HCH-1371-72-73 Seat No._____

M. Sc. (Sem. IV) Examination

April / May - 2015

(1) CHN-701(O) : Organic Chemistry

(2) CHN-701(I) : Inorganic Chemistry : Paper-I

(3) CHN-701(P) : Physical Chemsitry : Paper-I

Time : 3 Hours] [Total Marks : 70

(1) CHN-701(O) : Organic Chemistry

1 Answer any two :

(i) Describe chemical relationship between starch and cellulose.

(ii) Write note on Deoxy sugars and Amino sugars.

(iii) Give the evidence for linkage between phosphoric acid and nucleoside.

(iv) Synthesis of Adenine and Caffeine.

2 Answer any two :

(i) What is conformation ? Discuss conformational analysis of dimethyl cyclohexane.

(ii) Discuss the conformational analysis of 1,3-ditertiary butyl cyclohexane and 4-hydroxy cyclohexane carboxylic acid.

(iii) Describe stereochemistry of bicyclo [2,1,1] hexane and bicyclo [2,2,2] octane.

(iv) Discuss the conformational analysis of hexachloro-cyclohexane.

3 Answer any two :

(i) Give evidences for the position and nature of side chain in Ergosterol.

(ii) Give the evidences for the position of methyl group and aromatic rings in oestrone.

(iii) Give synthesis of progesterone from diosgenine.

(iv) Describe the general biosynthesis of steroids.

4 Answer any two :

(i) Write note on : Nuclear Overhouser effect.

(ii) Describe TOCSY for correlation spectroscopy.

(iii) What is $^{1}H-^{1}H$ cosy and DQF $^{1}H-^{1}H$ cosy ? Explain importance of both according to their application.

(iv) Describe the proton detected HETCOR spectroscopy.

5 Answer any seven :

(i) What is the popular name of 2-amino glucose ?

(ii) What is the meaning of DP values in the polysaccharides ?

(iii) What is photosynthesis ?

(iv) Which types of bases occurs in Nucleic acids ? Name the bases of each type.

(v) Which is the compound obtained from every steroids ? Write structure of it.

(vi) What type of stereochemistry observed in cyclopropane derivatives ?

(vii) How many stereoisomers of hexachlorocyclohexa are known ? Write names of all.

(viii) What is the activity of NMR shift reagents ?

(ix) What is full form of INADEQUATE ?

(x) What is the meaning of phytosterols and micosterols ?

(2) CHN-701(I) : Inorganic Chemistry : Paper-I

Instruction : All questions carry equal marks.

1 Answer any two :

(1) Discuss the photo redox reaction.

(2) Explain phosphorescnce and fluorescnece.

(3) Write the photochemistry of Cs^{+3}.

2 Answer any two :

(1) Give an account of fragmentation.

(2) Explain the use of mass spectroscopy.

(3) Discuss the principle of mass spectroscopy.

3 Answer any two :

(1) Describe ESCA spectra for any two molecules.

(2) Discuss the applications of AES.

(3) Discuss the Koopmen's theorem.

4 Answer any two :

(1) Explain the principle of STM.

(2) Discuss the principle of AFM.

(3) Define Luminescence spectroscopy.

5 Answer any seven :

(1) What is CMA ?

(2) What is STM ?

(3) What is Quantum yield ?

(4) Draw the Jablonski diagram.

(5) What is ESI ?

(6) Define mass spectroscopy.

(7) Give the full form of EXAFS.

(8) What is AES ?

(9) What is ESCA ?

(10) Give Adamsen rule.

(3) CHN-701(P) : Physical Chemsitry : Paper-I

Instructions : (1) Each question carries 14 marks.

(2) Figures on right side indicate marks of the question.

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

(i) Discuss the nature and importance of Triplet oxygen.

(ii) Discuss mechanism of ene reaction.

(iii) Write a note on photochemistry and solar energy storage.

(iv) What do you mean by water photolysis ?

(b) Answer the following : (any one) **4**

(i) How metal complexes are synthesized with help of photochemistry ?

(ii) Discuss kinetics and rates of photochemical reactions.

(iii) Discuss the principle and applications of chemilumenscence.

