1) An air-cored solenoid with length 30cm, area of cross-section 25cm^2 and numbet of turns 500 , carries a current of 2.5A. The current is suddenly switched off in a brief time of 10^{-3}s . How much is the average back emf induced across the ends of the open switch in the circuit? Ignore the variation in magnetic field near the ends of the solenoid.
A) 6.54V
B) 65.4V
C) 654V
D) 0.654V
2) For an ideal transformer, if $N_{\rm s} > N_{\rm p}$ then
A) $V_s < V_p$
B) $V_s > V_p$
C) $V_s = V_p$
D) None of these
3) A charged $10\mu F$ capacitor is connected to a 16mH inductor. What is the angular frequency of free oscillations of the circuit?
A) 250rads ⁻¹
B) 25rads ⁻¹
C) 1111rads ⁻¹
D) 2500rads ⁻¹
4) A light bulb is rated at 200W for a 220V supply. Find the resistance of the bulb
A) 220Ω
B) 484Ω
C) 242Ω
D) 400Ω
5) A radio can tune into any station in the 6MHz to 12MHz band. What is the corresponding wavelength band? (c = 3×10^8 m/s)
A) 40m to 60m
B) 25m to 50m
C) 20m to 30m

D) 10m to 20m 6) A charged particle oscillates about its mean equilibrium position with a frequency of 10⁹Hz. What is the frequency of the electromagnetic waves produced by the oscillator? A) 10^{18} Hz B) 10^{9} Hz C) 10^{-9} Hz D) 10^{10} Hz 7) Light from a point source in air falls on a spherical glass surface (n = 1.5 and radius of curvature = 20cm). The distance of the light source from the glass surface is 100cm. Find the image distance. A) -100cmB) -200cmC) 200cm D) 100cm Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in!!! 8) Double - convex lenses are to be manufactured from a glass of refractive index 1.5: with both faces of the same radius of curvature. What is the radius of curvatur required if the focal length is to be 20cm? A) 44cm B) 2.2cm C) 22cm D) 4.4cm

9) What is the focal length of a convex lens of focal length 30cm in contact with a concave

10) Unpolarised light is incident on a plane glass surface. What should be the angle of incidence so that the reflected and refracted rays are perpendicular to each other?

lens of focal length 10cm?

Ignore thickness of lens]

A) -15cm

B) - 40cm

C) -20cm

D) -30cm

A) 56°
B) 57°
C) 58°
D) 59°
11) Two slits are made 3 millimetre (3mm) apart and the screen is placed 2m away. What is the fringe separation when blue-green light of wavelength 600nm is used?
A) 0.4mm
B) 0.6mm
C) 0.5mm
D) 0.7mm Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
12) Estimate the distance for which ray optics is good approximation for an aperture of 5mm and wavelength 500nm.
A) 50m
B) 18m
C) 40m
D) 60m
13) What is the de-Broglie wavelength associated with an electron moving with a speed of 6.4 $\times10^6\text{m/s}$?
Mass of electron $m_e = 9.11 \times 10^{-31} kg$, Planck's constant $h = 6.63 \times 10^{-34} J.s.$
A) 0.124nm
B) 0.114nm
C) 0.135nm
D) 0.145nm
14) An electron, an α -particle and a proton have the same kinetic energy. Which of these particles has the shortest de-Broglie wavelength?
A) α -particle
B) Electron
C) Proton

15) A difference of 5.4eV separates two energy levels in an atom. What is the frequency of radiation emitted when the atom make a transition from the upper level to the lower level?

$$[1eV = 1.6 \times 10^{-19}]$$
, $h = 6.625 \times 10^{-34}$ J. s.

- A) 1.304×10^{15} Hz
- B) $5.6 \times 10^{15} \text{Hz}$
- C) $5.6 \times 10^{14} \text{Hz}$
- D) $1.304 \times 10^{14} \text{Hz}$ Old Papers = VisionPapers.in For More Papers and Materials Visit www. VisionPapers.in !!!
- 16) What is the shortest wavelength present in the Paschen series of spectral lines?
- A) 320nm
- B) 720nm
- C) 840nm
- D) 820nm
- 17) The radius of the innermost electron orbit of a hydrogen atom is 5.3×10^{-11} m. What are the radii of the n=3 orbit?
- A) 4.12×10^{-10} m
- B) 4.77×10^{-10} m
- C) 2.12×10^{-10} m
- D) 2.24×10^{-10} m

the earth's revolution around the sun in an orbit of radius 1.5×10^{11} m with orbital speed 3×10^4 m/s. (Mass of earth = 6×10^{24} kg, h = 6.625×10^{-34} J.s.)

