1. The Solid State

1. Graphite is a
(A) molecular solid
(B) covalent solid
(C) ionic solid
(D) metallic solid.

2. Which one of the following will have a low heat of fusion ?
(A) A covalent solid (B) An ionic solid
(C) A metallic solid (D) A molecular solid

3. Tetragonal crystal system has the following unit cell dimensions.
(A) $a = b = c, \alpha = \beta = \gamma = 90°$
(B) $a = b \neq c, \alpha = \beta = \gamma = 90°$
(C) $a \neq b \neq c, \alpha = \beta = \gamma = 90°$
(D) $a = b \neq c, \alpha = \beta = 90°, \gamma = 120°$.

4. A metallic crystal crystallises into a lattice containing sequence of layers AB, AB, AB,... Any packing of spheres leaves out voids in the lattice. What percentage of volume of this lattice is empty space ?
(A) 74% (B) 26%
(C) 50% (D) None of these.

5. The coordination numbers of a metal crystallising in a hexagonal close packed structure is
(A) 12 (B) 4
(C) 8 (D) 6.

6. The number of octahedral sites per sphere in *fcc* structure is
(A) 8 (B) 4
(C) 2 (D) 1.

7. The range of radius ratio (cationic to anionic) for an octahedral arrangement of ions in an ionic solid is
(A) 0—0.155 (B) 0.155—0.225
(C) 0.225—0.414 (D) 0.414—0.732.

8. The coordination number of $C\ell^-$ ion in $NaC\ell$ is
(A) 6 (B) 8
(C) 4 (D) 1. [*HP Board 2008*]

9. An atom containing an odd number of electrons is
(A) paramagnetic
(B) diamagnetic
(C) ferromagnetic
(D) antiferromagnetic. [*HP Board 2008*]

10. For tetrahedral coordination the radius ratio (r^+/r^-) should be [*HP Board 2008*]
(A) 0.155-0.225 (B) 0.225-0.414
(C) 0.414-0.732 (D) 0.732-1.0.

11 Substance A_xB_y crystallizes in a face centred cubic (F.C.C) lattice in which atoms "A" occupy each corner of cube and the atom "B" occupies the centre of each face of the cube. Identify the correct composition of substance A_xB_y. [*HP Board 2009*]
(A) AB_3
(B) A_4B_3
(C) A_3B
(D) Composition cannot be specified.

12. Which of the following shows ferromagnetism ?
(A) TiO_2 (B) CrO_2
(C) MnO (D) Fe_3O_4.
[*HP Board 2009*]

13. The number of atoms in *bcc* arrangement is
(A) 1 (B) 2
(C) 4 (D) 6 [*HP Board 2010*]

14. If the alignment of mangnetic moments in a substance is in a compensatory way so as to give zero net magnetic moment, then the substance is said to be
(A) Ferromagnetism (B) Anti-ferromagnetism
(C) Ferrimagnetism (D) Diamagnetism
[*HP Board 2010*]

15. The number of atoms present in a *fcc* unit cell is
(A) 6 (B) 8
(C) 4 (D) 12 [*HP Board 2010*]

16. Volume occupied by atoms in simple cubic crystal is [*HP Board 2011*]
(A) 52.4% (B) 74%
(C) 68% (D) None of these.

17. Volume occupied in *fcc* is : [*HP Board 2011*]
(A) 74% (B) 68%
(C) 52.4% (D) 65%

18. What is radius ratio for the co-ordinatior number 8 ? [*HP Board 2011*]
(A) 0.732–1.0 (B) 0.414–0.732
(C) 0.155–0.225 (D) None of these

ANSWERS

1.B	2.D	3.B	4.B	5.A	6.D	7.D	8.A	9.A
10.B	11.A	12.B	13.B	14.B	15.C	16.A	17.A	18.A

2. Solutions

1. When the solute is present in trace quantities, the following expression is used
   (A) gram per million (B) milligram percent
   (C) microgram percent (D) parts per million.
2. The concentration units independent of temperature would be
   (A) normality
   (B) mass - volume percent
   (C) molality
   (D) molarity.
3. Units of molarity are
   (A) g/lt (B) mol / lt
   (C) kg/lt (D) None of these.
4. Partial pressure of a solution component is directly proportional to its mole fraction. This statement is known as
   (A) Henry's law (B) Raoult's law
   (C) Distribution law (D) Ostwald's dilution.law.
5. In a mixture, A and B compounds show negative deviation as
   (A) $\Delta V_{mix} > 0$
   (B) $\Delta H_{mix} < 0$
   (C) A–B interaction is weaker than A–A and B–B interaction
   (D) None of the above reason is correct.
6. Which of the following is not correct for ideal solution ?
   (A) $\Delta S_{mixing} = 0$ (B) $\Delta V_{mixing} = 0$
   (C) $\Delta H_{mixing} = 0$ (D) It obeys Raoult's law.
7. Colligative properties of solutions are those which depend upon [*HP Board 2012*]
   (A) the nature of the solvent
   (B) the nature of the solute
   (C) the number of solvent molecules
   (D) the number of solute particles.
8. Which of the following is not a Colligative property ? [*HP Board 2008,2012*]
   (A) Depression in freezing point
   (B) Elevation in boiling point
   (C) Optical activity
   (D) Relative lowering in vapour pressure.
9. Which of the following is a colligative property ?
   (A) Molar mass (B) Osmotic pressure
   (C) Viscosity (D) Optical activity. [*HP Board 2008*]
10. Which is not a Colligative property ?
    (A) ΔT_b (B) ΔT_f
    (C) K_b (D) π [*HP Board 2008*]
11. Blood cells do not shrink in blood because blood is [*HP Board 2009*]
    (A) hypotonic (B) isotonic
    (C) equimolar (D) hypertonic.
12. A Pressure cooker reduces cooking time because
    (A) heat is more evenly distributed
    (B) the high pressure tenderises the food
    (C) the boiling point of water inside the cooker is elevated
    (D) the boiling point of water inside the cooker is depressed. [*HP Board 2009*]
13. Which of the following mode of expressing the concentrations is independent of temperature ?
    (A) Molarity (B) Molality
    (C) Formality (D) Normality. [*HP Board 2009*]

