MDU M.Sc Entrance: 2013

Chemistry

❖ Question Paper

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

Q.1 C = C frequency in oct-4-ene appears at:

(a) 1680-1600 cm^{-1} (very weak)
(b) 1680-1600 cm^{-1} (strong)
(c) 1680-1600 cm^{-1} (m)
(d) No peak in this region of 1680-1600 cm^{-1}

Q.2 *I* for C -13 is:

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

Q.3 *I* for P -31 is:

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

Q.4 What is the right order of coupling constants?

(a) $J^1 > J^2 > J^3$ (b) $J^1 < J^2 < J^3$ (c) $J^1 = J^2 = J^3$ (d) None of these

Q.5 Which aromatic band shows fine structure?

(a) Primary (b) Secondary (c) Tertiary (d) None

Q.6 Which is a better Diels Alder Diene for reaction with maleic anhydride?

(a) Furan (b) Pyrrole (c) Thiophene (d) Pyridine

Q.7 Which is a strong base?

(a) Aniline (b) Cyclohexane (c) Pyrrole (d) Quinoline

Q.8 Which is right order of nucleophilicity?

(a) $CH_3 - CH_2^{\ominus} > NH_2^{\ominus} > CH \equiv C^{\ominus} > HO^{\ominus}$ (b) $CH \equiv C^{\ominus} > NH_2^{\ominus} > CH_3 - CH_2^{\ominus} > HO^{\ominus}$

(c) $HO^{\ominus} > NH_2^{\ominus} > CH \equiv C^{\ominus} > CH_3 - CH_2^{\ominus}$ (d) $NH_2^{\ominus} > CH \equiv C^{\ominus} > HO^{\ominus} > CH_3 - CH_2^{\ominus}$

Q.9 Which gives single mono-nitro derivative?

(a) Naphthalene (b) O-xylene (c) Ethylbenzene (d) P-xylene

Q.10 Which one is most effective in an SN^2 displacement on methyl bromide?

(a) $C_2H_5O^{\Theta}$ (b) HO^{Θ} (c) $C_6H_5O^{\Theta}$ (d) $CH_3CO\ O^{\Theta}$

Q.11 Which react fastest with N-bromosuccinimide (NBS)?

(a) Toluene (b) Methane (c) Pyridine (d) Benzene

Q.12 When vinyl cyanide reacts with ethylalcohols in presence of a base, what is formed?

(a) $CH_2 = CH - OH$ (b) $C_2H_5O - CH_2 - CH_2CN$ (c) $CH_3\,CH_2OH$ (d) $C_2H_5 - O - C_2H_5$

Q.13 Which is the best leaving group?

(a) Chloride (b) Fluoride (c) Tosylate (d) None

Q.14 With cis-alkene, the triplet carbene give:

(a) cis-product (b) trans-product (c) No product (d) Both cis and trans products

Q.15 DNBF is used to identify N-terminal amino acid of peptides. The reagent is called:

(a) Van-Slyke reagent (b) Sorenson reagent

(c) Sanger's reagent (d) Stephens reagent

Q.16 Continuous wave NMR spectroscopy involves:

(a) Sequential detection of resonances of nuclei

(b) Simultaneous detection of all resonances of nuclei

(c) Sometimes simultaneous and sometimes sequential detection of resonances of nuclei

(d) None

Q.17 The addition of Br_2 to methyl acetylene to give trans-1,2-dibromopropene is a:

(a) Stereoselective reaction (b) Stereospecific reaction

(c) Stereoselective and Stereospecific reaction (d) None

Q.18 The reagent used in Edman degradation for N-terminal group analysis of peptides is:

(a) Phenyl isothiocyanate (b) Benzylchloroformate

(c) DNFB (d) Di-t-butyl carbonate

Q.19 Aspartic acid shows:

(a) pKa_1 (b) pKa_2 (c) pKa_1 and pKa_2 (d) pKa_1 , pKa_2 and pKa_3

Q.20 Which is incorrect about grading of sugars?

