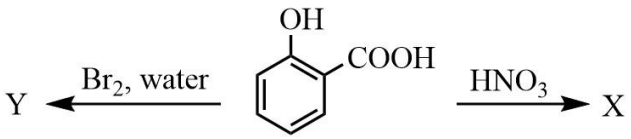
MDU M.Sc Entrance: 2016

Chemistry

❖ Question Paper

All questions are compulsory (One mark each) **Total Marks: 100 (1.5 Hours)**

Q.1 X and Y are



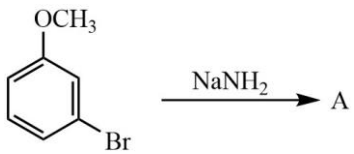
(a) Picric acid and 2,4,6-tribromophenol

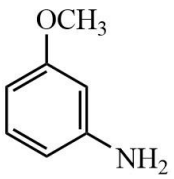
(b) 4-nitro salicylic acid and 4-bromo salicylic acid

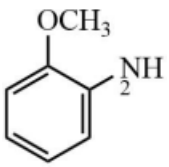
(c) o-nitrophenol, o-bromophenol

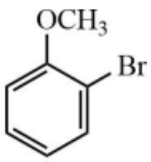
(d) None is correct

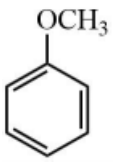
Q.2 A is



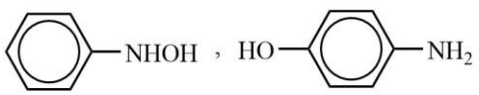
(a) 

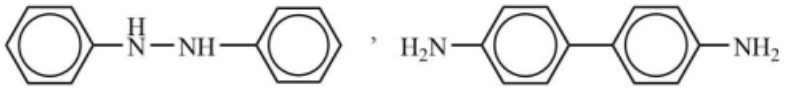
(b) 

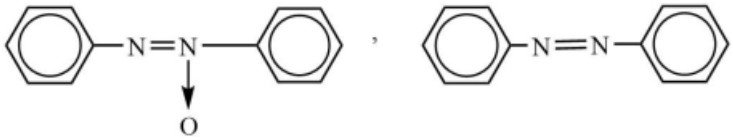
(c) 

(d) 

Q.3 A and B are

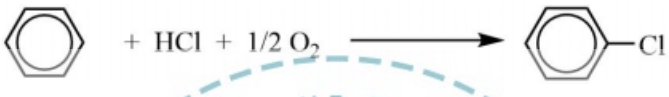
(a) 

(b) 

(c) 

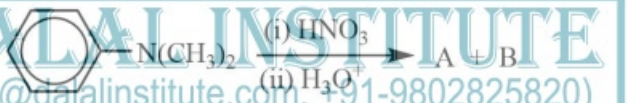
(d) None is correct

Q.4 This reaction is called ……. Reaction



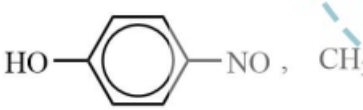
(a) Sandmeyer (b) Raschig (c) Gattermann (d) Hofmann

Q.5



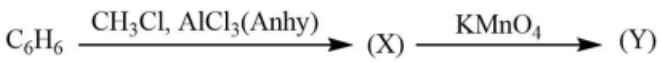
(a) 

(b) 

(c) 

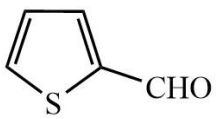
(d)

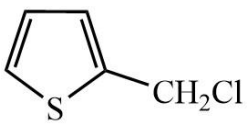
Q.6 In the reaction sequence product (Y) is

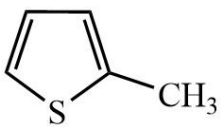


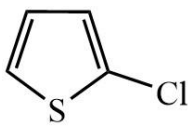
(a) Chlorobenzene (b) Benzaldehyde (c) Benzoic acid (d) Benzene

Q.7 Thiophene reacts with HCHO in presence of aqueous *HCl* to give

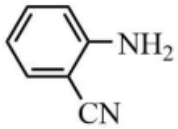
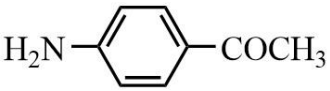
(a) 

(b) 

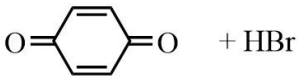
(c) 

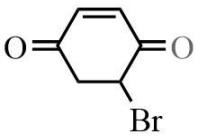
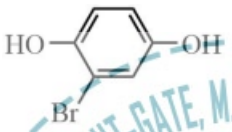
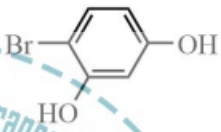
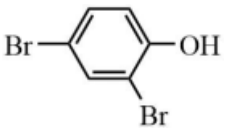
(d) 