ANSWERS

1.D 2.C 3.B 4.B 5.B 6.A 7.D 8.C 9.B 10.C 11.B 12.C 13.B

3. Electrochemistry

1. Strong electrolytes are those which
   (A) dissolve readily in water
   (B) conduct electricity
   (C) dissociate into ions at high dilution.
   (D) completely dissociate into ions at all dilutions.
2. Electrolysis involves oxidation and reduction respectively at
   (A) anode and cathode
   (B) cathode and anode
   (C) at both the electrodes
   (D) None of the above.
3. The cathode in a galvanic cell and electrolytic cell is
   (A) negatively charged in both cases
   (B) positively charged in both cases
   (C) positively charged in galvanic cell but negatively charged in an electrolytic cell
   (D) negatively charged in a galvanic cell but positively charged in an electrolytic cell .
4. During the electrolysis of NaCℓ solution, the gas liberated at the anode is
   (A) H_2 (B) O_2
   (C) $C\ell_2$ (D) Na .
5. In a galvanic cell
   (A) chemical energy is converted into electricity
   (B) chemical energy is converted into heat
   (C) electrical energy is converted into heat
   (D) electrical energy is converted into chemical energy.

6. Law of electrolysis was given by
(A) Lamarck (B) Ostwald
(C) Faraday (D) Arrhenius.

7. Faraday's laws of electrolysis are related to
(A) atomic number of the cation
(B) atomic number of anion
(C) equivalent weight of the electrolyte
(D) speed of the cation.

8. The units of conductivity are
(A) ohm^{-1} (B) $ohm^{-1}\ cm^{-1}$
(C) $ohm^{-2}\ cm^2\ equiv^{-1}$ (D) $ohm^{-1}cm^2$.
[*HP Board 2008,2012*]

9. In a dry cell the depolarizer is
(A) MnO_2 (B) Zn
(C) Charcoal powder (D) $NH_4C\ell$.
[*HP Board 2008*]

10. The units of cell constant are
(A) $ohm^{-1}cm^{-1}$ (B) cm
(C) $ohm^{-1}cm$ (D) cm^{-1}.
[*HP Board 2008,09,2012*]

11. Unit of equivalent conductance is
(A) $Ohm^{-1}cm^{-1}$ (B) $Ohm^{-1}cm^{-2}$
(C) $Ohm^{-1}cm^2$ (D) $Ohm^{-1}\ cm^2$ (g.eq.).
[*HP Board 2009*]

12. In an electrochemical cell,
(A) potential energy decreases
(B) kinetic energy decreases
(C) potential energy changes into electrical energy
(D) chemical energy changes into electrical energy
[*HP Board 2009*]

13. Unit of cell constant is
(A) $ohm^{-1}\ cm^{-1}$ (B) cm
(C) $ohm^{-1}\ cm$ (D) cm^{-1}[*HP Board 2009*]

14. The units of cell constant are
[*HP Board 2010*]
(A) $ohm^{-1}\ cm^{-1}$ (B) cm
(C) $ohm^{-1}\ cm$ (D) cm^{-1}

15. The units of conductivity are
(A) $ohm^{-1}\ cm^{-1}$ (B) $ohm^{-1}\ cm^{-2}$
(C) ohm^{-1} (D) $ohm^{-2}\ cm^{-2}\ equiv^{-1}$
[*HP Board 2010*]

16. For a redox reaction to proceed in a cell, the e.m.f. must be
(A) positive (B) negative
(C) fixed (D) zero
[*HP Board 2010*]

17. The standard EMF of Daniel Cell is 1.10V. The maximum electrical work obtained from the cell is ? [10h=2]
(A) 175.4 KJ (B) 212.3 KJ
(C) 106.15 KJ (D) 53.07 KJ
[*HP Board 2011*]

18. The conductivity of metals increases with
(A) Increase in temperature
(B) Decrease in temperature
(C) No change observed
(D) Increases then decreases. [*HP Board 2011*]

19. The electrode potential of SHE is arbitrarily fixed as :
(A) 0.34V (B) –0.44V
(C) Zero (D) –0.76V.
[*HP Board 2011*]

ANSWERS

1.D 2.A 3.C 4.C 5.A 6.C 7.C 8.B 9.D
10.D 11.D 12.D 13.D 14.D 15.B 16.A 17.B 18.B
19.C

4. Chemical Kinetics

1. For a reaction involving solid, decreasing which given below will increase the rate of reaction ?
(A) Particle size (B) Concentration
(C) Temperature (D) Pressure.

2. Rate of first order reaction depends upon
(A) time
(B) concentration of reactant
(C) temperature
(D) All the three.

3. Under a given set of experimental conditions, with increase of concentration of the reactants, the rate of a chemical reaction
(A) decreases (B) increases
(C) remains unaffected (D) first decreases.