(a) Sucrose-1 (b) Fructose-1.75 (c) Lactose-6 (d) Saccharin-3500

Q.21 Which is a local anaesthetic?

(a) Cocaine (b) Quinine (c) Morphine (d) None

Q.22 Which enhances the absorption of Vitamin-A?

(a) Vit. K (b) Vit. C (c) DMG (d) None

Q.23 By which of the following reaction, acetophenone can be converted to phenol?

(a) m-CPBA followed by base catalysed hydrolysis (b) Conc. HNO_3

(c) Iodine and $NaOH$ (d) Singlet Oxygen followed by hydrolysis

Q.24 Diazomethane with acetylene gives:

(a) Pyrazole (b) Pyrazoline (c) Piperidine (d) Pyrimidine

Q.25 Cinnamoyl alcohol with lead tetraacetate gives:

(a) Cinnamic acid (b) Cinnamoyl acetate (c) cinnamaldehyde (d) Acetophenone

Q.26 Betaine an intermediate in:

(a) Wittig reaction (b) Stobbe reaction (c) Stephenson reaction (d) MPV reduction

Q.27 If the migrating group in Beckmann rearrangement is chiral, then

(a) Its configuration will change (b) Its configuration will be retained

(c) Both (d) None

Q.28 Which reduces only carbonyl group in the presence of nitro, carboxyl, double bond and ester functional groups?

(a) LAH (b) Na/NH_3 (c) $NaBH_3$ (d) H_2/Ni

Q.29 Which is the correct decreasing order of reactivity towards electrophilic aromatic substation?

(a) Indole > Pyrrole > Pyridine (b) Pyrrole > Pyridine >Indole

(c) Pyrrole > Indole > Pyridine (d) Indole > Pyridine >Pyrrole

Q.30 OH signal of alcohol appears at what ppm range?

(a) 0.5 – 5.0 (b) 0.1 – 8.0 (c) 0.3 – 4.0 (d) 0.3 – 10.0

Q.31What is the decreasing order of chemical shifts for proton among these?

(a) Alkynes > Alkanes > Alkenes (b) Alkanes > Alkenes> Alkynes

(c) Alkynes > Alkenes> Alkanes (d) Alkenes > Alkynes > Alkanes

Q.32 The singlet at about 4.0 ppm in the proton NMR spectrum of methylacetate is due to which protons?

(a) Methyl (b) Methoxy (c) Methyl and methoxy (d) None

Q.33 Which is not an anti-cancerous durg ?

(a) Vincristine (b) Cyclophosphamide (c) Doxorubicin (d) Gabapentin

Q,34 Hexene-1 after reaction with m-CPBA followed by treatment with $LiAlH_4$ and then with water in acidic medium gives:

(a) Hexane (b) Hexan-1-ol (c) Hexan-2-ol (d) None

Q.35 Write the symbol of atomic orbital if n = 3, l =2 and m = –2, –1, 0, +1, +2 :

(a) 2*s* (b) 3*s* (c) 3*p* (d) 3*d*

Q.36 An element with atomic number 72 belongs to:

(a) s-Block (b) p-Block (c) d-Block (d) f-Block

Q.37 Which of the following metals has lowest ionization potential?

(a) Lithium (b) Sodium (c) Berylium (d) Magnesium

Q.38 Which cation has highest polarizing power?

(a) Na^+ (b) Mg^{2+} (c) K^+ (d) Al^{3+}

Q.39 How many lone pairs of electrons are present in ICl_2^- ion?

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

Q.40 Which of the following molecules/ions has smallest O –O bond?

(a) O_2 (b) O_2^+ (c) O_2^- (d) O_2^{2-}

Q.41 In Rutile structure, the coordination number of titanium atoms is:

(a) Six (b) Four (c) Two (d) Eight

Q.42 Which of the following metal ion pairs have similar ionic radii?

