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ABT-2201-02-03 Seat No. _____

M. Sc. (Sem. III) Examination

November/December - 2016

1. CHN-601 : Organic Chemistry : Paper - I

2. CHN-601 (I) : Inorganic Chemistry : Paper - I

3. CHN-601(P) : Physical Chemistry

(Advanced Physical Chemistry)

Time : **3** Hours] [Total Marks : **70**

1. CHN-601 : Organic Chemistry : Paper - I

Instruction : All questions carry **equal** marks.

1 Attempt any two :

(i) What are isoflavones ? Discuss the constitution of Daidzein.

(ii) Discuss the structural relationship between Quercetin and Cyanidin chloride.

(iii) Discuss the constitution of Chlorophyll 'a'.

(iv) Discuss biosynthesis of Cyanin.

2 Attempt any two :

(i) What are Terpins ? Discuss the structure of cadinene.

(ii) Discuss the constitution of any Triterpinoid.

(iii) Discuss the structure of Abietic acid.

(iv) Explain the general method for the structure determination of Terpines.

3 Attempt any three :

(i) Discuss the constitution of β-biotin.

(ii) Discuss the constitution of pantothenic acid.

(iii) Differentiate α, β and γ Tocopherols.

(iv) What are vitamins ? Discuss their classifications and nomenclature.

(v) Discuss the synthesis of vitamin B_7.

4 Attempt any two :

(i) What are alkaloids ? Discuss their classification, isolation and uses.

(ii) Discuss the constitution of Strychnine.

(iii) Discuss the constitution of any Tropolone alkaloid.

(iv) Discuss the general method to determine the structure of alkaloid.

5 Attempt any five :

(i) What is the relation between Flavanol and xanthone ?

(ii) What are Antivitamines ?

(iii) Draw the structure of ascorbic acid.

(iv) Give synthesis of Polyphoric acid.

(v) Discuss the classification of vitamins.

(vi) Discuss the structure of Chlorophyll.

(vii) Explain the structure of Pelargonin chloride.

2. CHN-601 (I) : Inorganic Chemistry : Paper - I

Instruction : All questions carry **equal** marks.

1 Answer any **two** of following :

(1) Discuss the principle of ESR spectroscopy.

(2) Explain the application of NQR Spectrum.

(3) Discuss the difference between ESR and NMR.

(4) Explain Hyperfine Splitting.

2 Answer any **two** of following :

(1) Discuss the X-ray P.E.S.

(2) Compare the U.V. PES of O_2 andN_2.

(3) Discuss the principle of Valence-Electron spectroscopy.

(4) Explain the U.V. photo-Electron spectroscopy.

3 Answer any **two** of following :

(1) Write a note on paramagnatism.

(2) Explain the contribution of d-orbital spin magnetic moment.

(3) Discuss the Antiferromagnetism.

(4) Discuss the methods of measurement of magnetic susceptibility.

4 Answer any **two** of following :

(1) Write a short note on application of DMC.

(2) Discuss the OMC of Al.

(3) Discuss the classification of OMC.

(4) Write a note on OMC of Be.

5 Write answer of following :

(1) Write the limitation of NQR.

(2) What is hyperfine splitting of CH_3 ?

(3) What is ESCA ?

(4) What is OMC ?

(5) Give the reaction of Zeiglor-Natta

(6) What is PES ?

(7) What is binding energy ?

3. CHN-601(P) : Physical Chemistry

(Advanced Physical Chemistry)

Instructions : (1) Attempt all questions.

(2) All questions carry equal marks.

1 (a) Do any two of the following : **2×5=10**

(i) Rate constants and liftimes of reactive energy stages for bimolecular reactions.

(ii) Photo reduction of dyes by two electron processes.

(iii) Gas photolysis taking the examples of R-X molecules.

(iv) Types and classification of photochemical reactions.

(b) Write any **one** of the following : **1×4=4**

(i) Explain the role of photochemistry in cis-trans isomerisation of ethylene and 1,4-butadiene.

(ii) Explain type I and type II proceses in photo oxygenation reactions with examples.

(iii) Discuss various factors affecting rate constants and life times of photochemical reactions.

2 (a) Attempt any **two** of the following : **2×5=10**

(i) Derive B.E.T. equation for mutilayer adsorption.

(ii) Explain insoluble films. Give their types and applications.

(iii) Write a note on adsorption theory.

(iv) Define Heat of adsorption and discuss various experimental methods for determiination of heat of adsorption.

(b) Write a note on any one of the following : **1×4=4**

(i) The following data have been obtained for the adsorption of nitrogen on silica at 77K, P_o is the vapour pressure of liquid nitrogen at this temperature.

P/P_o	0.05	0.15	0.25	0.40	0.60	0.80
α ml absorbed per gm of silica	30.00	38.00	42.50	48.00	55.00	108.00

Calculate the surface area of silica in terms of square meters per gram by Point B method. Assume the area of nitrogen molecule is 16.2 A^2.

(ii) Explain types of adsorption curves and adsorption isotherms.

3 (a) Write note on any two of the following : **2×5=10**

(i) Differences in crystalline and amorphous solids.

(ii) Differences in perfect and imperfect crystals.

(iii) Differences in Schottky and Frenkeldefect information.

(iv) Differences in super conductors of type-I and II.

(b) Attempt any **one** of the followings : **1×4=4**

(i) A organic compoundis in orthorhombic system. The unit cell has edge 12.05, 15.05, and 2.69 A^o. There are two moleclules per unit cell. The density of crystal is 1.4119 g cm^{-3}. Find the molecular weight of the compound.

(ii) Explain various methods for crystal growth.

4 (a) Answer any **two** of the followings : **2×5=10**

(i) Write a note on principle and calculation of vibrational frequency in IR spectroscopy.

(ii) Discuss UV – Visible chiroptical spectroscopy and how is it differentfrom ordinary UV Visible spectroscopy.

(iii) Write a note on optical rotatory dispersion (ORD) and circular dicronism (CD).

(iv) Explain concepts ^{13}C NMR spectrum, operating frequency and ^{13}C – C correlation.

(b) Attempt any **two** of the followings : **1×4=4**

(i) Explain theory of ^{1}H NMR and signal intensities in ^{1}H NMR spectrum.

(ii) Write a note on octant rule.

5 Define any **seven** for the following : **2×7=14**

(i) Photofragmentation

(ii) Quantum yield.

(iii) Thermodynamic Point defects

(iv) Role of Adsorption in detergency

(v) Physical adsorption.

(vi) Electrostatic adsorption

(vii) Circulatory polarised light

(viii) Effect of temperature on growth of temperature

(ix) Chemical shift

(x) Operating frequency in IR spectroscopy

(xi) Spin–spin coupling

(xii) Close packing

(xiii) Co-precipitation as a precursor to solid state reaction

(ix) Semiconducters.