4. Units of specific reaction rate for 2nd order reaction is
(A) sec^{-1} (B) mol L^{-1} sec^{-1}
(C) L^2 $mol^{-2}sec^{-1}$ (D) L mol^{-1} sec^{-1}.

5. The hydrolysis of ester in alkaline medium is a
(A) 1st order reaction with molecularity 1
(B) 2nd order reaction with molecularity 2
(C) 1st order reaction with molecularity 2
(D) 2nd order reaction with molecularity 1.

6. The second order rate constant is usually expressed as
(A) mol litre sec^{-1} (B) mol^{-1} litre sec^{-1}
(C) mol $litre^{-1}$ sec^{-1} (D) mol^{-1} litre sec^{-1}.

7. A zero order reaction is one whose rate is independent of
(A) temperature of the reaction
(B) the concentration of the reactants
(C) the concentration of the products
(D) the material of the vessel in which the reaction is carried out.

8. Rate constant of a reaction depends upon
(A) temperature
(B) initial concentration of the reactants
(C) time of reaction
(D) extent of reaction. [*HP Board 2008,2012*]

9. The unit of Ist order rate constant are
(A) conc. time^{-1} (B) time conc.$^{-1}$
(C) time^{-1} (D) time^{-1} conc.$^{-1}$.
[*HP Board 2008*]

10. The substance that increases the speed of a chemical reaction is called .
(A) inhibitor (B) promotor
(C) moderator (D) catalyst.

11. For the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$, rate of reaction in term, of O_2 is $d[O_2]/dt$. In terms of N_2O_5 will be
(A) $-d[N_2O_5]/dt$ (B) $+d[N_2O_5]/dt$
(C) $-\frac{1}{2}d\frac{[N_2O_5]}{dt}$ (D) $-2d\frac{[N_2O_5]}{dt}$.
[*HP Board 2009*]

12. Unit of rate constant for zero order reaction is
(A) mol L^{-1} s^{-1} (B) mol^{-1} Ls^{-1}
(C) s^{-1} (D) Mol^{-2} L^2s^{-1}.
[*HP Board 2009*]

13. Rate of a reaction can be expressed by Arrhenius equation as $k = Ae^{-Ea/RT}$. In this equation E_a represents
(A) the total energy of reacting molecule at a temperature T
(B) the fraction of molecule with energy greater than activation energy of the reaction
(C) the energy above which all the colliding molecule will react
(D) the energy below which the colliding molecule will not react. [*HP Board 2009*]

14 Which of the following graphs corresponds to first order reaction :

(A) Rate — Conc.

(B) Rate — 1/Conc.

(C) Rate — Conc.

(D) Rate — (Conc.)^2

[*HP Board 2012*]

ANSWERS

1.A 2.D 3.B 4.D 5.B 6.B 7.C 8.C 9.D 10.D 11.C
12.A 13.A 14.?

5. Surface Chemistry

1. Adsorption due to strong chemical forces is called
(A) chemisorption (B) physisorption
(C) reversible adsorption (D) Both B and C.

2. The heat of adsorption in physisorption lies in the range of (in kJ/mol)
(A) 40—400 (B) 40—100
(C) 10—40 (D) 1—10.

3. Catalyst only
(A) decreases activation energy
(B) increases activation energy
(C) brings about equilibrium
(D) None of these.

4. The size of colloidal particles is in between
(A) 10^{-7}—10^{-9} cm (B) 10^{-9}—10^{-11} cm
(C) 10^{-5}—10^{-7} cm (D) 10^{-2}—10^{-3} cm.

5. Milk is a colloid in which a
(A) liquid is dispersed in a liquid
(B) solid is dispersed in a liquid
(C) gas is dispersed in a liquid
(D) sugar is dispersed in a liquid.

6. Which one of the following is correctly matched ?
(A) Emulsion – Curd (B) Foam -Mist
(C) Aerosol - Smoke (D) Solid sol - Cake.

7. Chromatography is based on the principles of
(A) Chemical adsorption (B) Hydrogen bonding
(C) Chemisorption (D) Physical adsorption.
[*HP Board 2008*]

8. As_2S_3 sol. is
(A) positive colloid (B) negative colloid
(C) neutral colloid (D) None of these.
[*HP Board 2008*]

9. The role of a catalyst in a chemical reaction is to change
(A) enthalpy of a reaction
(B) nature of products
(C) activation energy
(D) equilibrium constant. [*HP Board 2008*]

10. In colloidal state, particle size ranges from
(A) 10-100 Å
(B) 20- 50 Å
(C) 1-10 Å
(D) 1-280 Å [*HP Board 2008*]

11. Colloidal sol is
(A) true solution
(B) suspension solution
(C) heterogeneous solution
(D) homogeneous solution. [*HP Board 2009*]

12. Which of the following is a lyophillic colloid ?
(A) Milk (B) Gum
(C) Fog (D) Blood
[*HP Board 2009*]

13. Which of the following has maximum value of flocculating power ?
(A) Pb^{2+} (B) Pb^{4+}
(C) Sr^{2+} (D) Na^{+}.
[*HP Board 2009*]

14. Which of the following are positively charged sols. ?
(A) $Fe(OH)_3$ (B) Sb_2S_3
(C) TiO_2 (D) Silver sol
[*HP Board 2010*]

15. The colloidal system in which the disperse phase and dispersion medium are both liquids is known as
(A) a gel (B) an aerosol
(C) an emulsion (D) a foam
[*HP Board 2010*]