Q.8 Which is Weaker base than aniline

(a)  (b)  (c)  (d) All

Q.9 End product of the following reaction is



(a)  (b)  (c)  (d) 

Q.10 The reagent with which both aldehydes and ketones reacts easily is

(a) Fehling's reagent (b) Schiff's reagent (c) Tollen's reagent (d) Grignard's reagent

Q.11 Which of the following compounds will exhibit geometrical isomerism

(a) 1,1-diphenyl-1-propane (b) 3-Phenyl-1-butene

(c) 2-phenyl-1-butene (d) 1-phenyl-2-butene

Q.12 Propyne and propene can be distinguished by

(a) Conc. H_2SO_4 (b) Br_2 in CCl_4 (c) Dil.$KMnO_4$ (d) $AgNO_3$ in ammonia

Q.13 Which of the following has the most acidic hydrogen

(a) 3-Hexanone (b) 2,4-Hexanedione (c) 2,5-Hexanedione (d) 2,3-Hexanedione

Q.14 Ammonia can be dried by

(a) Conc. H_2SO_4 (b) P_4O_{11} (c) CaO (d) Anhydrous $CaCl_2$

Q.15 Amongst H_2O, H_2S, H_2Se and H_2Te the one with the highest boiling point is

(a) H_2O because of hydrogen bonding
(b) H_2S because of hydrogen bonding
(c) H_2Te because of Higher molecular weight
(d) H_2Te because of Lower molecular weight

Q.16 When a mixture of one mole of C_6H_5COOH and one mole C_6H_5OH is treated with one mole of $NaHCO_3$, the product formed will consist of

(a) C_6H_5COOH, C_6H_5ONa
(b) C_6H_5COONa, C_6H_5ONa
(c) C_6H_5COONa, C_6H_5OH
(d) None

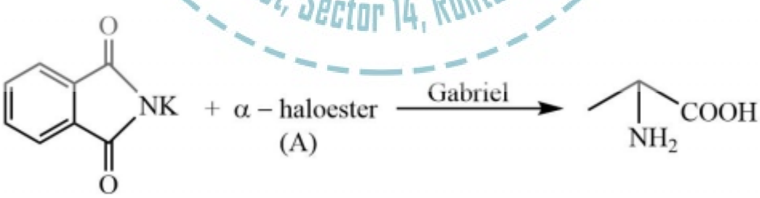
Q.17 Addition of ethanol to aqueous hydrolysis of benzyl chloride does not increase the rate of hydrolysis but changes only the composition of final products. This indicates that reaction is proceeding through

(a) SN^2
(b) SN^1
(c) SE^2
(d) SE^1

Q.18 Which one of the following is the best method for the preparation of acetophenone

(a) Ph COOEt + CH_3MgBr
(b) Ph COOCl + CH_3MgBr
(c) Ph $CONH_2$ + CH_3MgBr
(d) Ph CN + CH_3MgBr

Q.19 Required product is obtained when A is



(a) Ethyl-3-Chlorobutyrate
(b) Ethyl-3-Chloropropionate
(c) Ethyl-2-Chloropropionate
(d) Ethyl Chloroacetate

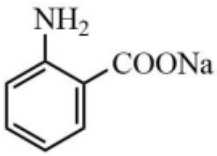
Q.20 Ozonolysis of C_6H_{10} gives HCHO,CH_3CHO and $CH_2(CHO)_2$. C_6H_{10} is

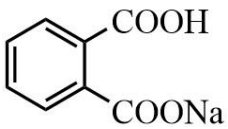
(a) 1,2-hexadiene
(b) 1,3-hexadiene
(c) 1,4-hexadiene
(d) 2-methyl-1,3-petadiene

Q.21 Reagent which can convert an alkyl amine into alkyl chloride

(a) Hinsberg's reagent (b) Lucas reagent (c) Tilden reagent (d) None

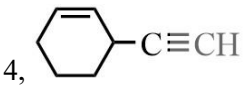
Q.22 Which is/are acid salt

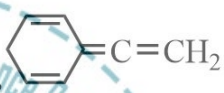
(a) 

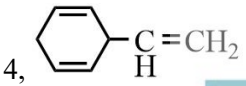
(b) 

(c) NaH_2PO_2 (d) NaH_2PO_3

Q.23 Index of unsaturation of C_6H_{10} in six membered structure is

(a) 

(b) 

(c) 

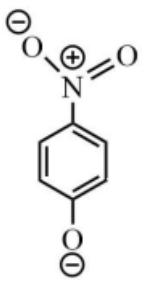
(d) All ture

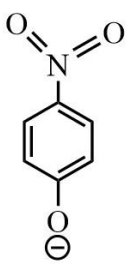
Q.24 The mononitration of acetanilide ($C_6H_5NHCOCH_3$) gives predominantly