- A) 3.6×10^{74}
- B) 1.6×10^{74}
- C) 2.6×10^{74}
- D) 4.6 \times 10^{74} Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 19) Given the following atomic masses

$$_{92}^{238}$$
U = 238.05079u
 $_{2}^{4}$ He = 4.00260u
 $_{90}^{234}$ Th = 234.04363u

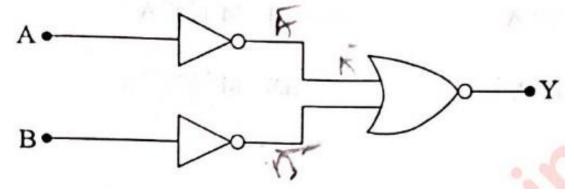
Calculate the energy released during the alpha decay of $^{238}_{92}$ U.

$$(1u = 931.5 \text{MeV/C}^2)$$

- A) 4.25MeV
- B) 6.23MeV
- C) 5.75MeV
- D) 3.25MeV
- 20) A radioactive isotope has a half-life of T years. How long will it take the activity to reduce to 6.250%?
- A) 3T
- B) 6T
- C) 5T
- D) 4T
- 21) The half-life of $^{90}_{38}$ Sr is 28 years. What is the disintegration rate of 38g of this isotope?

$$[N_A = 6.023 \times 10^{23} \text{mol}^{-1}]$$

- A) 2.7×10^{14} Bq
- B) 4.7×10^{14} Bq
- C) 3.7×10^{14} Bq
- D) 5.7 \times 10¹⁴Bq Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 22) The circuits shown in fig. works as which gate?



- A) NAND gate
- B) OR gate
- C) AND gate

- D) NOR gate
- 23) When a forward bias is applied to a p-n junction, it
- A) raises the potential barrier
- B) reduces the majority carrier current to zero
- C) lowers the potential barrier
- D) none of the above
- 24) Suppose a pure Si crystal has 5×10^{28} atoms m⁻³. It is doped by 1ppm concentration of pentavalent As. Calculate the number of electrons and holes.

Given that $n_i = 1.5 \times 10^{16} m^{-3}$

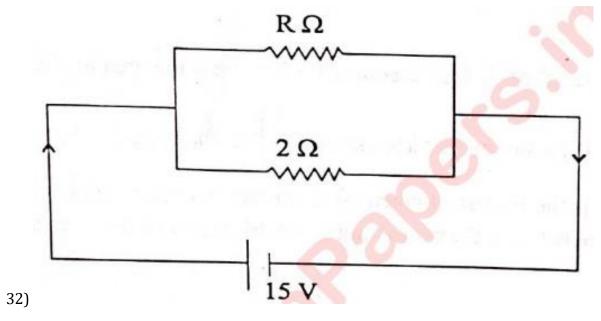
- A) $6.5 \times 10^9 \text{m}^{-3}$
- B) $4.5 \times 10^9 \text{m}^{-3}$
- C) $5.5 \times 10^9 \text{m}^{-3}$
- D) $5.5 \times 10^{-9} \text{m}^{-3}$ Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 5) Dimensional formula of Electric flux =
- A) $M^1L^{-3}T^{-3}A^{-1}$
- B) $M^1L^3T^3A^{-1}$
- C) $M^1L^3T^{-3}A^{-1}$
- D) $M^{-1}L^3T^{-3}A^{-1}$
- 26) An electric dipole with dipole moment $4\times 10^{-9} {\rm cm}$ is aligned at 60° with the direction of a uniform electric field of magnitude $5\times 10^4 {\rm NC}^{-1}$. Calculate the magnitude of the torque acting on the dipole.
- A) 17.3×10^{-5} Nm
- B) $1.73 \times 10^{-4} \text{Nm}$
- C) 1.73×10^{-5} Nm
- D) 17.3×10^{-4} Nm
- 27) An infinite line charge produces a field of $9 \times 10^4 \text{NC}^{-1}$ at a distance of 2cm. Calculate Electrical field produced at a distance of 3cm.
- A) $6 \times 10^4 \text{NC}^{-1}$
- B) $6 \times 10^3 \text{NC}^{-1}$