(a) Ti^{4+} and Zr^{4+} (b) V^{5+} and Nb^{5+} (c) Cr^{3+} and Mn^{3+} (d) Hf^{4+} and Zr^{4+}

Q.43 Which of the following solid will behave as p-type semiconductor?

(a) $NaCl$ (b) ZnS (c) FeS (d) $AgCl$

Q.44 Which metal has highest cohesion energy?

(a) Cobalt (b) Nickel (c) Copper (d) Zinc

Q.45 The aqueous solution of which metal ion will be colourless?

(a) Ti^{3+} (b) Cr^{3+} (c) Cu^{+} (d) Cu^{2+}

Q.46 Which of the following is a lanthanide element?

(a) Francium (b) Europium (c) Tungsten (d) Polonium

Q.47 In the reaction $HClO_4 + HF \rightleftharpoons H_2F^+ + HClO_4^-$, the base is

(a) $HClO_4$ (b) HF (c) H_2F^+ (d) ClO_4^-

Q.48 Which of the following will behave as a Lewis acid?

(a) NH_3 (b) NH_4^+ (c) BF_3 (d) CH_4

Q.49 If you titrate an aqueous solution of borax with HCl, indicator used will be

(a) Phenolphthalein (b) Methyl orange (c) Methyl red (d) Eriochrome black T

Q.50 As per HSAB concept, the hardest acid will be:

(a) Fe^{3+} (b) Zn^{2+} (c) Ag^+ (d) Hg^{2+}

Q.51 Which of the Halogens is strongest oxidising agent in water?

(a) F_2 (b) Cl_2 (c) Br_2 (d) I_2

Q.52 Which of the oxides is most acidic in nature?

(a) CO (b) CO_2 (c) N_2O_5 (d) SO_3

Q.53 Which of the following is most stable?

(a) Ce^{2+} (b) Eu^{2+} (c) Sm^{2+} (d) Pr^{2+}

Q.54 Pitchblende is an Ore of

(a) Lanthanum (b) Cerium (c) Uranium (d) Thorium

Q.55 How many Isomers are possible for the complex $K_2[Pt(NH_3)_4Cl_2]$?

(a) One (b) Two (c) Four (d) Six

Q.56 What is the spin only magnetic moment of $[Fe(CN)_6]^{3-}$ ion ?

(a) 5.92 (b) 4.90 (c) 2.83 (d) 1.73

Q.57 Which of high spin octahedral complex will show tetragonal distortion ?

(a) d^3 (b) d^4 (c) d^5 (d) d^8

Q.58 How many unpaired electrons are present in $[CoF_6]^{3-}$ ion ?

(a) Zero (b) One (c) Two (d) Four

Q.59 Predict the type of isomerism in $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6$

(a) Linkage Isomerism (b) Coordination Isomerism (c) Stereoisomerism (d) Coordination position Isomerism

Q.60 Which of the following complex ions will not be square planar in structure ?

(a) $[Co(CN)_4]^{2-}$ (b) $[Ni(CN)_4]^{2-}$ (c) $[Cu(NH_3)_4]^{2+}$ (d) $Ni(CO)_4$

Q,61 How many peaks are observed in UV-visible absorption spectra of $[Ni(H_2O)_6]^{2+}$?

(a) One (b) Two (c) Three (d) Four

Q,62 Write the Ground Term of Cr^{3+}

(a) 6_S (b) 4_F (c) 2_D (d) 3_P

Q,63 Predict the point group in $Fe(CO)_5$

(a) O_h (b) C_{3v} (c) C_{2v} (d) D_{3h}

Q.64 Nitrogenase enzyme consist of

(a) *Co* (b) *Se* (c) *Mo, Fe* (d) *Mg*

Q.65 Vitamin B_{12} consists of

(a) *Fe* (b) *Co* (c) *Mn* (d) *V*

Q.66 Complete the reaction :

$$^{235}_{92}U + ^{1}_{0}n \rightarrow ^{141}_{56}Ba + ^{92}_{36}Kr + \cdots..$$

(a) $2^{1}_{0}n$ (b) $^{1}_{1}H$ (c) $^{2}_{1}H$ (d) $^{4}_{2}He$

Q.67 Bhopal Tragedy which killed thousands of people, was due to air pollution of :

