AAC-2101

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2019

CHN-701(O) - Chemistry : Paper - I

(Organic Chemistry)

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

1 Answer any **two** :

(1) Discuss the constitution of cellulose.

(2) Discuss the constitution and properties of uric acid.

(3) What is the difference between caffeine and theine? Discuss the constitution of caffeine.

(4) Discuss the structure of Nucleotides.

2 Answer any **two** :

(1) Differentiate among conformations, configurations and isomers. Discuss the conformation analysis of 1, 2-dimethyl and 1, 3-dimethyl cyclohexane.

(2) What are bridge ring systems ? Discuss the stereochemistry of Bicyco [1,1,1] pentane and bicycle [2,2,2] octane.

(3) What are hydrindanes ? Discuss their possible isomers. Discuss the conformers of cyclohexane-1, 2-dicarboxylic acid.

(4) Discuss the conformational analysis of 2-bromocylohexanone and 2-bromo-4, 4-dimethylcyclohexanone.

AAC-2107

Seat No._____

M. Sc. (Sem. IV) Examination

April - 2019

CHN - 702(O) : Organic Chemistry : Paper - II

Time : 3 Hours] [Total Marks : 70

Instruction : All questions carry equal marks.

1 Answer any two : 14

(1) Explain the process of refining of crude oil.

(2) Write a note on aromatic chemicals production. What is Kapron ?

(3) Classify synthetic fibers. Give an account for manufacture of Terylene.

2 (a) Answer any one : 4

(1) What is paints ? Classify paints and write a note on fire retardate paints.

(2) Write short note on varnishes raw materials.

(b) Answer any two : 10

(1) Give account of toxic chemicals used in war.

(2) Describe the manufacture of TNT and picric acid.

(3) What are explosives ? Give their characteristics and classification.

3 Answer any three : 14

(1) Write a note on cyclization reactions. What is a chain transfer reactions ?

(2) Explain the type of polymerization. Discuss type of polyester resins.

(3) Give a detail account of co-polymers of ethylene.

(4) Give classification of plastics. Distinguish isotactic, syndiotactic and atactic polymers.

4 Answer any three : 14

(1) How can you prepare shoe polish ?

(2) Give the steps and tips for stain removal.

(3) Write on small scale manufacture of Napthalene balls and wax candles.

(4) Describe soap manufacturing process.

5 Answer any seven : 14

(1) Explain substitution polymer reaction.

(2) What is emulsion paints ?

(3) Which are use of urotropin ?

(4) Explain cloud point.

(5) What is Gun Powder ?

(6) Which are different types of detergents ?

(7) What is cordite ? Explain.

(8) What are live polymer ?

(9) Give the classification of explosives.

(10) How prepared dimethyl terpthalate ?

AAC-2113 Seat No._____

M. Sc. (Sem. IV) Examination

April - 2019

CHN - 703(O) : Organic Chemistry

Time : 3 Hours] [Total Marks : 70

1 (a) Answer any two of the following questions : 8
(1) Write a note on antiamoebic drugs.
(2) Give the synthesis of 4-aminoquinolines and 8-aminoquinolines.
(3) Write a note on primary tubercular agents.

(b) Answer any one of the following : 6
(1) Write a brief account on antifungal drugs.
(2) Classify the antimalarial drugs on the basis of chemotherapy. Give the synthesis and physiological activity of Diamino pyramidines.

2 (a) Answer any two of the following : 8
(1) Explain antiparkinsonism drugs.
(2) Explain anticonvulsant drugs.
(3) Write a note on Antipsychotics.

(b) Answer any one of the following : 6
(1) What is Tranquilizers ? Classify it. Give synthesis of any two of them.
(2) Classify the CNS depressant drugs. Draw the structure of Barbiturates and explain this biochemical effects and mechanism of action.

3 Answer any two of the following : 14

(1) Give the classification of Diuretics and synthesis of Acetazolamide and Furosemide.

(2) Write a note on Cardiac drugs.

(3) Name the different drugs acting on Renal system with their mode of action.

4 Answer any two of the following : 14

(1) How is cancer caused ? What are limitations of its therapy ? Draw structures of 6-mercaptopurine and 6-thioguanine.

(2) Write a note on Hypoglycemic drugs.

(3) What is hyper tension ? What should be normal blood pressure ? Write synthesis of one antihypertensive drug.

5 Answer any seven of the following : 14

(1) What is sleep cycle ?

(2) What are the sedatives and hypnotics ?

(3) Give types of anti anxiety drugs.

(4) Give action of antineoplastic drugs.

(5) Give the synthesis of Methisazone.

(6) Define chemotherapeutic drugs.

(7) Give the synthesis of Impiramine.

(8) Give classification of Anti-arrythimic agent.

(9) Write full form of AIDS and HIV.

(10) What is Tranquilizers ?

AAC-2118-19-20-21-22 Seat No._____

M. Sc. (Sem. IV) Examination

April - 2019

CHN - 704(A) : "Organometallic Chemistry"

(Elective)

CHN - 704(B) : "Organic Synthesis"

(Elective)

CHN - 704(C) : "Chemistry of Materials"

CHN - 704(D) : "Computational Chemistry"

(Elective)

CHN - 704(E) : "Advanced Quantum Chemistry"

(Elective)

Time : 2 Hours] [Total Marks : 50

CHN - 704(A) : "Organometallic Chemistry"

(Elective)

1 (a) Answer any two of the following : 10

(1) What is OMC ? Write note on structural characteristic of carbenes complexes.