- C) $6 \times 10^{-5} \text{NC}^{-1}$
- D) $6 \times 10^2 NC^{-1}$ Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 28) How will you connect 4 (four) capacitors, each of capacitance 4μ F for having equivalent capacitance 1.6μ F?
- A) Two in parallel and two in series
- B) All four in series
- C) All four in parallel
- D) Three in parallel and one in series
- 29) A slab of material of dielectric constant 3 has the same area as the plates of a parallel plate capacitor but has a thickness $\left(\frac{3}{4}\right)d$, where d is the separation of the plates. What is the Electrical potential difference between the plates, when the slab is inserted between the plates? Initial electrical potential difference V_0 .
- A) $\frac{V_0}{6}$
- B) $\frac{V_0}{4}$
- C) $\frac{V_0}{2}$
- D) $\frac{V_0}{3}$
- 30) A molecule of a substance has a permanent electric dipole moment of magnitude 10^{-29} cm. 2 mole of this substance is polarised (at low temperature) by applying a strong electrostatic field of magnitude 10^6 Vm $^{-1}$. What should be potential energy of its?

1 mole of the substance contains 6×10^{23} molecules]

- A) -6J
- B) -12J
- C) 12J
- D) 6J Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 31) At room temperature (27°C) the resistance of a heating element is 100Ω . What is the temperature of the element if the resistance is found to be 137Ω , given that the temperature coefficient of the material of the resistor is 1.35×10^{-4} °C⁻¹.
- A) 2767°C

- B) 1227°C
- C) 1027°C
- D) 2327°C



For the given following circuit diagram, the dissipated of electrical power 150W, then find value of Resistance R =

- A) 5Ω
- B) 8Ω
- C) 6Ω
- D) 3Ω

33) The number density of free electrons in a copper conductor estimated $8.5 \times 10^{28} \text{m}^{-3}$. How long does an electron take to drift from one end of a wire 6m long to its other end? The area of cross-section of the wire is $1.0 \times 10^{-6} \text{m}^2$ and it is carrying a current of 1.5A.

- A) 8.1×10^4 s
- B) 5.4×10^4 s
- C) 12.7×10^4 s
- D) 4.5×10^4 s

34) A solenoid of length 0.25m has a radius of 1cm and is made up of 500 turns. It carries a current of 2.5A. What is the magnitude of the magnetic field inside the solenoid?

$$(\mu_0 = 4\pi \times 10^{-7} \text{SI})$$

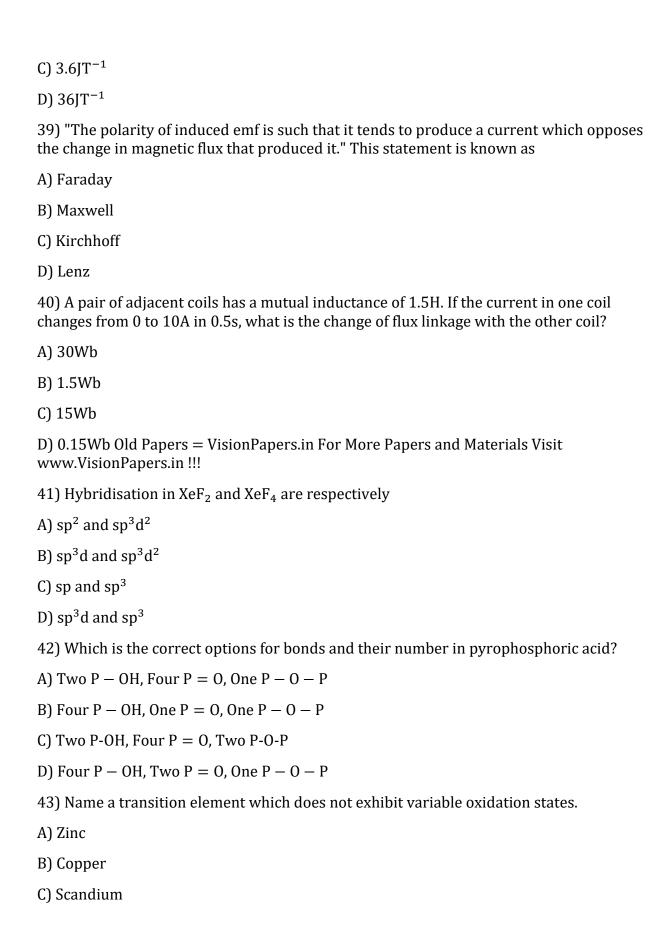
- A) 6.28×10^{-3} T
- B) 6.28×10^{-2} T
- C) 6.28×10^{-4} T
- D) 6.28×10^{-1} T
- 35) How the shunt wire should be?
- A) short and thin
- B) long and thin
- C) long and thick
- D) short and thick
- 36) Two long and parallel straight wires *A* and *B* carrying currents of 10A and 4A in the same direction are separated by a distance of 2cm. Estimate the force on a 4cm section of wire A.