(a) CO (b) SO_2 (c) Nitrogen Oxides (d) Methyl Isocyanate

Q.68 The cartesian components of angular momentum in a direction parallel to x-axis is given by

(a) $\hat{L}_x = i\hbar\left[x.\frac{\partial}{\partial x} - z.\frac{\partial}{\partial z}\right]$ (b) $\hat{L}_x = -i\hbar\left[y.\frac{\partial}{\partial z} - z.\frac{\partial}{\partial y}\right]$

(c) $\hat{L}_x = i\hbar\left[y.\frac{\partial}{\partial z} - z.\frac{\partial}{\partial y}\right]$ (d) $\hat{L}_x = -i\hbar\left[x.\frac{\partial}{\partial z} - z.\frac{\partial}{\partial x}\right]$

Q.69 Operators $\hat{A}$ and $\hat{B}$ are said to be commutative, if

(a) $\hat{A} - \hat{B} = 0$ (b) $\hat{A} + \hat{B} = 0$ (c) $\hat{A}\hat{B} - \hat{B}\hat{A} = 0$ (d) $\hat{A}\hat{B} + \hat{B}\hat{A} = 0$

Q.70 The wave function for a particle in one dimensional box is expressed as

(a) $\frac{\sqrt{2}}{a} sin\frac{n\pi x}{a}$ (b) $\sqrt{\frac{2}{a}} sin\frac{n\pi x}{a}$ (c) $\sqrt{\frac{2}{a}} sin\frac{\pi x}{a}$ (d) $\sqrt{\frac{2}{a}} sin\frac{2\pi x}{a}$

Q.71 The Boyle temperature is that at which the second virial coefficient of real gas is

(a) Zero (b) One (c) Four (d) One and half

Q.72 The fugacity function is definition as

(a) $\lim_{P\to 0}\frac{p}{f} = 1$ (b) $\lim_{P\to 0}\frac{f}{p} = 1$ (c) $\lim_{f\to 0}\frac{p}{f} = 1$ (d) $\lim_{P\to 0}\frac{p}{f} = 0$

Q.73 Choose the correct relation:

(a) $\left(\frac{\partial A}{\partial T}\right)_P = \left(\frac{\partial G}{\partial T}\right)_V$ (b) $\left(\frac{\partial A}{\partial T}\right)_V = \left(\frac{\partial G}{\partial T}\right)_P$ (c) $\left(\frac{\partial T}{\partial S}\right)_P = \left(\frac{\partial V}{\partial S}\right)_P$ (d) $\left(\frac{\partial S}{\partial P}\right)_T = -\left(\frac{\partial T}{\partial V}\right)_P$

Q.74 For the combination of one mole of $CH_3COOH(l)$ at 298K, Δn is

(a) 1 (b) –1 (c) Zero (d) –1/2

Q.75 In the limit T→ 0, for a crystal :

(a) $S_T = 3C_P$ (b) $S_T = 2C_P$ (c) $S_T = C_P/2$ (d) $S_T = C_P/3$

Where C_P is the heat capacity at constant pressure.

Q.76 The compressibility factors of Vander Waal gas at critical point is

(a) 0.375 (b) 0.400 (c) zero (d) 0.512

Q.77 The Joule-Thomson expansion of an ideal gas is

(a) Adiabatic process (b) An isentropic process

(c) An isenthalpic process (d) An isothermal process

Q.78 The spacing between 123 planes in an orthorhombic unit cells having a = 50 pm, b = 100 pm and c = 150 pm is