(2) Discuss the preparation and properties of π-complexes of transition metals.

(3) Give brief report on "Transition metal alkyl and aryl complexes."

(4) Discuss the stability of octahedral complexes which is enhanced by π-acceptor ligands.

(b) Answer any two of the following : 6

(1) Explain the Corey-house synthesis.

(2) Give short note on "Activation of Carbon-Hydrogen bonds".

(3) Give brief report on "Zeises Salt".

(c) Answer any two of the followings : 4

(1) Define and explain sandwich bonded organo metalic compounds.

(2) Give the difference between FC and SC.

(3) Give the method of preparation of $IrMe_3L_3$ starting from $IrClL_3$, $LiCH_3$ and CH_3Cl.

(4) Draw the singlet and triplet of Carbene's carbon in complexes.

2 (a) Answer any two of the following : 10

(1) Write brief report on polymerization of Olefine by "Zeigler-Natta" catalyst.

(2) Write short notes on :

(1) "OXO reaction"

(2) "OXO palladation"

(3) Explain the fluxionality and dynamic equilibrium in η^2-defins and η^3-allyl compounds.

(4) Explain the "Homogeneous catalytic hydrogenation reaction".

(b) Answer any two of the following : 10

(1) Give an account of catalytic cycle of "Rh" complexes.

(2) Write report on polymerization of Alkyenes.

(3) What is Haptoropic shift ? Explain with appropriate examples.

(4) Discuss the advantages and disadvantages of $HCo(CO)_4$ as a catalyst.

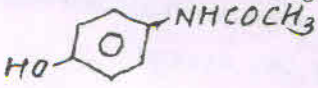
3 Answer the following : 10

(1) Give any two example of Alkyles Transition Metal complexes.
(2) Give classes of O.M.C.
(3) Draw the structure of $Fe_3(CO)_{12}$ and $Fe_2(CO)_9$.
(4) Draw the structure of "Zeises Salt".
(5) What is polymerization ?
(6) Define activation energy.
(7) Define fluxional organometallic compound and give example.
(8) What is catalytic reaction ?
(9) Give the examples of "Sandwich bonded Compound".
(10) Write the structure of Zeigler-Natta catalyst.

CHN - 704(B) : Organic Synthesis
(Elective)

1 (a) Answer any three of the following : 15

(1) What is chemoselectivity ? Explain with suitable example.
(2) Describe the use of acetals and ketals as protecting groups for carbonyl compounds.
(3) Give a brief account of the use of acetylenes in organic synthesis.
(4) Explain one group C-X disconnection with suitable examples.
(5) Do the disconnection and plan the synthesis of the following TM.



(b) Answer any two of the following : 5

(1) Give any one organic synthesis using umpolung reagents.
(2) Give a method for protection of carboxyl group.

(3) Write any two methods of alkene synthesis.
(4) Discuss the importance of the order of events in organic synthesis.

2 (a) Answer any three of the following : 15

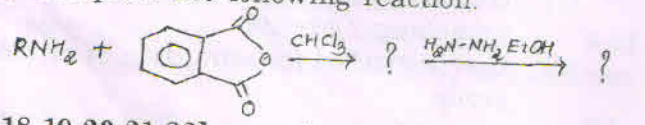
(1) Give the Reterosynthetic analysis of camphor.
(2) Discuss cyclisation reaction of four and six membered rings.
(3) Give the reterosynthesis of Juvabione.
(4) Explain the disconnection approach to α,β-unsaturated carbonyl compounds.

(b) Answer any two of the following : 5

(1) Discuss the use of Robinson annelation for organic synthesis.
(2) Explain the meaning of two group C-Cdisconnection.
(3) Explain reterosynthesis of cortisone.
(4) Describe the use of Micheal reaction.

3 Answer any five the following short questions : 10

(1) Define the term Disconnection with appropriate example.
(2) What is protecting group ?
(3) Explain the term FGI with example.
(4) What is acceptor synthon ? Give examples.
(5) Give the use of RMgX.
(6) Draw the structure of any two saturated 5 membered heterocyclic compounds.
(7) What is Frankland reagent ?
(8) How can you convert alcohol into alkyl halide ?
(9) Give any two examples of synthetic equivalent for $CH_3CH_2^{(+)}$.
(10) Complete the following reaction.



CHN - 704(C) : Chemistry of Materials

1 Answer any four of the following questions :

(1) Give an account of applications of ferrous and non ferrous alloys.

(2) Discuss "Photolithography".

(3) Enlist uses of different glasses.

(4) Which are chemical methods of preparation of thin films ?

(5) Discuss about optical properties of liquid crystals.

(6) Distinguish clearly between nematic and smectic mesophases.

2 Answer any four of the following questions :

(1) Explain the types and applications of polymers.

(2) Write the preparations and characterization of 1-2-3 and 2-1-4 materials.

(3) Explain the fullerenes as superconductor.

(4) What are perovskites ?

(5) Explain Magnetism of Organic materials.

(6) Describe optical properties of solid state devices.