$$(\mu_0 = 4\pi \times 10^{-7} \text{SI})$$

- A) 1.6×10^{-4} N
- B) 1.6×10^{-5} N
- C) 1.6×10^{-6} N
- D) 1.6×10^{-3} N Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 37) A solenoid has a core of a material with relative permeability 400. The windings of the solenoid are insulated from the core and carry a current of 1A. If the number of turns is 1000 per metre, find magnetic field (B)

T.
$$(\mu_0 = 4\pi \times 10^{-7} \text{SI})$$

- A) $1.6\pi \times 10^{+2}$
- B) $16\pi \times 10^2$
- C) $16\pi \times 10^{-2}$
- D) $0.16\pi \times 10^{-2}$
- 38) A short bar magnet placed with its axis at 30° with a uniform external magnetic field of 0.25T experiences a torque of magnitude equal to 4.5×10^{-2} J. What is the magnitude of magnetic moment of the magnet?
- A) $0.36JT^{-1}$
- B) 0.036 IT^{-1}



D) Chromium
44) Which statement is incorrect from the following?
A) CrO is basic, but Cr ₂ O ₃ is amphoteric
B) 'Cd' is not consider as transition element
C) Atomic sizes of elements of ' $4d$ ' series' is greater than corresponding elements of ' $3d$ ' series
D) Atomic sizes of elements of ' $5d$ ' series is greater than corresponding ' $4d$ ' series
45) How many numbers of Geometrical Isomers of $[Pt(NH_3)(Br)(Cl)(Py)]$ will have?
A) 3
B) 2
C) 1
D) 4
46) How many numbers of mole Ions produced from aqueous solution of 1 mole Iron (III) hexacyanido Ferrate (II) complex?
A) 4
B) 7
C) 5
D) 6
47) Which of the following ligand is ambidentate?
$NO_3^-, NO_2^-, CN^-, SCN^-$
(P)
(Q)
(R)
(S)
A) R and S
B) P and Q
C) Q and S
D) Q and R Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in

48) How many numbers of sigma (σ) and pi (π) bonds in DDT respectively?

- A) 28 and 6
- B) 29 and 6
- C) 30 and 6
- D) 21 and 6

49) Which of the following undergoes S_N 2 reaction most readily?

- A) $C_6H_5CH(CH_3)Br$
- B) $C_6H_5CH(C_6H_5)Br$
- C) $C_6H_5C(CH_3)(C_6H_5)Br$
- D) C₆H₅CH₂Br

50) From following reactions, which reaction does not give "Benzene"?

A)
$$C_6H_5COONa + Sodalime \xrightarrow{\Delta}$$

B)
$$C_6H_5N_2^+Cl^- + H_3PO_2 + H_2O \rightarrow$$

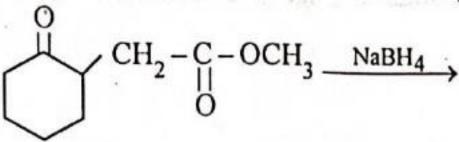
C)
$$C_6H_5OH + Zn \xrightarrow{\Delta}$$

D) (D)

$$C_6H_5OH + H_2CrO_4 \stackrel{[O]}{\rightarrow}$$

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51) Which product is obtained from following reaction?