(a) 2.9 pm (b) 29 pm (c) 9.2 pm (d) 92 pm

Q.79 The cell potential is a

(a) Colligative property (b) Thermodynamic property

(c) Intensive property (d) Extensive property

Q.80 The solubility of silver chloride in water at 298.15 K is 0.00179 g litre^{-1}. The solubility product will be

(a) 156×10^{-10} mol^2 dm^{-6} (b) 1.56×10^{-9} mol^2 dm^{-6}

(c) 15.6×10^{-12} mol^2 dm^{-6} (d) 1.56×10^{-10} mol^2 dm^{-6}

Q.81 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.82 When a radioactive element loses one and particles, it yields

(a) Isobar (b) Isomer (c) Isotope (d) Allotrope

Q.83 50 ml of 0.1 $NaOH$ are added to 49ml of 0.1 HCl. The pH of the resulting dilution is

(a) 12 (b) 11 (c) 10 (d) 9

Q.84 The heat of reaction is independent of

(a) Pressure (b) Temperature (c) Physical state (d) The Path by which product is formed

Q.85 Which of the following will show ESR spectra?

(a) C_6H_6 (b) CH_3 (c) CH_4 (d) H_2

Q. 86 What is the frequency of radiation possessing wavelength 400 nm?

(a) $7.5\times10^{-14}\ S^{-1}$ (b) $7.5\times10^{14}\ S^{-1}$ (c) $7.5\times10^{9}\ S^{-1}$ (d) $7.5\times10^{-13}\ S^{-1}$

Q.87 In aerosol, the dispersion medium is

(a) Gas (b) Solid (c) Liquid (d) Mixture of all

Q.88 The polymers consist of coil like polymer chain are

(a) Thermoplasts (b) Elastomers (c) Thermosets (d) None of these

Q.89 Which of the following is a state fucntion?

(a) E – PV (b) E + PV (c) Q/W (d) Q – W

Q.90 The Ilkovic equation for diffusion current is expressed

(a) $\vec{I}_d = 607nDC\, m^{2/3}t^{1/6}$ (b) $\vec{I}_d = 607nD^{1/2}C\, m^{1/3}t^{1/6}$

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

Q.91 The force constant of a diatomic S.H.O can be calculated by employing relation:

(a) $k = 4\pi^2c^2(\bar{\nu}^2)\mu$ (b) $k = 4\pi^2c(\bar{\nu}^2)\mu$ (c) $k = 4\pi^2c(\bar{\nu})\mu$ (d) $k = 4\pi^2c\mu$

Where all the symbols have their usual meaning.

Q.92 Zero-point energy for diatomic molecule possessing harmonic motion is:

(a) zero (b) $h\nu$ (c) $\frac{1}{2}h\nu$ (d) $\frac{1}{3}h\nu$

Q.93 The power output of a laser in which 2.0 J pulse can be delivered in one nanosecond is

(a) 2.0 GW (b) 20.0 GW (c) 0.20 GW (d) None of these

Q.94 For Arrhenius equation, $A = e^{-E_a/RT}$, if T→∞, then value of E_a will be

(a) Positive (b) Negative (c) zero (d) equal to A

Q.95 The molarity of pure water is

(a) 50 (b) 18 (c) 100 (d) 55.6

Q.96 The degeneracy of the rotational energy level with J = 4 for a heterodiatomic molecule is

(a) 4 (b) 7 (c) 9 (d) 8

Q.97 Mean path of a gas molecule is

(a) inversely proportional to pressure (b) directly proportional to pressure

(c) independent of pressure (d) independent of temperature

Q.98 In B.E.T equation one of the following statement is not true, Select the one