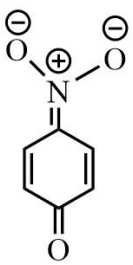
(a) 3-nitroacetanilide (b) 2-nitroacetanilide

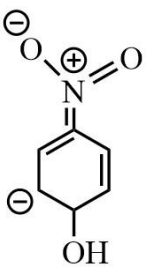
(c) 2-, and 3-nitroacetanilide (d) 4-nitroacetanilide

Q.25 The most unlikely representation of resonance structures of p-nitrophenoxide ion is

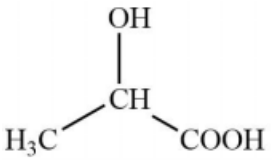
(a) 

(b) 

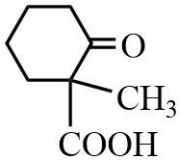
(c) 

(d) 

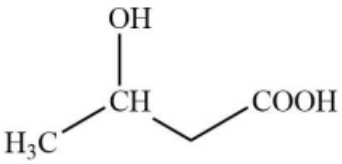
Q.26 Chirality is lost when

(a) 

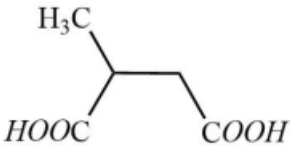
is heated

(b) 

is heated

(c) 

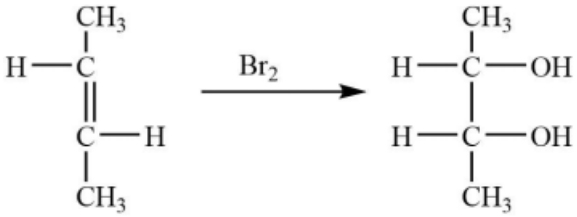
is heated

(d) 

is heated

Q.27

Which of the following is ture statement



Trans A

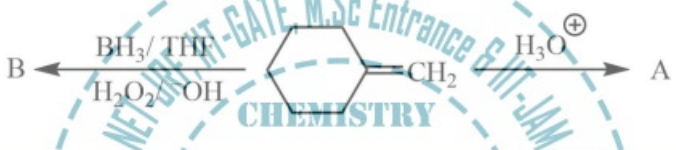
(a) A is formed by anti-addition and is meso

(b) A is formed by syn-addition and is meso

(c) A is formed by anti-addition and is racemic

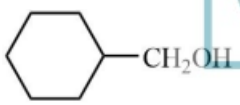
(d) A is formed by syn-addition and is racemic

Q.28 A and B are



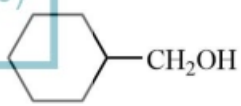
(a) Both 

(b) Both 

(c) 

, 

(d) 

, 

Q.29

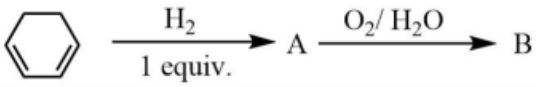
(a) $CH_3 - CO - COOH$

(b) $OHC\ CH_2\ COOH$

(c) $CH_2 = C(OH) - COOH$

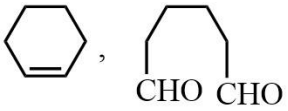
(d) $HO - CH = CH - COOH$

Q.30 A and B are



(a) 

(b)  , not formed

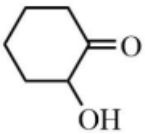
(c) 

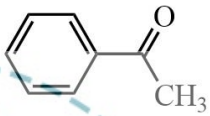
(d) None is correct

Q.31 Maximum dehydration takes place of

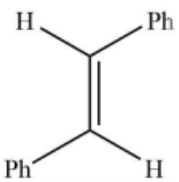
(a) $H_3C - C(CH_3)_2 - OH$

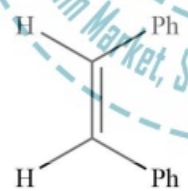
(b) $CH_3 - CO - CH(OH) - CH_3$

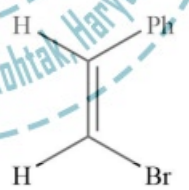
(c) 

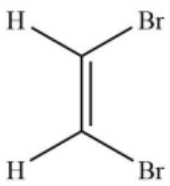
(d) 

Q.32 A is

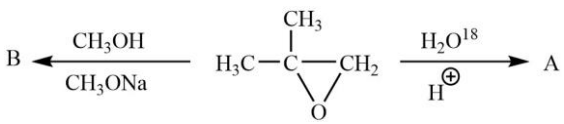
(a) 

(b) 

(c) 

(d) 