- 52) Which method is used to prepare salicylic acid from phenol?
- A) Stephen reaction
- B) Kolbe's reaction
- C) Etard reaction
- D) Reimer-Tiemann reaction
- 53) Which of the following compounds will not give "Iodoform" by reaction witl "sodiumhypoiodide"?
- A) $CH_3 CHO$

D)
$$\mathrm{CH_3} - \mathrm{CH_2} - \mathrm{CO} - \mathrm{CH_2} - \mathrm{CH_3}$$

54) What will be the main product in the following reaction?

$$CHO + CH_3CHO \xrightarrow{OH^-} ?$$

$$CH_2 - CH - CHO$$

$$OH$$

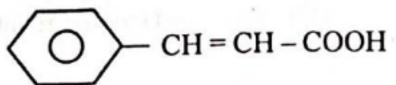
$$OH$$

$$CH = CH - CHO$$

$$OH$$

$$OH$$

$$CH_2-CH_2-CH_2$$



- D) (D) Old Papers = VisionPapers.in For More Papers and Materials Visit www. VisionPapers.
- 55) Which is the incorrect order of increasing acidic strength for the following?
- A) CH₂FCH₂CH₂COOH < CH₃CHFCH₂COOH
- B) CH₂ClCOOH < CH₂FCOOH
- C) $CH_3COOH < CH_2CICOOH$
- D) $HCOOH < C_6H_5COOH$
- 56) How many numbers of Isomer for the compound having molecular formula C₃H₉N?
- A) 2
- B) 3
- C) 4
- D) 5
- 57) From which of the following reaction primary amine is produced?
- A) Reduction of Nitrile Compounds
- B) Reduction of Amide Compounds
- C) Hoffmann bromamide degradation reaction
- D) Above all reactions
- 58) Identify the compound 'C' from following reaction.

$$\mathsf{CH}_{3}\mathsf{COOH} \overset{\mathsf{NH}_{3}}{\underset{\Delta}{\longrightarrow}} \mathsf{A} \overset{\mathsf{Br}_{2} + \mathsf{NaOH}}{\longrightarrow} \mathsf{B} \overset{\mathsf{NaNO}_{2}}{\underset{\mathsf{HCl}}{\longrightarrow}} \mathsf{C}$$

- A) $CH_3 CH_2N_2^+Cl^-$
- B) $CH_3 CH_2OH$
- C) CH₃OH
- D) $CH_3 CH_2 NH_2$ Old Papers = VisionPapers.in For More Papers and Materials Visit www. VisionPapers.ir
- 59) Select proper statement from following True (T) and False (F) statements.

- (I) Pentose sugar + base \rightarrow Nucleotide
- (II) Nucleotide + Phosphate → Nucleoside
- (III) DNA contains four bases A, G, C and T
- (IV) RNA contains four bases A, G, C and U
- A) FTFT
- B) FTTT
- C) FFTT
- D) TTTT
- 60) Which glycosidic linkage occurs in 'Amylopectin'?
- A) $C_1 C_3$ and $C_1 C_4$
- B) $C_1 C_4$ and $C_1 C_6$
- C) $C_1 C_2$ and $C_1 C_6$
- D) $C_2 C_4$ and $C_4 C_6$
- 61) Which polymer is used in manufacture of paints and lacquers?
- A) Glyptal
- B) Teflon
- C) Neoprene
- D) Melamine Old Papers = VisionPapers.in
- 62) Which of the following polymer is not obtained by the condensation polymerization?
- A) Decron
- B) Nylon 2 Nylon 6
- C) Nylon 6,6
- D) Polyacrylonitrile
- 63) Which of the following drug is used for treatment of Acidity?
- A) Ranitidine
- B) Meprobamate
- C) Salvarsan
- D) Codein