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

(i) Determine the binding energy for heavy $^{57}_{27}Fe$ in MeV if m_n = 1.008665u μ m_H = 1.007825 u and m $(^{57}_{27}Fe)$ = 56.934932 u.

(ii) Discuss the liquid drop model to explain nuclear behaviour.

(iii) Write down the application of radio isotops in chemical investigation.

(iv) Short note : Parent-Daughter relationship in nuclear reactions.

(b) Answer the following : (any one) 4

(i) The bones of prehistoric bison were found to have a ^{14}C activity of 2-80 dPM/gm carbon contemporary carbon has a disintigration rate of 15.3 dPM/gm. How long ago did the animal live ?

($t_{1/2}$ of ^{14}C = 5730 years)

(ii) Write a note on analytical applications of radioisotopes.

(iii) Discuss artificial radioactivity with examples.

3 (a) Answer the following : (any two) 10

(i) Discuss kinetics of CTST on the basis of vibrational partition function.

(ii) According to Lindmann theory for unimolecular reactions.
Rate α (reactant)^2 at low pressure and
Rate α (reactant) at highest pressure.
Explain at what concentration second order kinetics changes to first order kinetics.

(iii) Derive the rate equation on the basis of conventional transition state theory.

(iv) Write a note on explosion limits.

(b) Answer the following : (any one) 4

(i) Discuss the kinetics of CH_3CHO.

(ii) Explain RRK theory for explaining mechanism of unimolecular reactions.

(iii) Explain : Kinetics of organic decomposition of Acetaldehyde.

4 (a) Answer the following : (any two) 10

(i) Discuss the principle and basic instrumentation in uv-visible spectroscopy.

(ii) Determine the instabilty constant of indicator using uv-visible spectroscopy.

(iii) List out differences between IR and Raman spectroscopy.

(iv) Explain basic principle of AAS and its applications.

(b) Answer the following : (any one) 4

(i) Write a note on nature of spectra and selection rule in Raman spectroscopy.

(ii) Discuss detectors used in emission spectroscopy.

(iii) Explain principles and applications of uv-visible spectroscopy.

5 Give answer : (any seven) 14

(i) Photochemical and chemical reaction.

(ii) Binding energy

(iii) Define unimolecular reactions and give their types.

(iv) Nuclear fission and fusion.

(v) Raman effect

(vi) What is meant by photosensitisation ?

(vii) What is meant by α-Decay ?

(viii) What is meant by 'Emission Spectroscopy'.

(ix) What is reaction rate ?

(x) Define α, β and γ-rays.

HCH-1378-79-80 Seat No._____

M. Sc. (Sem. - IV) Examination

April / May – 2015

Chemistry : Paper - II

(1) CHN-702(O) : Organic Chemistry
(2) CHN-702(I) : Inorganic Chemistry
(3) CHN-702(P) : Physical Chemistry

Time : 3 Hours] [Total Marks : 70

(1) CHN-702(O) : Organic Chemistry

Instructions : (1) All questions carry equal marks.

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

1 Answer **any two :** 14

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

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

(3) Classify the Natural and artificial fibers. Discuss the properties of synthetic fibers and method of spinning.

2 (a) Answer **any one** : 4

(1) Classify the paints. Explain the methods and applications of applying paints.

(2) Write short note on varnishes raw materials.

(b) Answer **any two** : 10

(1) Dutch and Carter process for manufacturing of white Lead.

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

(3) Give an account of toxic chemicals used in war.

3 (a) Answer **any one** : 4

(1) Discuss the moulding composition from which the plastics are made.

(2) Give the synthesis and applications of the following.

(i) Phenol Formaldehyde resin.

(ii) Epoxy resin

(iii) Malemine formaldehyde resin

(b) Answer **any two** : **10**

(1) Explain the types of polymerization Discuss types of polyester resins.

(2) Discuss the manufacturing of the following

(i) PERLON-L

(ii) Urea formaldehyde resins.

(iii) Cellulose nitrate.

(3) Detail account on cyclization reaction.

4 (a) Answer any one. **4**

(1) Give the manufacturing process of chalk crayons.