Q.33 A and B are



(a) $CH_3 - C(CH_3)(^{18}OH) - CH_2 - OH$, $CH_3 - C(CH_3)(OH) - CH_2 - OCH_3$

(b) $CH_3 - C(CH_3)(OH) - CH_2 - {}^{18}OH$, $CH_3 - C(CH_3)(OH) - CH_2 - OCH_3$

(c) Both are correct

(d) None is correct

Q.34 A and B are

(a) $CH_2 = CH - CHO$, $Cl - CH_2 - CH(OH) - CHO$

(b) $CH_2 = CH - CHO$, $HO - CH_2 - CH(Cl) - CHO$

(c) $CH_2 = CH - CHO$, $CH_3 - CH(OCl) - CHO$

(d) None is correct

Q.35 The quantum numbers, for the outer electrons of an atom are given by n = 2; l = 0; m = 0; s = +1/2

(a) Lithium (b) Beryllium (c) Hydrogen (d) Boron

Q.36 "The exact path of electron 2p-orbital cannot be determined" The above statement is based upon

(a) Hund's rule (b) Bohr's rule (c) Uncertainty principle (d) Aufbau principle

Q.37 The ground state configuration of Fe^{3+} ion in gaseous state is (At. No. of Fe = 26)

(a) $[Ar]^{18}\ 3d^3\ 4s^2$ (b) $[Ar]^{18}\ 3d^6\ 4s^2$ (c) $[Ar]^{18}\ 3d^5$ (d) $[Ar]^{18}\ 3d^6$

Q.38 Which of the following is the smallest in size

(a) N^{3-} (b) O^{2-} (c) F^- (d) Na^+

Q.39 The electronegativity of the following elements increases in order

(a) C, N, Si, P (b) N, Si, C, P (c) Si, P, C, N (d) P, Si, N, C

Q.40 In ClF_3, Chlorine is

(a) sp^2 hybridised (b) sp^3 hybridised (c) sp^3d hybridised (d) sp^3d^2 hybridised

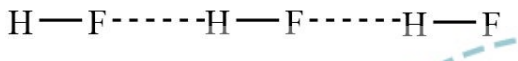
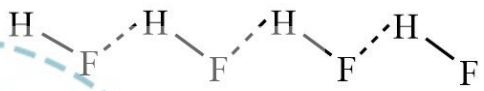
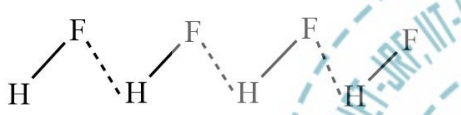
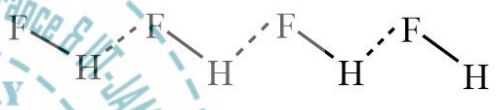
Q.41 The angles between covalent bonds is maximum in

(a) CH_4 (b) BF_3 (c) PF_3 (d) NH_3

Q.42 Ionic solids with Schottky defects contain in their structure

(a) Equal number of cation and anion vacancies
(b) Interstitial anions and anion vacancies
(c) Cation vacancies only
(d) Cation vacancies and interstitial cations

Q.43 The hydrogen bonds in solid HF can be best represented as

(a) 
(b) 
(c) 
(d) 

Q.44 In which of the following molecules the van der wall's forces is likely to be the most important in determining the m.pt. and b.pt.

(a) CO (b) H_2S (c) Br_2 (d) HC*l*

Q.45 Alkali metal hydrides react with water give

(a) Acidic solution (b) Basic solution (c) Neutral solution (d) Hydride ion

Q.46 Which is a planar molecule

(a) XeO_4 (b) XeF_4 (c) $XeOF_4$ (d) XeO_2F_2

Q.47 A silicate used in talcum powder

(a) consists of planar sheets which can slip over another

(b) is known as talc

(c) is a pure magnesium silicate of the form 3 $MgO.4SiO_2.H_2O$

(d) All of these

Q.48 Which of the following has the stronger bond

(a) F – B (b) F – C*l* (c) F – Br (d) C*l* – Br

Q.49 Which of the following metal ions is coloured

(a) Cu^{+} (b) Zn^{2+} (c) Sc^{3+} (d) V^{4+}

Q.50 Among the lanthanides the one obtained by synthetic method is

(a) Lu (b) Pm (c) Pr (d) Gd

Q.51 Thorium element belongs to

(a) Alkali metal (b) Transition elements (c) Lanthanides (d) Actinides

Q.52 H_2S would separate the following at pH < 7

(a) Zn^{2+}, Co^{2+} (b) Cu^{2+}, Cd^{2+} (c) Cu^{2+}, Co^{2+} (d) Cu^{2+}, As^{2+}

Q.53 Nitrite (NO_2^-) interferes in the 'ring-test' of Nitrate (NO_3^-). Some of the following reagents can be used for the removal of Nitrate

(I) NH_4Cl (II) $(NH_2)_2CS$(thiourea) (III) NH_2SO_3H(sulphamic acid) (IV)Sulphanilic acid