3 Attempt any ten in brief : **10**

(1) What is restifier ?

(2) Define : Superconductors.

(3) Define composite matarial.

(4) What is non linear optical materials ?

(5) Define a gel.

(6) What is ferroelectricity ?

(7) Give any two examples of low melting alloys.

(8) What are non ferrous alloys ?

(9) What is Glass transition temperature ?

(10) Define a capacitor.

(11) What is "MOCVD" ?

(12) Give the composition of stainless-steel.

(13) Name any three glass modifiers.

CHN - 704(D) : Computational Chemistry

(Elective)

1 (a) Answer any two : 12

(1) Explain Newton–Raphson method for solving transcendental equations.

(2) Discuss errors in integration formulae when applied to calculate energy of minimization.

(3) Brief resume on numerical integration method.

(b) Answer any two : 10

(1) How are Gaussian orbitals used to approximate a Slater type orbital ?

(2) Discuss the principle of Gauss-Jordan method.

(3) Define Taylor series in reference to simple differential equations.

2 (a) Answer any two : 12

(1) Name software's of semi empirical calculations and discuss their functions in calculating energy of molecules.

(2) Give the applications GAMESS.

(3) Explain molecular orbitals theory (MOT) using the Linear Combination of Atomic Orbitals (LCAO) approximation.

(b) Answer any two : 10

(1) Explain the steps required to carry out simulation with MOPAC.

(2) Enumerate salient features, merits and demerits of chem-Draw.

(3) Discuss the features of IR interpretation softwares.

3 Answer any three : 6

(1) Gold as a software.

(2) Polak Rebiero

(3) Computational chemistry

(4) What is networking ? How it is useful for a chemist ?

(5) Briefly explain principle of Huckel MO theory.

(6) Compare and contrast DFT with HF technique.

(7) What are the different computational methods to treat chemical systems ?

CHN - 704(E) : Advanced Quantum Chemistry

(Elective)

1 Answer any three questions : 20

(1) Explain Born-Oppenhamer approximation.

(2) Derive Hohenberg-Kohn theorem.

(3) Explain CNDO theory.

(4) Obtain Hartree-Fock equation for atoms.

2 Answer any three questions : 20

(1) Explain density functional theory in respect of treatment of chemical concepts.

(2) Explain MC-SCF methods.

(3) Explain EHT and PPT treatments.

(4) Explain electronic energies and its properties.

3 Answer any five questions : 10

(Each carries 2 marks)

(1) State Slater Condon rules.

(2) Name application of CNDO procedure.

(3) For which kind of chemical analysis MOPAC software is used ?

(4) Give importance of Roothan's equation in LCAO approximation.

(5) State N and V representations.

(6) What is ZDO approximation ?

(7) Which software packages are used in computation of quantum chemistry ?

CEQ-7401

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Organic Chemistry : CHN - 701 (O)

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instructions : (1) This question paper carries four questions.

(2) Figures to the right indicate marks of the question.

1 Answer any **two** of the following : 18

(a) Give the properties of α-Amylose and β-Amylose. Discuss the structure of Amylopectin.

(b) What are the differences between RNA and DNA ? Discuss the structure of Nucleotides.

(c) Give at least two syntheses of Caffeine and Uric acid.

2 Answer any **two** of the following : 17

(a) Draw and name of all conformers of hexa-chloro cyclohexane and discuss their stability.

(b) What is conformation ? Discuss conformational analysis of Dimethyl cyclohexane.

(c) What are bridge ring systems ? Discuss the stereochemistry of bicyclo [2,1,1] hexane and bicyclo [2,2,1] heptane.

3 Answer any **two** of the following : 18

(a) Discuss the chemical relationship between Oestrone, Oestriol and Oestradiol.

(b) Give synthesis of progesterone from cholesterol.

(c) Prove the structure of lanosterol.

4 Answer any **two** of the following : 17

(a) What is NMR shift reagent ? Discuss mechanism of action of shift reagent with suitable example.

(b) Give the full form of NOESY and HMBC spectrum. Describe the proton detected HETCOR spectroscopy.

(c) What is $1_H - 1_H$ cosy and DQF $1_H - 1_H$ cosy ? Explain importance of both according to their application.

CEQ-7402

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Inorganic Chemistry : CHN - 701(I)

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instruction : All questions are compulsory.

1 Answer any **two** of the following : 18

(1) Discuss the photochemical reaction of complex compound with appropriate examples.

(2) Explain photo redox reaction.

(3) Explain the differences between Photo chemical and Thermo chemical reaction with examples.

2 Answer any **two** of the following : 17

(1) Discuss about Mass Spectroscopy for Inorganic compounds.

(2) Write a short note on "Fragmentation".

(3) Explain, how various isotopes are identified using Mass spectroscopy.

3 Answer any **two** of the following : 18

(1) Discuss the applications of AES.

(2) Write a short note on "Auger Electron Spectroscopy".

(3) Explain the Koopman's theorem.

4 Answer any two of the following : 17

(1) Explain the Chemilulminescence.

(2) Explain the principal and application of AFM.

(3) Compare photo fluorence and phosphorience.

CEQ-7403

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Physical Chemistry : CHN - 701 (P)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Give the answer : (any **two**) **18**

(1) Explain with examples : Chemiuminescence.