16. The zig zag motion of colloidal particles was first observed by
(A) John Tyndall (B) Robert Brown
(C) Zsigmondy (D) Ostwald
[*HP Board 2010*]

17. Blood may be purified by
(A) dialysis (B) electro-osmosis
(C) coagulation (D) filtration
[*HP Board 2011*]

18. Shape selective catalysis is a reaction catalysed by
(A) Zeolites
(B) Enzymes
(C) Platinum
(D) Zeigler-Natta catalyst. [*HP Board 2011*]

19. Out of these which colloidal solution is not a Lyophilic Colloid ?
(A) Gold sol. (B) Gelatin
(C) Starch (D) Haemoglobin.
[*HP Board 2011*]

ANSWERS

1.A	2.C	3.A	4.C	5.A	6.C	7.D	8.B	9.C
10.A	11.C	12.B	13.B	14.A	15.C	16.B	17.A	18.A
19.A								

6. General Principles and Processes of Isolation of Elements

1. An ore of aluminium is
(A) $Na_3A\ell F_6$ (B) $A\ell_2O_3.2H_2O$
(C) $A\ell_2O_3$ (D) $A\ell_2O_3.H_2O$

2. Which of the following is used as a depressant in froth floatation process ?
(A) Amyl xanthate (B) Pine oil
(C) Copper sulphate (D) Potassium cyanide

3. The reducing agent used in thermite process is
(A) magnesium (B) chromium
(C) aluminium (D) iron.

4. Cupellation process is used in the metallurgy of
(A) Cu (B) Ag
(C) $A\ell$ (D) Fe.

5. Which of the following is not an ore ?
(A) Bauxite (B) Malachite
(C) Zinc blende (D) Pig iron.

6. Electrolytic reduction method is used in the extraction of
(A) highly electronegative elements
(B) highly electropositive elements
(C) transition metals
(D) noble metals.

7. The main function of roasting is
(A) to remove the volatile matter
(B) oxidation
(C) reduction
(D) to make slag.

8. In blast furnace, iron oxide is reduced by
(A) silica (B) CO
(C) C (D) lime stone.

9. Cassiterite is an ore of
(A) Mn (B) Ni (C) Sb (D) Sn.

10. The process of converting hydrated alumina into anhydrous alumina is called
(A) roasting (B) smelting
(C) dressing (D) calcination.

11. The chemical formula of copper pyrites is
(A) $CuFeS_2$ (B) Cu_2S
(C) Cu_2O (D) $CuCO_3.Cu(OH)_2$.
[*HP Board 2009*]

12. Malachite is an ore of
(A) iron (B) zinc
(C) copper (D) mercury.
[*HP Board 2009*]

13. Which of the following ore is best concentrated by froth floatation process ?
(A) Magnetite (B) Galena
(C) Malachite (D) Cassiterite
[*HP Board 2010*]

14. Magnetic separation is used in the concentration of (A) copper pyrites (B) chromite
(C) bauxite (D) cinnabar.
[*HP Board 2010*]

15. Which of the following is magnetite ?
(A) Fe_3O_4 (B) Fe_2O_3
(C) $Fe_2O_3 3H_2O$ (D) Fe_2CO_3
[*HP Board 2010*]

16. The most abundant element in the earth's crust is :
(A) Oxygen (B) Aluminium
(C) Silicon (D) None of these.
[*HP Board 2011*]

17. The method which is used for getting metals of high purity is :
(A) Zone refining (B) Van Arkel's Method
(C) Liquation (D) Chromatography.
[*HP Board 2011*]

18. Purest form of iron is
(A) Cast iron (B) Wrought iron
(C) Steel (D) Pig iron.
[*HP Board 2011*]

ANSWERS

1.B	2.D	3.C	4.B	5.D	6.B	7.B	8.B	9.D
10.D	11.A	12.C	13.B	14.B	15.A	16.A	17.A	18.A

7. The *p*-Block Elements

1. Ammonia is, in general,
(A) acidic (B) basic
(C) amphoteric (D) All the above.

2. The laughing gas is
(A) nitrous oxide (B) nitric oxide
(C) nitrogen trioxide (D) nitrogen pentaoxide.

3. Which of the following compound is explosive ?
(A) NF_3 (B) $NC\ell_3$
(C) NBr_3 (D) NI_3.

4. NH_3 can be prepared by
(A) Dow's process (B) Haber's process
(C) Ostwald's process (D) All the above.

5. The bond angle in ammonia molecule is
(A) 109° 28′ (B) 90°
(C) 120° (D) 107°.

6. In XeF_2, XeF_4 and XeF_6 the number of lone pairs on Xe is respectively
(A) 2, 3, 1 (B) 1, 2, 3
(C) 4, 1, 2 (D) 3, 2, 1.