Correct choice is

(a) I, II (b) I, II, IV (c) I, II, III (d) II, III, IV

Q.54 The oxidation number of Fe in $K_4[Fe(CN)_6]$ is

(a) 3 (b) 2 (c) 0 (d) 1

Q.55 CFSE value for an octahedral low spin d^6 metal ion complex will be

(a) 20 Dq (b) 24 Dq (c) 12 Dq (d) 6 Dq

Q.56 The number of unpaired electrons in a d^7 tetrahedral complex

(a) 3 (b) 2 (c) 1 (d) 7

Q.57 E.A.N in $[Ni(NH_3)_6]^{2+}$ is

(a) 38 (b) 36 (c) 40 (d) 37

Q.58 Term symbol for the ground state V^{3+} is

(a) $^3F_2$ (b) $^4S_{3/2}$ (c) $^3P_0$ (d) $^3P_2$

Q.59 How many geometrical isomers are possible for $[Co(NH_3)_4Cl_2]$

(a) 2 (b) 3 (c) 4 (d) 6

Q.60 Which of the following metal-carbonyls is paramagnetic

(a) $Fe(CO)_6$ (b) $Ni(CO)_4$ (c) $V(CO)_6$ (d) $Cr(CO)_6$

Q.61 Which of the following carbonyls does not possess bridged CO

(a) $Fe_2(CO)_9$ (b) $Fe_3(CO)_{12}$ (c) $Ru_3(CO)_{12}$ (d) $Co_2(CO)_8$

Q.62 CH_3HgOH is classified as

(a) Soft-Soft (b) Hard-Hard (c) Soft-Hard (d) Hard-Soft

Q.63 Which of the following is not border line acid

(a) Bi^{3+} (b) $B\,Me_3$ (c) SO_2 (d) CO_2

Q.64 According to spectrochemical series which ligand will produce greater crystal field splitting

(a) F^- (b) NH_3 (c) NO_2^- (d) CO

Q.65 The transition in $[Cu(H_2O)_6]^{2+}$ complexes is due to

(a) Presence of water molecules

(b) Intermolecular vibrations

(c) Promotion of an electron from T_{2g} to E_g level as the transfer of hole from E_g to T_{2g} level

(d) Excitation of electron from 3d to 4s energy level

Q.66 Vitamin B_{12} contains

(a) Se (b) Zn (c) Co (d) Fe

Q.67 Which complex ion is thermodynamically stable and kinetically labile

(a) $[Cu(NH_3)_4]^{2+}$ (b) $[Cr(CN)_6]^{3-}$ (c) $[Mn(CN)_6]^{3-}$ (d) $[Ni(CN)_4]^{2-}$

Q.68 Radioactivity of a sample (Z = 22) decrease 90% after 10 years. What will be the half-life of the sample

(a) 5 years (b) 2 years (c) 3 years (d) 10 years

Q.69 A catalyst is a substance which

(a) Supplies energy to the reaction

(b) Shortens the time to reach the equilibrium

(c) Increases the equilibrium constant of the reaction

(d) Increases the equilibrium concentration of the product

Q.70 The temperature of the system decreases in an

(a) Adiabatic compression (b) Isothermal expansion

(c) Isothermal compression (d) Adiabatic expansion

Q.71 Consider a pure crystalline solid that is heated from absolute zero to a temperature above the boiling point of the liquid. Which of the following processes produces the greatest increase in entropy of the substance

(a) Vaporizing the liquid
(b) Melting the solid
(c) Heating the liquid
(d) Heating the gas

Q.72 Elastic deformation in polymers is due to

(a) Slight adjustment of molecular chains
(b) Slippage of molecular chains
(c) Straightening of molecular chains
(d) Severe of covalent bonds

Q.73 Which of the following process is responsible for the formation of delta a place where rivers meet the sea

(a) Emulsification (b) Coagulation (c) Colloid formation (d) Peptization

Q.74 Which of the following is correct for lyophilic sols

(a) They are irreversible
(b) They are formed by inorganic substances
(c) They are self-stabilized
(d) They are readily coagulated by addition of electrolytes

Q.75 Buffer solutions have constant acidity and alkalinity because

(a) They have large excess of H^+ and OH^- ion
(b) They have fixed value of pH
(c) Acid and alkali in this solution are shielded from attack by other ions
(d) These give unionized acid or base on reaction with acid or alkali

Q.76 Automobile steering wheels are normally made of

(a) High density polythene
(b) Cellulose acetate
(c) Cellulose nitrate
(d) PVC

Q.77 The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is

(a) 28.7 pm (b) 2.87 (c) 12.3 pm (d) 1.23 pm

Q.78 If moisture and dirt entrapment is a major problem, it would be a good practice to

(a) Butt weld (b) Stop weld (c) Skip weld (d) Stitch weld

Q.79 Iron crystallises in a bcc system with a = 2.86Å. the density of Iron is

(a) 79.2 g cm^{-3} (b) 7.92 g cm^{-3} (c) 0.792 g cm^{-3} (d) 792 g cm^{-3}

Q.80 The born Lande equation for the estimation of lattice energy of an ionic crystal is