(2) Give the manufacturing process of Plaster of Paris.

(b) Answer any two. **10**

(1) Give the manufacturing process of shoe polish.

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

(3) What are detergents? Give a short account of sulphonative detergents.

5 Answer **any seven** : 14

(1) What is condensation polymerization? Give suitable example.

(2) Give synthesis of. Nylon 6,6

(3) Define the term addition and substitution polymerization.

(4) Give synthesis of Dacron.

(5) Which metal ions are contained with blue pigments?

(6) Which solvents and thinners are used in varnishes?

(7) Give name of anionic surfactants in detergents.

(8) What is HDPE and LDPE?

(9) Give Classification of Paints.

(10) Give uses of Gum paste.

(2) CHN-702(I) : Inorganic Chemistry

Instruction : All questions carry equal marks.

1 Answer any two :

(i) Write note on polymeric compounds of sulphur.

(ii) Give the various methods for the preparation of borazine and its properties.

(iii) Write a note on : Silicons.

2 Answer any two :

(i) What is coordination polymer ? Give various methods for its synthesis.

(ii) Discuss various uses of inorganic polymer and chelate polymers.

(iii) Discuss the factors affecting the properties of coordination polymers.

3 Answer any two :

(i) Discuss the stereochemistry of compounds of co-ordination number-2.

(ii) Discuss the stereochemistry of compounds of co-ordination numbers 8 and 9.

(ii) Describe the uses of chelating agents as sequestering agent in industries.

4 Answer any two :

(i) What is electron deficient molecule ? Describe hydrogen-bonded structure of B_2H_6.

(ii) Describe boron balancing equation B_5H_{11} and $B_{10}H_{14}$.

(iii) Explain the topological theory of boronhydride.

5 Answer any seven :

(1) Define glass transition temperature T_g*.

(2) What is unusual coordination no. Which C.N. are concluded as unusual C.N. ?

(3) What is silicon resin ?

(4) BF_3 exists but BH_3 does not exist. Assign reason.

(5) What are Kurrolls salts ?

(6) Give structure of B_5H_9.

(7) Give uses of diborane.

(8) What are polyphosphonic nitrilic chloride ? Give equation for its preparation.

(9) What is chelate polymer ?

(10) Benzene and inorganic benzene has isoelectronic relation. Prove it.

(3) CHN-702(P) : Physical Chemistry

1 Answer any two of the following : **14**

(i) Discuss about Bell-Evans-Polanyi principle.

(ii) Derive Arhenius equation.

(iii) Write short note on σ_I and σ_R scales.

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

(i) Explain : Heat of Hydration of proton.

(ii) Give the definition of Ionic liquids.

(iii) Calculate the Ionic mobilities of Anion and cation in potassium - Hydroxide solution.
Equivalent conductance of $K^+ = 73.67 \times 10^{-4}$ mho m^2 mol^{-1}
Equivalent conductance of $\overline{OH} = 197.7 \times 10^{-4}$ mho m^2 mol^{-1}.

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

(i) Explain : Solvent effects from the curve-crossing model.

(ii) What is the application of solvation scales in mechanistic studies.

(iii) Discuss any two parameters of scales based on spectroscopic properties.

4 Answer any two of the following : 14

(i) Discuss about "Amperometric titrations".

(ii) Derive the equation of polarographic wave and half wave potential.

(iii) Give the fundamental knowledge about Nephelometery and instrumentation of it.

5 Give the answer : (any seven) 14

(i) What is 'Reaction rates' ?

(ii) Give the principle of reactivity.

(iii) Define the LFER.

(iv) What you mean by Droping mercury electrode ?

(v) What is σ values ?

(vi) Give the definition of electro-catalysis.

(vii) What is "metallurgy" ?

(viii) Give the principle of capillary electrophoresis.

(ix) Give the application of 'Nephelometry'.

(x) Write arhenius equation and define the terms of it.