7. Bleaching powder is obtained by treating $C\ell_2$ with
(A) CaO (B) $CaCO_3$
(C) $CaOC\ell_2$ (D) $Ca(OH)_2$.

8. Which of the following is most volatile ?
(A) HI (B) HBr (C) $HC\ell$ (D) HF.

9. The hybridization in $IC\ell_7$ is
(A) sp^3d^3 (B) d^2sp^3 (C) sp^3d (D) sp^3 .

10. Which of the following has the stronger bond ?
(A) F–Br (B) F–$C\ell$
(C) F–Br (D) $C\ell$–Br.

11. Maximum covalency of sulphur is
(A) 2 (B) 4
(C) 6 (D) 8. [*HP Board 2009*]

12. The molarity of pure water is
(A) 18 (B) 5.56
(C) 55.6 (D) 100
[*HP Board 2010*]

13. The basicity of phosphorus acid is
(A) two (B) three
(C) one (D) zero. [*HP Board 2010*]

14. Which one of the following is tailing of mercury ?
(A) N_2O (B) SiO_2
(C) Hg_2O (D) None of these
[*HP Board 2010.2012*]

15. Which of the following is not a d-block element :
(A) Hg (B) Po
(C) Ni (D) W [*HP Board 2011*]

16. The halogen with highest negative electron gain enthalpy :
(A) F (B) $C\ell$
(C) Br (D) I [*HP Board 2012*]

17. Which of the following has highest ionisation enthalpy ?
(A) P (B) N
(C) As (D) Sb [*HP Board 2012*]

ANSWERS

1.B	2.A	3.B	4.B	5.D	6.D	7.D	8.C	9.A
10.A	11.C	12.C	13.A	14.C	15.B	16.?	17.?	

8. The *d*- and *f*-Block Elements

1. The transition elements have a general electronic configuration of
(A) $ns^2\ np^6\ nd^{1-10}$ (B) $(n-1)\ d^{1-10}\ ns^{0-2}np^{0-6}$
(C) $(n-1)\ d^{1-10}ns^{1-2}$ (D) $nd^{1-10}ns^{1-2}$.

2. The correct ground state electronic configuration of chromium atom ($Z=24$) is
(A) [Ar] $4d^5 4s^1$ (B) [Ar] $3d^4 4s^2$
(C) [Ar] $3d^6 4s^0$ (D) [Ar] $3d^5 4s^1$.

3. Which of the following elements is alloyed with copper to form brass ?
(A) Lead (B) Bismuth
(C) Zinc (D) Antimony.

4. Argentite is an ore of
(A) Cu (B) Pt (C) Au (D) Ag.

5. The inner transition elements are the elements in which the added electrons goes to
(A) $(n-1)$ *d*-orbitals
(B) $(n-2)$ *f*-orbitals
(C) $(n-1)$ *d*-orbitals and $(n-1)$ *f*-orbitals
(D) $(n-1)$ *d*-orbitals and *ns* orbitals.

6. Transition elements
(A) exhibit inert pair effect
(B) exhibit variable oxidation states
(C) have low melting points
(D) do not show any catalytic activity.

7. Paramagnetism is a property of
(A) completely filled electronic subshells
(B) unpaired electrons
(C) non -transition elements
(D) melting and boiling points of the elements.

8. Which of the following transition element exhibit the oxidation state of +8 ?
(A) Cd (B) Ru
(C) Au (D) Te

9. Which forms interstitial compounds ?
(A) Fe (B) Co
(C) Ni (D) All the above.

10. The transition metal present in vitamin B_{12} is
(A) Fe (B) Co
(C) Ni (D) Na.

11. Which of the following element has maximum electron gain enthalpy ? (negative)
(A) F (B) Cl
(C) Br (D) I [*HP Board 2011*]

ANSWERS

1.C 2.D 3.C 4.D 5.B 6.B 7.B 8.B 9.D 10.B 11.B

9. Co-ordination Compounds

1. An example of double salt is
(A) bleaching powder (B) $K_4[Fe(CN)_6]$
(C) hypo solution (D) potash alum

2. Which of the following represents the IUPAC name of $[Co(NH_3)_6]C\ell_3$?
(A) hexaamminecobalt (III) chloride
(B) cobalt (III) hexamine tri-chloride
(C) cobalt hexamine chloride
(D) hexamine cobalt chloride.

3. Name of complex $[Pt(NH_3)_6]C\ell_4$ is
(A) hexaammineplatinum (IV) chloride
(B) hexaammineplatinum (II) chloride
(C) tetrachloro hexaammineplatinum (IV)
(D) tetrachloro hexaammineplatinum (II).

4. $[Co(NH_3)_5\ Br]SO_4$ and $[Co(NH_3)_5\ SO_4]Br$ are examples of which type of isomers ?
(A) Linkage (B) Geometrical
(C) Ionisation (D) Optical .

5. Which complex has square planar structure ?
(A) $[Ni(CO)_4]$ (B) $[NiC\ell_4]^{2-}$
(C) $[Ni(H_2O)_6]^{2+}$ (D) $[Cu(NH_3)_4]^{2+}$.

6. The number of *d*-electrons in $[Cr(H_2O)_6]^{3+}$ (At. no. of Cr= 24) is
(A) 2 (B) 3
(C) 4 (D) 5

7. Which of the following complex species involves d^2sp^3 hybridisation ?
(A) $[CoF_6]^{3-}$ (B) $[Co(NH_3)_6]^{3+}$
(C) $[Fe(CN)_6]^{3-}$ (D) $[Cr(NH_3)_6]^{3+}$

8. Which of the following acts as a positive ligand?
(A) Acetate (B) Carbonyl
(C) Nitrosonium (D) Aquo.

9. The effective atomic number of Fe in $Fe(CO)_5$ is
(A) 26 (B) 34
(C) 36 (D) 54

10. The coordination number of copper in cuprammonium sulphate is
(A) 2 (B) 4
(C) 3 (D) 6.

11. Write the I.U.P.A.C. name of the $K_3[Fe(CN)_5NO]$
(A) Potassium pentacyanonitrosyl ferrate (II)
(B) Potassium penta cyanonitrile (II)
(C) Potassium penta cyanonitrosyl ferrate (III)
(D) None of these [*HP Board 2012*]

ANSWERS

1.D 2.A 3.A 4.C 5.D 6.B 7.D 8.C 9.C 10.B 11.?