(2) Explain the mechanism of ene reaction.

(3) Explain :

(a) Metal complex sensitizers

(b) Water Photolysis

2 Give the answer : (any **two**) **17**

(1) Write a short note : Nuclear fission.

(2) Explain :

(a) Synthesis of Na and C isotopes.

(b) Synchrocyclotron

(3) Write a short note : Shell model.

3 (a) Give the answer : (any **one**) **9**

(1) Write a short note : Hinsheelwood theory.

(2) Explain : Rice, Ramsperger and Kassel theory.

(b) Give the answer : (any **one**) 9

(1) Calculate the $\Delta H^*, \Delta G^*$ and ΔS^* at 500 K. A = 2.0×10^9 sec^{-1}, energy of activation = 111 K.J/mole.

(2) Calculate the ΔS^* in Jule / k.mole at 25°C. Value of log A = 15.17.

4 Give the answer : (any **two**) 17

(1) Discuss the basic principle, instrumentation and applications of Atomic absorption spectroscopy.

(2) Discuss the classical theory of Raman effect.

(3) Explain : Determination of P^K value and instability constant of Indicator by U.V. Spectra.

CEQ-7408

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Organic Chemistry : CHN - 702 (O)

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instructions : (1) Figures on the right indicate full marks.

(2) Answers of all questions must be written in same answer book.

1 Answer any **two** : 18

(1) Discuss important chemicals obtained by industrial method from C_2 and C_4 fraction and their uses.

(2) Classify synthetic fibres. Give an account for manufacture of terylene.

(3) Explain the distillation of crude oil and coal tar.

2 Answer any **two** : 17

(1) What are paints ? Classify of paints and note on fire retardate paints.

(2) Write a note on Toxic Chemical agents.

(3) Write a note on the industrial uses of explosives.

3 Write any **two** : 18

(1) Explain cyclization reaction in polymer with illustration.

(2) Classify resins. Write a note on silicon resin.

(3) Write a note on manufacture of phenol formaldehyde resins.

4 Answer any **two** : 17

(1) Discuss the small scale manufacture of Agarbatties and phenyl disinfectants.

(2) How can you prepare shoe polish ?

(3) Describe soap manufacturing process.

CEQ-7410

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Physical Chemistry : CHN - 702(P)

(Old Course)

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instructions : (1) All questions are compulsory.
(2) Figures to the right indicate maximum marks.
(3) Answer the questions accurately and appropriately.

1 Answer any **two** of the following questions. 14

(1) Explain the terms entropy, enthalpy and Gibb's free energy. Discuss the thermodynamic criteria for spontaneity of various reactions.

(2) Define the terms of Hammett equation and interpret their effects on linear free energy relationship.

(3) Describe the transition state theory of reaction rate.

(4) Write is the Taft equation and discuss its applications in organic chemistry.

2 Answer any **two** of the following questions : 14

(1) Give a brief resume of ionic liquids.

(2) Discuss the fused-oxide system in metallurgy.

(3) Write a note on electrocatalysis.

(4) Explain the energy density in energy storage and in fuel cell.

CEQ-7410

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Physical Chemistry : CHN - 702(P)

(Old Course)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Figures to the right indicate maximum marks.
(3) Answer the questions accurately and appropriately.

1 Answer any **two** of the following questions. **14**

(1) Explain the terms entropy, enthalpy and Gibb's free energy. Discuss the thermodynamic criteria for spontaneity of various reactions.

(2) Define the terms of Hammett equation and interpret their effects on linear free energy relationship.

(3) Describe the transition state theory of reaction rate.

(4) Write is the Taft equation and discuss its applications in organic chemistry.

2 Answer any **two** of the following questions : **14**

(1) Give a brief resume of ionic liquids.

(2) Discuss the fused-oxide system in metallurgy.

(3) Write a note on electrocatalysis.

(4) Explain the energy density in energy storage and in fuel cell.

3 Answer any **two** of the following questions : 14

(1) Discuss the solvent effects from the curve crossing model.

(2) Elaborate the qualitative solvent-solute effects on reactivity.

(3) Explain the use of salvation scales in mechanistic studies.

(4) Write a note on the various indexes of salvation.

4 Answer any **two** of the following questions : 14

(1) Explain the principle and instrumentation of coulometery.

(2) Describe the capillary electrophoresis and its applications.

(3) What is principle of polarography ? Derive the polarographic half wave equation.

(4) How chronopotentiometry is different from ordinary potentiometry ?

5 Answer any **seven** of the following short questions : 14

(1) What is the unit of rate constant for a third order reaction ?

(2) Write the importance of Hammond postulate.

(3) State Bell-Evans-Polanyi principle.

(4) Draw the potential energy surface for chemical reaction dynamics.

(5) Difference between solvaton and hydration.

(6) When cyclic voltametry is applied ?

(7) Define the diffusion and migration current.

(8) What is 'electroosmotic flow' ?

(9) Draw a mechanism of proton transfer.

(10) What is the role of supporting electrolyte in polarography ?

CEQ-7409

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

CHN - 702 (I) : Inorganic Chemistry : Paper - II

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

1 Answer any **two** questions from the following : 18

(1) Explain Imides of Sulphur.

(2) Write synthesis of $B_3N_3H_6$ and Chemical Properties of $B_3N_3H_6$.