(a) $U_0 = \frac{MN_AZ_+e}{4\pi\epsilon_0 r_0}\left(1-\frac{1}{n}\right)$ (b) $U_0 = \frac{MN_AZ_-e}{4\pi\epsilon_0 r_0}\left(1-\frac{1}{n}\right)$

(c) $U_0 = \frac{MN_AZ_+e^2}{4\pi\epsilon_0 r_0}\left(1-\frac{1}{n}\right)$ (d) None of these

Q.81 Polydispersity index (P.D.I) of a polymer sample is given by

(a) P.D.I = $\bar{M}_m - \bar{M}_n$ (b) P.D.I = $\bar{M}_m + \bar{M}_n$

(c) P.D.I = $\bar{M}_m\bar{M}_n$ (d) P.D.I = $\bar{M}_m/\bar{M}_n$

Q.82 The coefficient of thermal expansion, α is expressed as

(a) $\alpha = -\frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$ (b) $\alpha = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$ (c) $\alpha = \frac{1}{T}\left(\frac{\partial V}{\partial T}\right)_P$ (d) $\alpha = -\frac{1}{T}\left(\frac{\partial V}{\partial T}\right)_P$

Q.83 In BET equation, which of the following statements is not ture

(a) It does not use the concept of saturated vapour pressure

(b) It considers the multilayer adsorption

(c) It is not valid for porous adsorbent

(d) It uses the concept of latent heat of condensation

Q.84 Entropy is related to thermodynamic probability, W by relation

(a) $S = RlnW$ (b) $S = R–lnW$ (c) $S = k\,lnW$ (d) $S = k + lnW$

Q.85 The number of macro states for the distribution of three atoms (having total energy = 3quanta) among ground, first, second states (possessing zero, one and two quanta of energy respectively) are

(a) one (b) six (c) ten (d) Three

Q.86 The Ilkovic equation for diffusion current is given by

(a) $\vec{\imath}_d = 607nDCm^{2/3}t^{1/2}$ (b) $\vec{\imath}_d = 607nD^{1/2}Cm^{2/3}t^{1/6}$

(c) $\vec{\imath}_d = 607nDC^{1/2}m^{2/3}t^{1/2}$ (d) $\vec{\imath}_d = 607nD^{1/2}m^{2/3}t^{1/6}$

All notation have their usual meanings

Q.87 In the lead acid battery during charging the cathode reaction is

(a) Reduction of Pb^{2+} to Pb (b) Formation of $PbSO_4$

(c) Formation of PbO_4 (d) None of these

Q.88 The fundamental vibrational frequency of carbon mono oxide (CO) molecule is 2500 cm^{-1}. The force constant of CO molecule will be

(a) $4\pi^2 c\mu(2050)^2 \times 10^4$ (b) $4\pi^2 c^2\mu^2(2050)^2 \times 10^{-4}$

(c) $4\pi^2 c^2\mu(2050)^2 \times 10^4$ (d) $4\pi^2 c^2\mu(2050)^2 \times 10^2$

Q.89 The operator for linear momentum of a particle moving in a direction parallel to x-axis is given by

(a) $\hat{P}_x = ih\frac{\partial}{\partial x}$ (b) $\hat{P}_x = -ih\frac{\partial}{\partial x}$ (c) $\hat{P}_x = -ih\frac{\partial^2}{\partial x^2}$ (d) $\hat{P}_x = -i\frac{h}{2\pi}\frac{\partial}{\partial \pi}$

Q.90 The average of an observable quantity x, is obtained by

(a) $\hat{x} = \frac{<\Psi X\Psi^@>}{<\Psi\Psi^@>}$ (b) $\hat{x} = \frac{<\Psi\Psi^@ X>}{<\Psi\Psi^@>}$ (c) $\hat{x} = \frac{<\Psi X^2\Psi^@>}{<\Psi\Psi^@>}$ (d) $\hat{x} = \frac{<\Psi\Psi^@ X^2>}{<\Psi\Psi^@>}$

Q.91 Chromatography is based on

(a) Physical adsorption of the solute
(b) Differential adsorption of different components
(c) Chemisorption of the solute
(d) Solubility of the solute

Q.92 A hydrogen electrode and a normal calomel electrode had a voltage 0.435 V when placed in a certain solution at 298 K. What will be the pH of the solution

(a) 2.125 (b) 2.205 (c) 2.622 (d) 2.014

Q.93 A photon in 'X' region is more energetic than in the visible region. The 'X' is

(a) Microwave (b) Radio wave (c) IR (d) UV

Q.94 Select the correct statement

(a) Composite reactions differ from complex reactions
(b) Composite reactions involve more than one elementary reaction
(c) Composite reactions involve only one elementary reaction
(d) None of the above