(a) It considers the multi-layer adsorption

(b) It doesn't use the concept of saturation of vapour pressure

(c) It is not valid for porous adsorbent

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

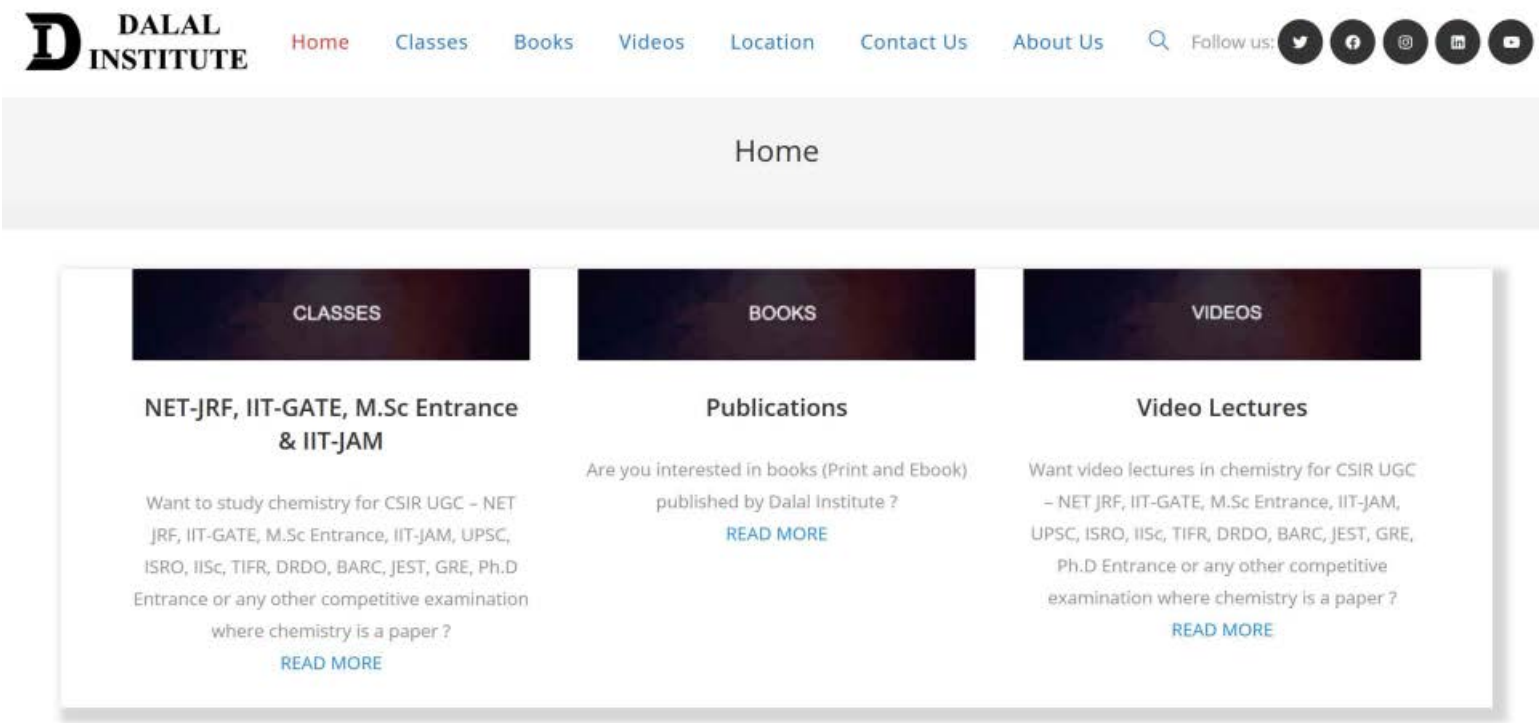
Q.99 No diffraction would result, if:

(a) $\lambda << 2d$ (b) $\lambda \approx 2d$ (c) $\lambda << d$ (d) $\lambda >> 2d$

Q.100 $11.2 \times 10^3 m^3$ of a gas at STP requires 104.6 J to raise its temperature by 10 degree. The C_v for the gas is:

(a) 20.92 $J\ deg^{-1} mole^{-1}$ (b) 10.46 $J\ deg^{-1} mole^{-1}$ (c) 9.4 $J\ deg^{-1} mole^{-1}$ (d) zero

This is a low resolution version only for preview purpose. If you want to read the full book, please consider buying.