(3) Write the synthesis, properties and uses of high thermal silicones, silicone resin and silicone rubber.

2 Answer any **two** questions from the following : 17

(1) Discuss classification of Inorganic Polymers and write general property of Inorganic Polymers.

(2) What is coordination polymer ? What are the methods for preparation coordination polymer ?

(3) Discuss various uses of inorganic and chelate polymers.

3 Answer any **two** questions from the following : 18

(1) Discuss the stereochemistry of compounds of coordination no. 2 and coordination no. 3.

(2) What is unusual coordination ? Discuss the stereochemistry of compounds of coordination no. 5 and 7.

(3) Use of IR Spectra to study the compounds of different coordination no.

4 Answer the following questions : (any **two**) **17**

(1) Discuss the semi-topological structure of $B_5H_{11}B_6H_{10}B_{10}H_{14}$.

(2) Explain Limpscob method – equation of balance for Tetraborane-10, Pentaborane-9, Pentaborane-11, Decaborane-14.

(3) Discuss the preparation of higher boranes and 3C-2e structure of diborane.

CEQ-7417-7428 Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Inorganic Chemistry : CHN - 703 (I)

(1) Co-ordination Chemistry : Paper - III

(2) Corrosion

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

(1) Co-ordination Chemistry : Paper - III

1 Answer any **two** : **18**

Discuss the following methods of studying Coordination Compounds :

(1) X-ray Crystallography method.

(2) Molar Conductivity Method.

(3) Cyclic Voltametric technique.

2 Answer any **two** : **17**

(1) Explain : Antiferromagnetism Paramagnetism

(2) Describe the effect of Spin-orbital coupling and discuss the effect of spin-orbital coupling and magnetic field on Magnetic Susceptibility.

(3) Discuss the super exchange model for Magnetism.

3 Answer any **two** : **18**

(1) Describe the Ion-Exchange method for determining Stability Constant.

(2) Discuss the Graphical method for determining stability constant.

(3) Derive the Relation between overall and step-wise formation constant and its relation with thermodynamic parameters.

4 Answer any **two** : 17

(1) Write an explanatory note on applications of coordination compounds in various field.

(2) Discuss the application of coordination compounds in Solvent Extraction and as a Catalyst.

(3) Role of Coordination compounds in Biological and Analytical field.

(2) Corrosion

1 Answer any **two** of following : 18

(1) Discuss the effect of dissolved salts on the corrosion of Iron and steel in aqueous solution.

(2) Write a short note: Varieties of steel.

(3) Explain the effect of heat treatment on the corrosion of steel.

2 Answer any **two** of following : 17

(1) Write a note on Anodic Inhibitors.

(2) Explain the application of passivators.

(3) Which substances are used as vapour phase inhibitors ? When are they used ?

3 Answer any **two** of the following : 18

(1) Explain Cathodic protection theory in metal corrosion.

(2) Explain the anodic and cathodic protection of metal against corrosion.

(3) Explain principle of anodic or cathodic protection theory for corrosion of metals.

4 Answer any **two** of following : 17

(1) Discuss the corrosion resistance by inorganic and organic coating.

(2) Write a note on paints.

(3) Write a note on Monel metal.

CEQ-7416

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Physical Chemistry : CHN - 703(P)

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instructions : (1) Attempt all questions.

(2) Write answers of all questions in the same answer book.

(3) Figures to the right indicate marks of the question.

1 Write a note on any **two** of the following : **9×2=18**

(a) Define degree of crystallinity and discuss various equations representing degree of crystallinity.

(b) Mechanism of poly condensation in caprolactm.

(c) Explain QC scheme of Alfey and Price for determination of Reactivity Ratio.

2 (i) Attempt any **one** of the following : **9**

(a) Explain various weight distribution methods used in Polymer Fractionalization.

(b) Determine the Mn and Mw using Gel permeation chromatography.

(ii) Do any **one** of the following : 8

(a) A protein sample consists of an equimolar mixture of haemoglobin (M = 15.5 Kg. mol^{-1}) ribonuclease (M = 13.7 $kg.mol^{-1}$) and Myoglobin (M = 17.2 $kg.mol^{-1}$). Calculate the number average and mass average masses which is greater.

(b) Write a Note on : Isolation and purification of polymers.

3 Attempt any **two** of the following : 9×2=18

(a) Explain relaxation and retardation behaviour in explaining visco-elasticity of polymeric materials.

(b) Write a note on Blow mouldings.

(c) Define Rheology and discuss its importance in polymer studies.

4 (i) Attempt any **one** of the following : 9

(a) Discuss various methods involved in chemical testing of polymers.

(b) Role of 1HNMR and 13CNMR in polymer characterization.

(ii) Do any **one** of the following : 8

(a) What information can be obtained from interpretation of IR spectra of polymers ?

(b) Discuss X-ray diffraction analysis as a tool for polymer characterization.

CEQ-7415

Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Chemistry : CHN - 703

(Medicinal Chemistry)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Answer any **two** : **18**

(a) What is the cause of malaria ? Explain the malaria cycle. Classify antimalarial drugs on the base of chemotherapy. Write a synthesis of any two of 4-amino quinolines.