Q.95 The value of van der waal's constant "a" for gases O_2, N_2, NH_3 and CH_4 are 1.36, 1.39, 4.17 and 2.253 litre^2 atm mole^{-2} respectively. The gas which can most easily be liquified is

(a) NH_3 (b) O_2 (c) N_2 (d) CH_4

Q.96 Frenkel defect appear in crystal in which

(a) Size of anion is equal to size of cation
(b) Size of anion is less than size of cation
(c) Size of anion is much larger size of cation
(d) None of the above

Q.97 Molar polarization P_m, is independent of

(a) Pressure (b) Temperature (c) Concentration (d) None of these

Q.98 At temperature near absolute zero gaseous molecule possess only

(a) Translational energy (b) Rotational energy

(c) Rotational and translational energy (d) Vibrational energy

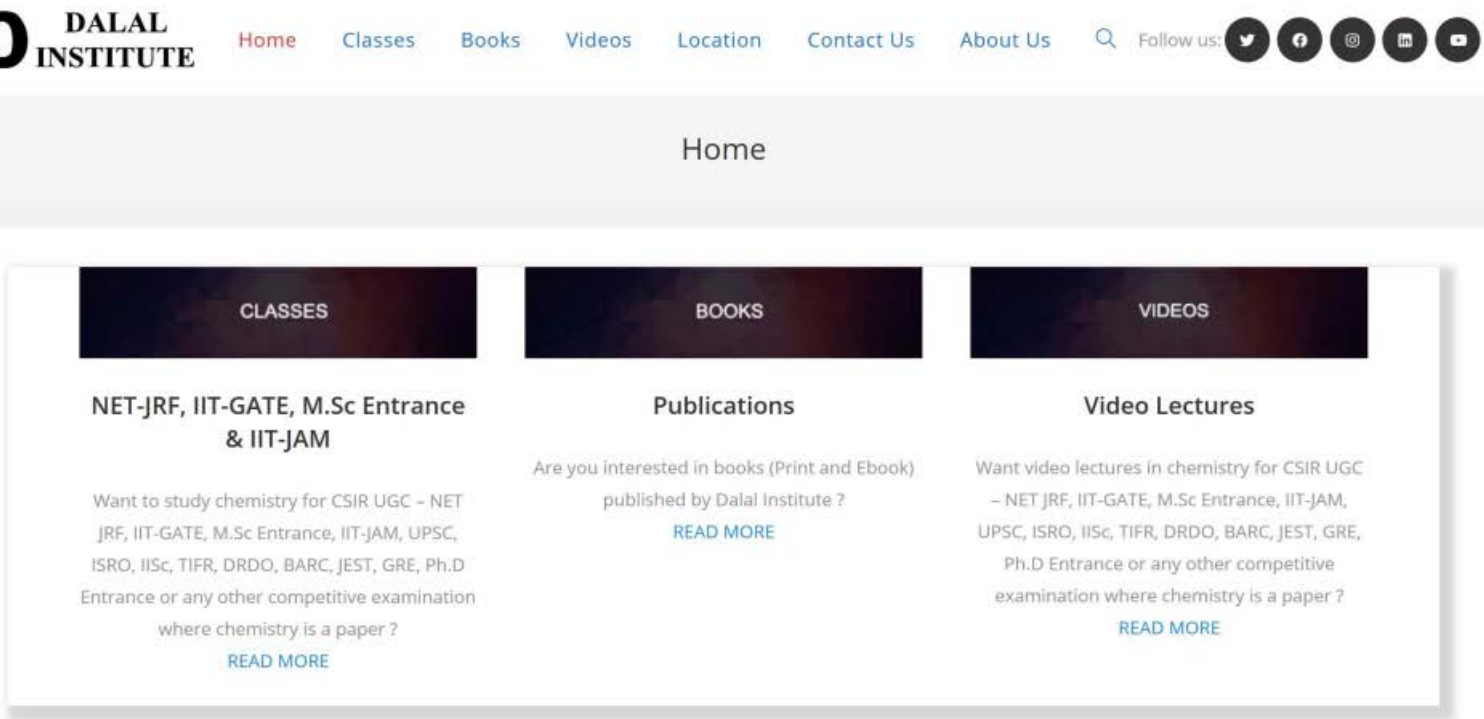
Q.99 The molecule which is IR inactive but Raman active is

(a) HC*l* (b) N_2 (c) SO_2 (d) protein

Q.100 The cell potential is a

(a) Intensive property (b) Extensive property

(c) Thermodynamic property (d) Colligative property



Home: https://www.dalalinstitute.com/
Classes: https://www.dalalinstitute.com/classes/
Books: https://www.dalalinstitute.com/books/
Videos: https://www.dalalinstitute.com/videos/
Location: https://www.dalalinstitute.com/location/
Contact Us: https://www.dalalinstitute.com/contact-us/
About Us: https://www.dalalinstitute.com/about-us/

Postgraduate Level Classes (NET-JRF & IIT-GATE)
Admission
Regular Program Distance Learning
Test Series Result

Undergraduate Level Classes (M.Sc Entrance & IIT-JAM)
Admission
Regular Program Distance Learning
Test Series Result

MDU M.Sc Entrance Chemistry Solved Papers

"MDU M.Sc Entrance Chemistry Solved Papers" is now available, visit our website for more info.