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.

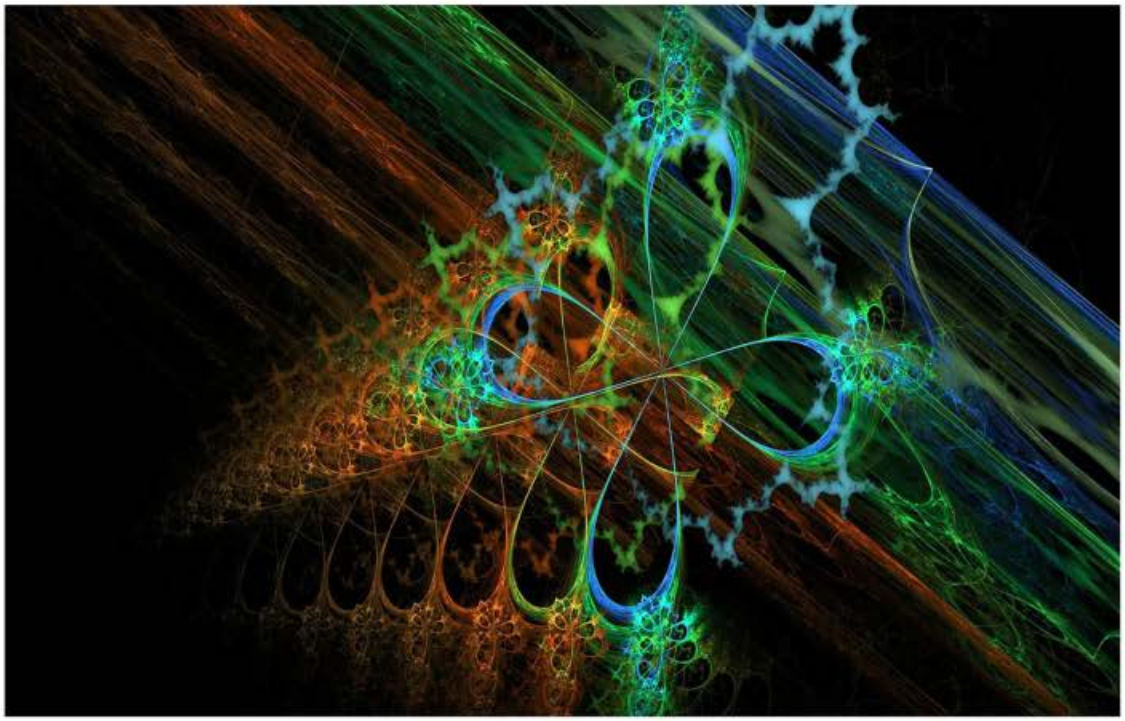
READ MORE

Dalal Institute's

MDU M.SC ENTRANCE

Chemistry

Solved Papers



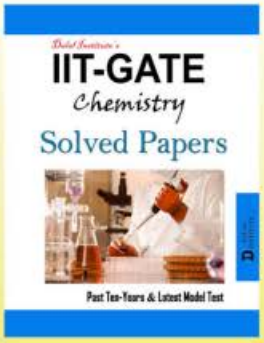
DALAL INSTITUTE

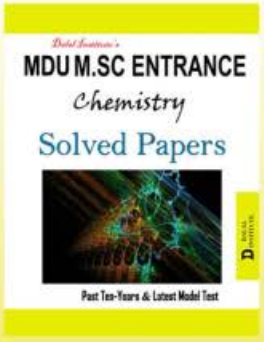
2011–2019 & Letest Model Test

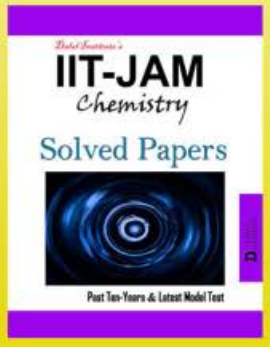
Table of Contents

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