(b) Write a short note on :

(i) Antileprotic and (ii) Antifungal drugs

(c) Write a brief account of antiviral drugs. Write any 3 synthesis of antiviral drugs.

2 Answer any **two** : **17**

(a) Write about anticonvulsant drugs in detail.

(b) What are hypnotics an sedative drugs ? Give relationship between their sleep promoting action and their chemical structure relationship.

(c) Write the difference between local and general anaesthetics. Give details about non-volatile general anaesthetic agents.

3 Answer any **two** : 18

(a) Explain in detail about β-Adrenergic blocking agents and cardiovascular diseases. Give synthesis of any two cardiac drugs.

(b) Define diuretic drugs. Write the classification of diuretic drugs. Write the synthesis of furosemide and chlorothiazide.

(c) Which drugs are acting on Renal system ? Explain about mode of action of these drugs.

4 Answer any **two** : 17

(a) Write a brief account of Antidiabetic agents. Write synthesis of any one oral hypoglycemic agent.

(b) Write a short note on anticancer drugs.

(c) What is Hypertension ? Write synthesis of :

(i) Clonidine

(ii) Methyldopa

(iii) Captopril

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CEQ-7420/21/22/23/24 Seat No. ____

M. Sc. (Sem. IV) Examination

November - 2019

CHN-704 : Chemistry (Elective)

(A) Organo Metallic Chemistry
(B) Organic Synthesis
(C) Chemistry of Materials
(D) Computational Chemistry
(E) Inorganic Chemistry (Advance Quantum Chemistry)

Time : 2 Hours] **[Total Marks : 50**

(A) Organo Metallic Chemistry

Instructions : (1) Mention proper question number in your answer book.
(2) Figures to the right indicate marks for that question.
(3) Draw proper labelled diagrams wherever required.

1 (a) Answer any two of the following questions: **10**

(1) Describe 18-electrons and 16-electrons organometallic compound with examples.

(2) Discuss any one synthetic process and structure of η^3-organometallic compound.

(3) Define Fischer carbenes and Schrock carbenes and their stability.

(b) Answer any two of the following : 6

(1) Give an example in which an unstable cyclic hydrocarbon is stabilized by π-bonding with the metal.

(2) Discuss the effect of steric crowding of ligands on the rate of substitution reaction of organometallic compounds.

(3) Why are the alkyls of transition metals kinetically less stable than the alkyls of main group elements ?

(c) Answer any two of the following : 4

(1) Name these organometallic compounds.

(i) $[Ir(CO)cl(PPh_3)_2]$

(ii) $[C_2(C_6H_5)_2Co_2\ (CO)_6]$

(2) Calculate E.A.N. of metal in

$(\eta^4 - C_4H_4\ Fe(CO)_3)$

(3) For which metal atoms 'Unusual electron configurations' are common, give example for one of this kind of OMC.

2 (a) Answer any two of the following : 10

(1) Explain use of 'Zeigler-Natta' catalyst in polymerization reactions.

(2) Discuss the structure and bonding in

$\left(\eta^5 - (C_5H_5)_2\ Fe\right)$

(3) Write a note on Fluxional behaviour of metallocene.

(b) Answer any two of the following : 6

(1) Discuss the use of spectroscopy in identification of dihydride compounds.

(2) Give reasons involved in synthesis of ferrocene.

(3) Write a note on reactions of CO ligand.

(c) Answer any two of the following : 4

(1) Give an example of Homogeneous catalyst and its importance.

(2) Explain 'Internal Rotation' with example.

(3) What will be the effect of π-acceptor ligand on stability of compound ?

3 Answer any five of the following : 10

(1) Give the characteristics of Ionic organometallic compounds.

(2) Why are the transition metal alkyls less stable than transition metal alkynes ?

(3) Give the oxidation number of Fe and Cr in their respective aryl sandwich compounds.

(4) Explain Vilsmeir Reaction of ferrocene.

(5) Explain why Aluminium trimethyl is dimeric in solution as well as in vapour phase ?

(6) 18-electron rule does not apply to high spin organometallic octahedral compound, why ?

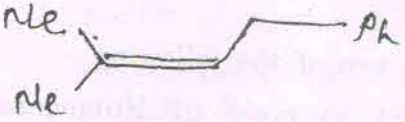
(7) What will be the effect of electronegativity of metal on the rate of hydrolysis of OMC ?

(B) Organic Synthesis

1 Answer any three of the following : 20

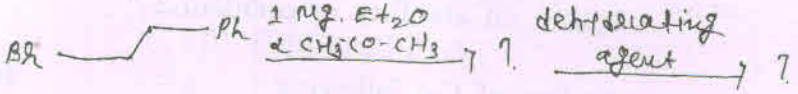
(1) What is chemoselectivity ? Explain with suitable example.

(2) Do the disconnection of following TM and give synthesis of Target molecule.



(3) Describe the uses of acetals and ketals as protecting groups for carbonyl compounds.

(4) Complete the following synthetic scheme.



Explain the synthetic equivalence of above reaction.

(5) Give a brief account of the uses of acetylene in organic synthesis.

2 Answer any three of the following : 20

(1) Discuss cyclization reaction of four and six membered lings.

(2) Give the reterosynthesis of Juvabione.

(3) Write any two methods of alkene synthesis.

(4) Write a short note : Michael Reaction.