HCH-1384-85-86-87 Seat No._____

M. Sc. (Sem. IV) Examination

April / May – 2015

Chemistry : Paper - III

(1) CHN-703(O) : Organic Chemistry
(2) CHN-703(I) : (Inorganic Chemistry) (Corrosion)
(3) CHN-703(P) : Physical Chemistry
(4) CHN-703(I) : Coordination Chemistry

Time : 3 Hours] [Total Marks : 70

(1) CHN-703(O) : Organic Chemistry

1 (a) Answer any two of the following : 8
(i) Give the synthesis of any two 9-amino acridines and their physiological activity.
(ii) Write a note on primary tubercular agents.
(iii) Give the classification of antiviral drugs and synthesis of any one antiviral drug.

(b) Answer any one of the following : 6
(i) Write a brief account on antifungal drugs.
(ii) Write a note on antileprotic drugs.

2 (a) Answer any two of the following : 8
(i) Explain Hollucinogenic drugs.
(ii) Write a note on antianxiety drugs.
(iii) Explain antiparkinsonism drugs.

(b) Answer any one of the following : 6
(i) What are sedative and hypnotics ? Explain the relationship between their chemical structure and sleep promoting activity.

(ii) Differentiate general and local anaesthetics. Discuss the mechanism of general anaesthetics. Give the characteristics of an ideal anaesthetic agents.

3 Answer any two of the following : 14

(i) Explain β-Adrenergic blocking agents and cardiovascular diseases. Give synthesis of any two cardiac drugs.

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

(iii) Write a note on Diurectics.

4 Answer any two of the following : 14

(i) What is hypertension ? What should be normal blood pressure ? Write synthesis of one anti-hypertensive drugs.

(ii) Write a note on anticancer drugs.

(iii) What is diabetics ? Mention its types. Write synthesis of any one oral hypoglycemic agent.

5 Answer any seven of the following questions : 14

(i) Write full form of AIDS and HIV.

(ii) Give the structure and uses of emetine.

(iii) Give name and uses of two drugs of butyrophenone class.

(iv) What are Tranquilizers ?

(v) Define chemotherapeutic drugs.

(vi) Give classification of Anti-arrythimic agent.

(vii) What is sleep cycle ?

(viii) Give side effect and uses of Busulphan.

(ix) To identify the neurotransmitters of CNS.

(x) Give classification of Antiamoebic drugs.

(2) CHN-703(I) : (Inorganic Chemistry) (Corrosion)

1 Answer any two :

(i) Discuss the effect of pH and dissolved oxygen on the corrosion of iron and steel.

(ii) Discuss the factors affecting the corrosion of iron and steel.

(iii) Write a short note on varieties of steel.

2 Answer any two :

(i) Discuss the application of passivators.

(ii) Write note on Vapor Phase inhibitors.

(iii) Write a short note on slushing compounds.

3 Answer any two :

(i) Explain the principle of cathodic protection theory for corrosion on metals.

(ii) Write a note on sacrificial anode.

(iii) Discuss the anodic protection theory for corrosion on metals.

4 Answer any two :

(i) Discuss the features of Hastalloy and Imcelel.

(ii) Discuss the classification of coating for corrosion resistance.

(iii) Explain the alloying on 'Monel Metal'.

5 Answer any two :

(i) Write a short note on 'Heat treatment'.

(ii) What are packing inhibitors ? Discuss the application of organic inhibitors.

(iii) Discuss the organic coating process for corrosion protection.

(3) CHN-703(P) : Physical Chemistry

Instructions : (1) Attempt all questions
(2) All questions carry equal marks.

1. (a) Do any one of the following **1×4=4**

(i) Calculate reactivity ratios for the copolymerisation reaction between following pair of monomers:

Monomer	Q	e
1,3 Butadiene	2.39	-1.05
Methyl Methacrylate	0.79	0.40

(ii) What type of copolymerization behaviour is expected in a copolymer so formed, when $r_1<1$ and $r_2<1$. (r_1 and r_2 are reactivity ratios). Also explain what azeotropic composition is?

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

(i) Morphology of Crystalline polymers

(ii) Kinetics of Free Radical copolymerisation

(iii) Mechanism of Step polymerisation considering examples

(iv) Degree of crystallinity and methods for determining degree of crystallinity.