64) Which Artificial sweetener is unstable at cooking temperature?
A) Sucralose
B) Aspartame
C) Alitame
D) Saccharin Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.
65) Cell edge length in bcc, ccp and simple cubic unit cell is respectively as
A) $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2}r$
B) $2r$, $2\sqrt{2}r$, $\frac{4r}{\sqrt{3}}$
C) $2\sqrt{2}r, \frac{4r}{\sqrt{3}}, 2r$
D) $\frac{4r}{\sqrt{3}}$, $2\sqrt{2}r$, $2r$
66) Atoms of element N form hcp lattice and those of the element M occupy $1/3^{\rm rd}$ C tetrahedral voids. What will be the formula of the compound formed by the element M and N?
A) M ₄ N
B) M_3N_2
C) M_2N_3
D) M, N
67) Calculate the mole fraction of aqueous solution of 1 molal urea (NH ₂ CONH ₂)
A) 0.01878
B) 0.01768
C) 0.01800
D) 0.01698
68) Value of Henry's constant K_H
A) no effect by changing temperature
B) decreases with increase in temperature
C) increases with increase in temperature

D) first decreases and then increases by increase in temperature Old Papers = VisionPapers. in For More Papers and Materials Visit www.VisionPapers.in !!! 69) What is value of Van't Hoff factor (i) when 80% of CaCl₂ dissociates? A) 2.70 C) 3 B) 2.40 D) 2.30 70) How much electricity in terms of Faraday is required for reduction of 2mol Cr₂O₇²⁻ into Cr³⁺ in acidic medium? A) 12F B) 3F C) 6F D) 9F 71) Which is proper value of x for the following to increase cell potential of $Zn_{(s)}|Zn_{(xM)}^{2+}||Cu_{(0.02M)}^{2+}|Cu_{(s)}|$ A) x = 0.02MB) x < 0.02M C) x > 0.02M D) $x \ge 0.02$ M 72) Which substance is used as oxidising agent in nickel-cadmium cell? A) $Ni(OH)_3$ B) Cd C) Ni. D) CdO 73) What is the value of slope when graph plotted of $\log \frac{[R]_0}{[R]}$ Vs t (time) for first order reaction? A) $-\frac{K}{2.303}$

B) $\frac{K}{2.303}$

- C) K
- D) $\frac{2.303}{K}$ Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!
- 74) A reaction is first order with respect to a reactant *A* and second order with respect to reactant *B*. What is the effect of rate when concentration of both *A* and *B* increased by doubled?
- A) Eight times
- C) Doubled
- B) Quadrupled
- D) Sixteen times
- 75) Which colloidal sol results, when highly diluted solution of AgNO₃ is added to highly diluted KI solution?
- A) $.AgI/NO_3^-$
- B) AgI/K+
- C) AgI/Ag⁺
- D) AgI/I-
- 76) Match the types of colloidal systems given in Column I with the name given in Column II.

Column - I

Column - II

- i) Solid in liquid (p) Aerosol
- ii) Liquid in solid (q) Foam
- iii) Liquid in gas (r) Sol
- iv) Gas in liquid (s) Gel

A) (i)
$$\rightarrow$$
 (r), (ii) \rightarrow (s), (iii) \rightarrow (p), (iv) \rightarrow (q)

B) (i)
$$\rightarrow$$
 (s), (ii) \rightarrow (r), (iii) \rightarrow (p), (iv) \rightarrow (q)

C) (i)
$$\rightarrow$$
 (r), (ii) \rightarrow (s), (iii) \rightarrow (q), (iv) \rightarrow (p)

D) (i)
$$\rightarrow$$
 (p), (ii) \rightarrow (q), (iii) \rightarrow (r), (iv) \rightarrow (s)

- 77) In which colloids both Lyophilic and Lyophobic parts present?
- A) Micelle

- B) Gold sol
- C) Rubber sol
- D) Sol of As₂S₃
- 78) Which method is not proper to obtain metal of high purity from impure metal?
- A) Leaching
- B) Chromatographic methods
- C) Liquation
- D) Distillation
- 79) Which is known as "Copper Matte"?
- A) $Cu_2S + FeO$
- B) $Cu_2S + FeS$
- C) $Cu_2O + FeS$
- D) $Cu_2O + FeO$
- 80) Which products are obtained by reaction of hot and concentrated NaOH with dichlorine?
- A) $NaCl + NaClO_2 + H_2O$
- B) $NaCl + NaClO_4 + H_2O$
- C) $NaCl + NaClO_3 + H_2O$
- D) $NaCl + NaOCl + H_2O$ Old Papers = VisionPapers.in For More Papers and Materials Visit www.VisionPapers.in !!!