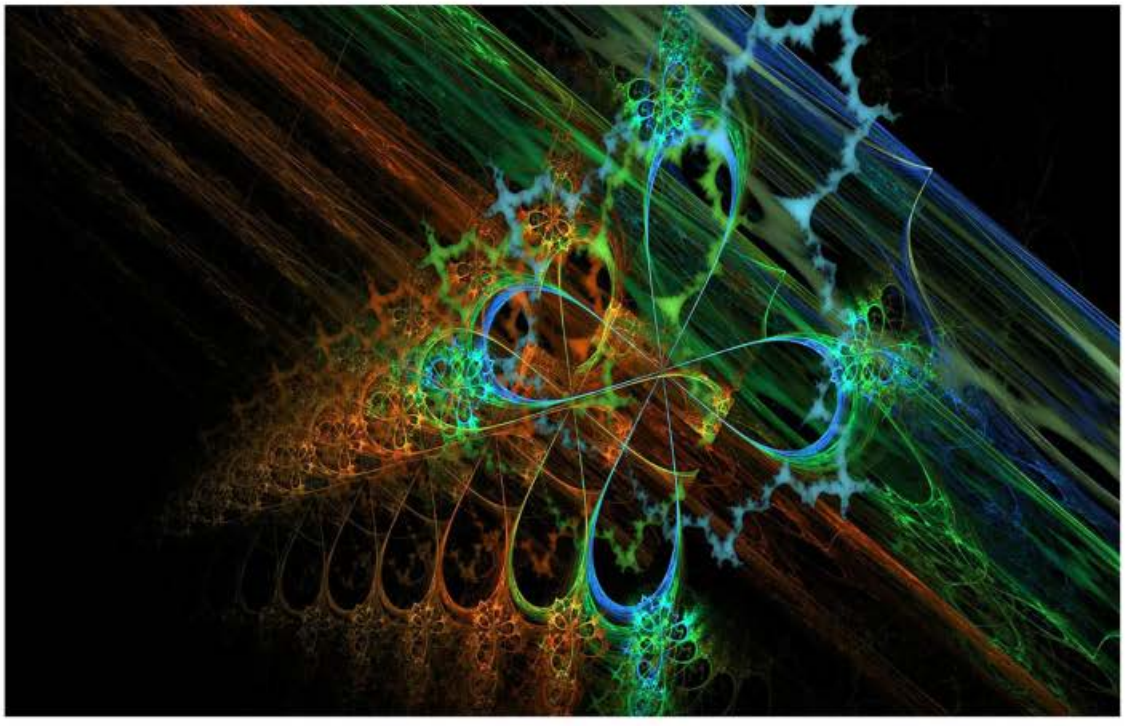
READ MORE

Dalal Institute's

MDU M.SC ENTRANCE

Chemistry

Solved Papers



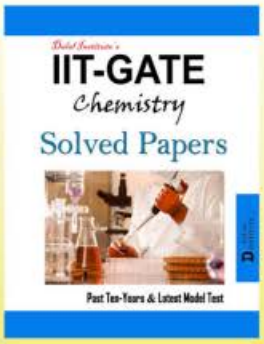
DALAL INSTITUTE

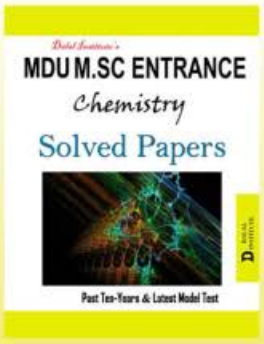
2011–2019 & Letest Model Test

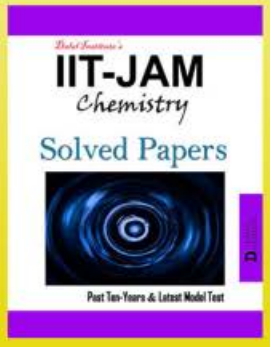
Table of Contents

The best institute for CSIR-JRF, UGC-NET, IIT-GATE, IIT-JAM, UPSC, GRE, IISc, TIFR, DRDO, BARC, JEST, ISRO and all Ph.D-M.Sc entrance examinations where chemistry is a paper.

Dalal Institute's other publications in this series







DALAL INSTITUTE

Main Market, Sector 14, Rohtak, Haryana 124001, India
(info@dalalinstitute.com, +91-9802825820)
www.dalalinstitute.com