid chloride > acid anhydride > esters > amides

121. Assuming that petrol is octane (C_8H_{18})

Ans: 125 moles of O_2



114 g 12.5 mol

Mass of 1.425 L of petrol = 1425×0.8
= 1140 g

No. of moles of O_2 required for combustion of 1140 g $C_8H_{18} = \frac{12.5 \times 1140}{114}$
= 125 moles

122. The solubility of A_2X_3 is $y \text{ mol.dm}^{-3}$

Ans: $108 y^5$

Sol: K_{sp} of A_2X_3 is $108 y^5$ where 'y' is the solubility in mol L^{-1}

123. In the closest packing of atoms,

Ans: one and two

Sol: One octahedral and two tetrahedral void per atom is present in a close packing of atoms.

124. If the enthalpy of vaporization of water at $100^\circ C$

Ans: $100.0 J K^{-1} \text{ mol}^{-1}$

Sol: $\Delta S_{vap} = \frac{\Delta H_{vap}}{T_b} = \frac{37.3 \times 10^3 J \text{ mol}^{-1}}{373 K}$
= $100 J K^{-1} \text{ mol}^{-1}$

125. The E° values for Ag^+/Ag , the reducing power of the metals

Ans: $Ag < Cr < Mg < K$

Sol: The capacity to act as reducing agents follows the order $Ag < Cr < Mg < K$