(5) Do the disconnection and give synthesis of following :

(a) 

(b) 

3 Answer any five following short questions : 10

(1) How can you convert alcohol into alkyl halide ?

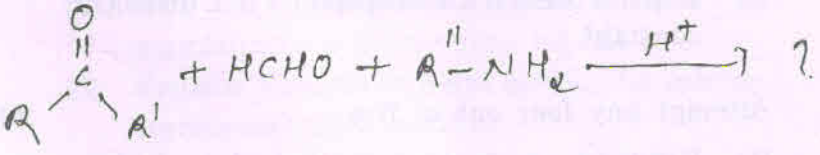
(2) Write the use of the following reagents.

NBS, $AlCl_3$, $K_2Cr_2O_7$

(3) What is acceptor synthon ? Give examples.

(4) Which is name reaction of the following ?

Complete the reaction

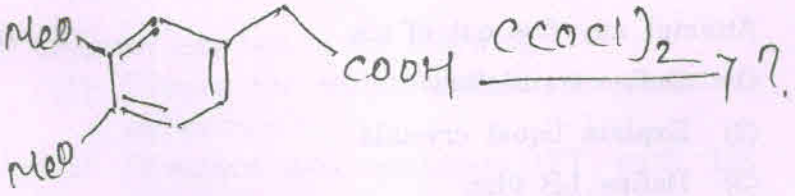


(5) What is Franklang reagent ?

(6) Which acid derivative is most stable ? And which acid derivative ms more reactive ?

$$R-\overset{O}{\overset{\|}{C}}-Cl,\ R-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}},\ R-\overset{O}{\overset{\|}{C}}-NH_2,\ R-\overset{O}{\overset{\|}{C}}-OR$$

(7) Complete the following reaction :



(C) Chemistry of Materials

1 Attempt any four out of five. 20

(1) Explain in detail Fe–C phase transformation in Ferrous alloys.

(2) Give application of Nano-materials.

(3) Write the properties and application of Thin film.

(4) Explain Numatic and Smectic phase.

(5) Explain dielectric susceptibility and dielectric constant.

2 Attempt any four out of five. 20

(1) Explain conductining and feroelectric polymers.

(2) Classify polymers.

(3) Classify conductance.

(4) Explain neat capacity and superconductining state.

(5) What are fullerenes ? Why are their super-conductance ?

3 Attempt any five out of six. 10

(1) Define transistors.

(2) Explain liquid crystals.

(3) Define LB film.

(4) Write difference between glass and ceramic.

(5) Write the composition of stainless steel.

(6) What are ionic conductance ?

(D) Computational Chemistry

1 Answer any three of the following ; 18

(1) Taking examples, calculate differentials on basis of Taylor's series.

(2) Write a note on errors integration formulae.

(3) What are eigen values and how these values can be calculated ?

(4) Explain Bisection method in solving polynomial equations.

(5) How are Gaussian orbitals used to approximate a Slater type orbital ?

(6) Explain Newton-Raphson method for solving transcendental equations.

2 Answer any three of the following : 18

(1) Give the applications GAMESS.

(2) Enumerate salient features merits and demerits of Chem. – Draw.

(3) Write notes on Drug design packages.

(4) Discuss about Graphical design packages.

(5) Describe "Fortran" and "Pivoting".

(6) Write a note on Semi-empirical methods.

3 Answer any two of the following : 14

(1) Discuss the features of IR interpretation software's.

(2) Compare and contrast DFT with HF technique.

(3) Discuss the uses and Auto-cad for atom structure-draw.

(4) Discuss about Internet and android app uses in chemistry.

(E) Inorganic Chemistry
(Advance Quantum Chemistry)

1 Answer any two : 20

(1) Discuss configuration interaction theories which are size-consistent.

(2) Explain CNDO theory.

(3) Derive Hohenberg-Kohn theorem.

(4) Explain EHT and PPT treatments.

2 Answer any two : 20

(1) Explain Born-Oppenhamer approximation.

(2) Obtain Hartree-Fock equation for atom.

(3) Explain MC-SCF methods.

(4) Explain electronic energies and its properties.

3 Answer any one : 10

(1) Discuss the experiments which uses GAUSSIAN software packages on computers in quantum chemistry.

(2) Discuss the experiments which uses AMBER modelling software packages on computers in quantum chemistry.

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AAC-2104

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2019

Botany : CBO-504

(Plant Breeding & Horticulture)

Time : 3 Hours] [Total Marks : 70

Instructions : (1) There are two sections in this question paper.

(2) Each section contains three question and carries 35 marks.

(3) Write answers of each section in separate answer book.

(4) Figures to the right indicate marks of questions.

SECTION - I

1 Answer any two in detail : 14

(1) Compare the different steps in pedigree and bulk method.

(2) Discuss in detail : Pure line method of selection.

(3) Objectives of Plant Breeding.

2 Discuss any three in short : 14

(1) GM plants. 5

(2) Seed certification 5

(3) Release of varieties. 5

(4) Plant Breeder's Rights. 4

(5) Functions and objectives of NBPGR. 4

2

3 Explain any four in brief : 7

(1) Hybrid vigour. 2

(2) Mention various steps of hybridization procedure. 2

(3) Write full form of TRIPs and NBPGR. 1

(4) Distinguish between Station trial and Multi location trial. 2

(5) Explain : Emasculation. 1

(6) Write full form and year of establishment of WIPO. 2

SECTION - II

4 Answer any two in detail : 14

(1) Cultivation of fruits as horticulture crop of Gujrat.