10. Haloalkanes and Haloarenes

1. Ethyl alcohol gives ethyℓ chloride with the help of
   (A) $NaC\ell$ (B) $C\ell_2$
   (C) $KC\ell$ (D) $SOC\ell_2$.
2. $CH_3-CH=CH_2 + HI \longrightarrow$ X. Where X is
   (A) $CH_3-CH_2-CH_2-I$ (B) $CH_3-\underset{\underset{I}{|}}{CH}-CH_3$
   (C) $CH_3-CH_2-CH_3$ (D) $CH_3-CH_3+CH_4$.
3. The reaction
   $CH_3-CH=CH_2 + HBr \longrightarrow CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$ is
   (A) nucleophilic addition reaction
   (B) electrophilic addition reaction
   (C) electrophilic substitution reaction
   (D) free radical addition reaction.
4. SN^1 reaction of alkylhalides leads to
   (A) retention of configuration
   (B) racemisation
   (C) inversion of configuration
   (D) None of these.
5. Most reactive halide towards SN^1 reaction is
   (A) *n*-butyl chloride (B) *sec*- butyl chloride
   (C) *tert*-butyl chloride (D) allyl chloride.
6. The reactivity order of halides for dehydrohalogenation is
   (A) $R-F > R-C\ell > R-Br > R-I$
   (B) $R-I > R-Br > R-C\ell > R-F$
   (C) $R-I > R-I > R-Br > R-C\ell$
   (D) $R-F < R-I > R-Br > R-C\ell$.
7. Mg reacts with RBr best in
   (A) $C_2H_5OC_2H_5$
   (B) $C_6H_5OCH_3$
   (C) $C_6H_5N(CH_3)_2$
   (D) equally in all the three.
8. Both methane and ethane can be prepared in single step by the use of
   (A) C_2H_4 (B) CH_3OH
   (C) CH_3Br (D) CH_3CHO.
9. Alkyl halides react with Mg in dry ether to form
   (A) magnesium halide (B) Grignard's reagent
   (C) alkene (D) alkyne.
10. Which of the following metal can be used for carrying out Wurtz-Fittig reaction ?
    (A) Sodium (B) Mercury
    (C) Radium (D) Any of these.

ANSWERS

1.D 2.B 3.B 4.B 5.C 6.B 7.A 8.C 9.B 10.A

11. Alcohols, Phenols and Ethers

1. Alkene $R-CH=CH_2$ reacts with B_2H_6 in the presence of H_2O_2 to give
   (A) $R-\underset{\underset{O}{\|}}{C}-CH_3$ (B) $R-\underset{\underset{OH}{|}}{CH}-CH_3$
   (C) $R-CH_2-CHO$ (D) $R-CH_2-CH_2-OH$
2. Alcohol fermentation is brought about by the action of
   (A) CO_2 (B) O_2
   (C) invertase (D) yeast.
3. What is the product obtained when chlorine reacts with ethyl alcohol in the presence of NaOH ?
   (A) $CH_3C\ell$ (B) $C_2H_5C\ell$
   (C) $CC\ell_3CHO$ (D) $CHC\ell_3$.
4. Rectified spirit is a mixture of
   (A) 95% ethyl alcohol + 5% water
   (B) 94% ethyl alcohol + 4.53 water
   (C) 94.4% ethyl alcohol + 5.43% water
   (D) 95.87% ethyl alcohol + 4.13% water.
5. In glycerine ,
   (A) one primary –OH group is present only
   (B) one tertiary –OH group is present
   (C) two secondary –OH groups are present
   (D) one secondary –OH group is present.
6. Victor Meyer's test is not given by
   (A) $(CH_3)_3COH$
   (B) C_2H_5OH
   (C) $(CH_3)_2CHOH$
   (D) $CH_3CH_2CH_2OH$.
7. When phenol is treated with $CHC\ell_3$ and NaOH, the product formed is
   (A) benzaldehyde
   (B) salicylaldehyde
   (C) salicyclic acid
   (D) benzoic acid.

8. Alcohols are the compounds obtained by replacing one or more H-atom by
(A)–COOH group (B) – CHO group
(C) –OH group (D) > C = O group.

9. $C_6H_5OH \xrightarrow[H_2SO_4]{conc.HNO_3} X$. The X can be
(A)Benzene
(B) Catechol
(C) *p*-Nitrophenol
(D) 2, 4, 6- Trinitrophenol

10. Which compound is predominantly formed when phenol is allowed to react with bromine in aqueous medium ?
(A)Picric acid
(B) Salicylic acid
(C) 2, 4, 6-Tribromophenol
(D)*p*-Bromophenol.

11. Phenol upon distillation with zinc dust gives :
(A)Benzene
(B) Benzaldehyde
(C) Benzoic acid
(D) Benzophenone

[*HP Board 2011*]

ANSWERS

1.D 2.D 3.D 4.D 5.D 6.A 7.B 8.C 9.D 10.C 11.A

12. Aldehydes, Ketones and Carboxylic Acids

1. In the following reaction, product P is

$$R-\overset{\overset{O}{\|}}{C}-C\ell \xrightarrow[Pd/BaSO_4]{H_2} P$$

(A) $R\,CH_2\,OH$ (B) $R\,COOH$
(C) $R\,CHO$ (D) $R\,CH_3$.