(2) PRe- and Post-harvest handling techniques in floriculture.

(3) Anatomical and Physiological aspects of rooting on cuttings.

5 Discuss any three in short : 14

(1) Planning of Landscaping. 5

(2) Procedure and benefitsz of composting. 5

(3) Organic farming. 5

(4) Indoor Gardening. 4

(5) Role of IPM in horticulture. 4

6 Explain any four in brief : 7

(1) Advantages of mulching in horticulture. 2

(2) What is Xeriscape landscaping ? 2

(3) Name two gardens of India. 1

(4) What is Grafting ? Give its types. 2

(5) Significance of Layering. 1

(6) Helpful advice on making your indoor garden as successful as possible. 2

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AAC-2110 Seat No._____

M. Sc. (Sem. IV) Examination

April - 2019

CBO - 505 : Mycorrhize, Mushrooms, Ethno Botany & Plant Geography

(Old & New Course)

Time : 3 Hours] [Total Marks : 70

Instructions :

(1) The question paper consists of two section, each has three questions. Write answer of each section in separate sheet.
(2) All questions are compulsory.
(3) Illustrate your answer with necessary diagrams if required.

SECTION - I

1 Answer the following : (any two) 14
(1) Describe phosphate solubilizing fungi (PSF).
(2) Describe mycorrhize role in crop productivity.
(3) Explain isolation and multiplication of mycorrhize.

2 Answer the following : (any three) 14
(1) Explain white button mushrooms. 5
(2) Explain method of cultivation agaricus bisporus. 5
(3) Describe poisonous mushrooms. 5
(4) Write on biological significance of mushroom. 4
(5) Write on medicinal value of edible mushroom. 4

12

3 Answer the following : (any four) 7

(1) Define : Mycorrhize. 2

(2) Define : Ectomycorrhize 2

(3) Write any one morphological characters of AM fungi. 1

(4) Write the name of edible mushrooms. 2

(5) Define : Truffles 2

(6) Mushroom contain _____% protein on dry weight basis. 1

SECTION - II

4 Answer the following : (any two) 14

(1) Describe major tribes in India.

(2) Explain Ethnobotany in context of Health Care Programme.

(3) Write the medico-ethnobotanical role in Ayurveda.

5 Answer the following : (any three) 14

(1) Describe continental drift. 5

(2) Explain forest types of Gujarat. 5

(3) Describe importance of phytogeography. 5

(4) Describe Endemism. 4

(5) Describe land flora of Gujarat. 4

6 Answer the following : (any four) 7

(1) Write any two scope of ethnobotany. 2

(2) Give the difference between ethnobotany and economic botany. 2

(3) Who is the father of Indian ethnobotany ? 1

(4) Give the name of climatic zones of India. 2

(5) Define : Discontinuity. 2

(6) Define : Flora. 1

CEQ-7411 Seat No._____

M. Sc. (Sem. IV) Examination

November - 2019

Botany : CBO - 505

(Mycorrhizae, Mushrooms, Ethnobotany & Plant Geography)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) There are two sections in this question paper.

(2) Each section contains three questions and carries 35 marks.

(3) Write answers of each section in separate answer book.

(4) Figures to the right indicate marks of question.

SECTION - I

1 Discuss or describe in detail : (Attempt any **two**) **14**

(1) Role of Mycorrhizae in forests.

(2) Phosphate solubilizing fungi.

(3) Orchid mycorrhizae.

2 Discuss or describe in detail : (attempt any **three**) **14**

(1) Good compost used in Mushroom cultivation. **5**

(2) Poisonous Mushrooms. **5**

(3) Spawn. **5**

(4) Cultivation of *Agaricus bisporus*. **4**

(5) Environmental factors affecting Mushroom formation. **4**

3 Discuss or describe briefly : (attempt any **four**) 7

(1) Distinguish : Endo-mycorrhizae and Ecto-mycorrhizae. 2

(2) Role of mycorrhizae in crop productivity. 2

(3) One method of isolation of mycorrhizae (only outline). 1

(4) Biological significance of mushrooms. 2

(5) Explain : Arbuscular Mycorrhizae. 1

(6) Medicinal values of edible mushrooms. 2

SECTION - II

4 Discuss or describe in detail : (attempt any **two**) 14

(1) Ethnobotany : Definition and its sub-disciplines.

(2) Ethnobotany in health care programme.

(3) Medicinal uses of 'Bhinda' and 'Pipal'.

5 Discuss any three in short : 14

(1) Discontinuity. 5

(2) Climate types of India. 5

(3) Native Plant Genetic Resources. 5

(4) Tectonic activity. 4

(5) Forest types of Gujarat. 4

6 Explain any four in brief : 7

(1) Distinguish : Ethnobotany and Economic botany. 2

(2) Major tribes of India. 2

(3) Ethnobotanical uses of plant *Arjuna*. 1

(4) Explain : Endemism. 2

(5) Define: Continental Drift. 1

(6) Explain : Phytogeography. 2