2. $\begin{matrix}CH_3COO\\ \\ CH_3COO\end{matrix}\!\!>\!\!Ca$ on heating will yield ?
(A) CaO, CO_2, H_2O
(B) $Ca(COCH_3)_2$
(C) $CaCO_3$ and CH_3COCH_3
(D) CH_3CHO and $CaCO_3$.

3. Which of the following compounds give a ketone with Grignard's reagent ?
(A) Formaldehyde
(B) Ethanenitrile
(C) Ethyl alcohol
(D) Methyl iodide.

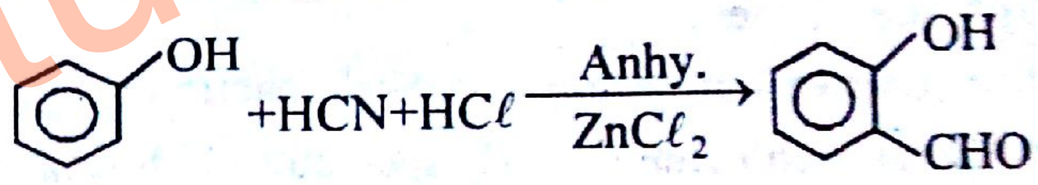
4. Identify the product *Y* in the sequence.

$$CH_3CHO+CH_3MgBr \xrightarrow{Ether} X \xrightarrow{H_2O/H^+} Y$$

(A) CH_3OH
(B) CH_3CH_2OH
(C) $(CH_3)_2CHOH$
(D) $(CH_3)_3COH$.

5. Which of the following reacts with NaOH to produce an acid and an alcohol ?
(A) HCHO
(B) CH_3COOH
(C) CH_3CH_2COOH
(D) C_6H_5COOH.

6. The following reaction



is known as
(A)Perkin reaction
(B) Gattermann aldehyde synthesis
(C) Kolbe's reaction
(D) Gattermann-Koch reaction.

7. If formaldehyde and KOH are heated, then we get
(A) methyl
(B) methyl alcohol
(C) ethyl formate
(D) acetylene.

8. The addition of HCN to carbony compounds is an example of
(A) nucleophilic substitution
(B) electrophilic addition
(C) nucleophilic addition
(D) electrophilic substitution.

ANSWERS

1.C 2.C 3.B 4.C 5.A 6.B 7.B 8.C

13. Amines

1. Stephen reduction converts cyanides to
   (A) aldehydes (B) ketones
   (C) amines (D) acids.
2. Which of the following substances on treatment with P_2O_5 gives ethanenitrile ?
   (A) Propanamide (B) Ethanamide
   (C) Ethanoic acid (D) N-methylethylamine.
3. Aniline upon heating with conc. HNO_3 and conc. H_2SO_4 mixture gives
   (A) *o*-and *p*-nitroaniline (B) *o*-nitroaniline
   (C) black tarry mass (D) no reaction.
4. Which one gives carbylamine reaction ?
   (A) CH_3NH_2 (B) $C_2H_5NO_2$
   (C) CH_3CONH_2 (D) $(CH_3)_2NH$.
5. The electrolytic reduction of nitrobenzene in strongly acidic medium produces
   (A) phenol (B) *p*-Aminophenol
   (C) hydroazobenzene (D) azobenzene.
6. Which of the following on boiling with $Na_2CO_3(aq)$ gives aniline ?
   (A) Nitrobenzene
   (B) Anilinium chloride
   (C) Chlorobenzene
   (D) Benzene diazonium chloride.
7. An organic compound with formula C_3H_5N on hydrolysis forms an acid which reduces Fehling solution. The compound can be
   (A) ethanenitrile (B) isocyanoethane
   (C) ethoxyethane (D) propanenitrile.
8. In the following reaction
   $C_6H_5NH_2 + CHC\ell_3 + 3NaOH \longrightarrow A + 3B + 3C$.
   The product A is
   (A) phenyl isocyanide (B) phenyl cyanide
   (C) ethyl chloride (D) $HC\ell$ or H_2O.
9. Which reactants are involved in Mendius reaction?
   (A) RCN and Na/C_2H_5OH
   (B) RCN and $H_2O/HC\ell$
   (C) RCN and $Zn/NH_4C\ell$
   (D) RCN and $SnC\ell_2/HC\ell$
10. Nitrobenzene is subjected to reduction with zinc dust and ammonium chloride. The main product formed will be
    (A) benzenamine
    (B) aniline
    (C) N-phenylhydroxylamine
    (D) none of above.

ANSWERS

1.A 2.B 3.A 4.A 5.B 6.B 7.B 8.A 9.A 10.C

14. Biomolecules

1. Last product of protein digestion is
   (A) polypeptides (B) DNA
   (C) amino acid (D) peptones.
2. A nucleotide consists of
   (A) ribose sugar
   (B) nitrogen containing base
   (C) phosphoric acid
   (D) All of these.
3. α-D (+) glucose and β-D-(+) glucose are
   (A) enantiomers
   (B) geometrical isomers
   (C) epimers
   (D) anomers.
4. An example of water soluble vitamin is
   (A) vitamin D (B) vitamin E
   (C) vitamin A (D) vitamin C.
5. The base adenine occurs in
   (A) DNA only (B) RNA only
   (C) DNA and RNA both (D) protein.
6. Which is not a reducing sugar ?
   (A) glucose (B) fructose
   (C) mannose (D) sucrose.
7. Glucose $\xrightarrow{H_2O} C_2H_5OH + CO_2 +$ Energy. The above reaction is an example of
   (A) hydrolysis
   (B) saponification
   (C) dehydration
   (D) fermentation.

8. The sweetest sugar among the following is
(A) lactose
(B) fructose
(C) glucose
(D) sucrose.

9. If the sequence of bases in one strand of DNA is ATGACTGTC then the sequence of bases in its complementary strand is
(A) TACTGACAG
(B) TUCTUGUC CUG
(C) GUAGTUAUG
(D) None of these.

10. Which of the following has magnesium ?
(A) Carbonic anhydrase
(B) Haemocyanin
(C) Chlorophyll
(D) Vitamin B_{12}.

ANSWERS

1.C 2.D 3.D 4.D 5.C 6.D 7.D 8.B 9.A 10.C

15. Polymers

1. Which is not true about polymers ?
(A) Polymers do not carry any charge
(B) Polymers have high viscosity
(C) Polymers scatter light
(D) Polymers have low molecular weight.

2. Teflon, styrene and neoprene are all
(A) copolymers
(B) condensation polymers
(C) homopolymers
(D) monomers.

3. The copolymer is
(A) Nylon – 6
(B) Nylon – 66
(C) PMMA
(D) Polyethene.

4. Which of the following is not an example of additional polymer ?
(A) Polystyrene
(B) Nylon
(C) PVC
(D) Polypropylene.

5. Which of the following monomer gives the polymer neoprene on polymerization ?
(A) $CH_2 = CHC\ell$
(B) $CC\ell_2 = CC\ell_2$
(C) $CH_2 = CH - CC\ell = CH_2$
(D) $CF_2 = CF_2$.

6. Which of the following is a constituent of nylon ?
(A) Adipic acid (B) Styrene
(C) Teflon (D) None of these.

7. Which of the following is used in paints ?
(A) Terylene
(B) Nylon
(C) Glyptal
(D) Chloroprene.

8. Which of the following is a synthetic polymer?
(A) Starch (B) Silk
(C) Protein (D) Polystyrene.

9. A polymer which is commonly used as a packaging material is
(A) Polythene (B) Polypropylene
(C) PVC (D) Bakelite.

10. The abbreviation PDI refers to
(A) Name of the polymer
(B) Poly dispersity index
(C) Planck's disposal index
(D) Poly diagonal index.

ANSWERS

1.D 2.C 3.B 4.B 5.C 6.A 7.C 8.D 9.A 10.B

16. Chemistry in Everyday Life

1. The drug used to get relief from pain are called
(A) antipyetics
(B) analgesics
(C) antibiotics
(D) antiseptics.

2. Which of the following is not an antiseptic drug ?
(A) Iodoform (B) Dettol
(C) Gammexane (D) Gentian violet.

3. The compound acting as an antacids is
(A) $Mn(OH)_2$
(B) Veronal
(C) Norethindrone
(D) Lansoparazole.

4. Which of the following is used as an antioxidant in food ?
(A) BTX
(B) BHT
(C) BHC
(D) All the three.

5. Drug which helps to reduce anxiety and brings about calmness is
(A) tranquilizer
(B) diuretic
(C) analgesic
(D) antihistamine.

6. Sweetness value is the highest in
(A) alitame
(B) sucrose
(C) aspartame
(D) fructose.

7. The detergent which is used as a germicide is
(A) sodium lauryl sulphate
(B) cetyltrimethylammonium chloride
(C) lauryl alcohol ethoxylate
(D) sodium-2-dodecylbenzenesulphonate.

8. An antipyretic is
(A) quinine
(B) paracetamol
(C) luminal
(D) piperazine.

9. Aspirin is an acetylation product of
(A) *p*-Dihydroxybenzene
(B) *o*-Hydroxybenzoic acid
(C) *o*-Dihydroxybenzene
(D) *m*-Hydroxybenzoic acid.

10. Sodium benzoate is metabolised in body to
(A) glucose
(B) hippuric acid
(C) benzene
(D) benzoic acid.

11. Renitidine is used as
(A) Antiseptic (B) Antacid
(C) Antihistamine (D) Disinfectant
[HP Board 2010]

12. Chloramphenicol is
(A) antipyretic
(B) broad spectrum antibiotic
(C) azo dye
(D) transquilizer *[HP Board 2010]*

13. Which of the followig is not an antipyretic ?
(A) Paracetamol
(B) Aspirin
(C) Phenacetin
(D) Chloramphenicol *[HP Board 2010, 2012]*

14. Chloramphenicol is used as :
(A) An analgesic (B) A tranquilizer
(C) An antibiotic (D) Antiseptic.
[HP Board 2011]

15. Out of these which compound is not a tranquilizer ?
(A) Luminal (B) Seconal
(C) Valium (D) Bithional.
[HP Board 2011]

16. Which of the following is used as artifcial sweetner ? *[HP Board 2011]*
(A) Saccharin (B) Aspirin
(C) Omeprazole (D) Pheniramine.

17. Which of the following is not an antibiotic ?
(A) Chloramphenicol
(B) Sulphadiazine
(C) Penicillin
(D) Bithional *[HP Board 2012]*

ANSWERS

1.B 2.C 3.D 4.B 5.A 6A 7.B 8.B 9.B
10.B 11.B 12.B 13.C 14.C 15.D 16.A