2 (a) Write a note on one of the following **1×4=4**

(i) Purification of monomers before synthesis

(ii) Interfacial Polymerisation

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

(i) Explain various Weight distribution methods used in polymer fractionalisation.

(ii) Determine average molecular weight in polymers using vapour phase osmometery.

(ii) Determine sedimentation coefficient of a polymer in aqueous solution at a concentration 'c' that led to following data where 'r' is the distance of boundary from the axis of rotation and time 't' is the time of centrifugation:

Time (min)	5	10	15	20	25	30	35	40
$R(cm)$	6.560	6.575	6.591	6.609	6.622	6.640	6.654	6.670

(iv) Calculate Mv for polymethyl-methacrylate from the following data.

(where $t_0 = 216.00$, $K = 8.5 \times 10^{-5}$ and $a = 0.75$)

Conc in g/Kg	0.2715	0.1940	0.1509	0.1235	0.1405
Flow time in Sec	460	378	338	312	296

3 (a) Write a note on one of the following **1×4=4**

(i) Maxwell's model

(ii) Compounding and Casting

(b) Attempt any two of the followings **2×5=10**

(i) Discuss deformation behaviour and classify polymeric materials using Burger model and Brownian movement concept.

(ii) Explain various moulding techniques used in polymers.

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

(iv) Explain various spinning techniques used in polymer processing.

4 (a) Answer any one of the followings 1×4=4

(i) Tensile strength testing in polymers.

(ii) Role of microscopy in polymer characterisation.

(b) Do any two of the followings. 2×5=10

(i) Explain various thermal methods used for characterisation of polymers.

(ii) Write down various methods used in testing of elasticity in polymers and discuss any two in detail.

(iii) Discuss X-ray diffraction analysis as a tool for polymer characterisation.

(iv) Explain the role of spectroscopy in characterisation of polymers.

5 Attempt seven from the following 2×7=14

(i) Newtonian equation

(ii) Poly functional polymerisation

(iii) Ideal copolymerisation

(iv) Relaxation

(v) Colligative Property

(vi) Reinforcing

(vii) Role of Polarimetery in polymer characterisation

(ix) Principle of viscometery

(x) Mechanical Testing

(4) CHN-703(I) : Coordination Chemistry

Instruction : All questions carry equal marks.

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

(i) Explain the applications of molar conductivity method for coordination compounds.

(ii) Discuss the importance of x-ray crystallography method to study the coordination compounds.

(iii) Write a short note on "Cyclic Voltametry method."

(b) Answer any one of the following questions. **4**

(i) List the precautions to be taken during measurement of molar conductivity of coordination compounds.

(ii) Define the terms : Specific conductivity and equivalent conductivity.

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

(i) Write a short note on "Magnetic succeptibility."

(ii) Explain ferromagnetism and antiferromagnetism.

(iii) Discuss the magnetic succeptibility of binuclear complexes.

(b) Answer any one of the following questions : **4**

(i) Explain direct metal – metal interactions.

(ii) Discuss paramagnetism.

3 (a) Answer any two of the following questions. **10**

(i) Derive the relation between overall and stepwise formation constant.

(ii) Explain the 'Solvent extraction method for determining stability constant.

(iii) Discuss the 'Ion exchange method' for determining the stability constant.

(b) Answer any one of the following questions : 4

(i) Explain the 'spectrophotometric method for determining stability constant.

(ii) Discuss the 'effect of nature of coordinating group' on the stability of complexion.

4 (a) Answer any two of the following questions : 10.

(i) Discuss the applications of coordination compounds in electroplating.

(ii) Discuss the applications of coordination compounds in 'photographic processes'.

(iii) Explain the applications of coordination compounds in 'Dyes'.

(b) Answer any one of the following questions : 4

(i) Explain the applications of coordination compounds as catalyst.

(ii) Discuss the uses of coordination compounds in 'Solvent extraction'.

5 Answer any seven of the following : 14

(i) Define : Molar conductivity

(ii) Give the principle of cyclic voltametric method.

(iii) Give the definition of magnetic succeptibility.

(iv) Draw the structure of any one of Binuclear complex compound.

(v) Give the use of X-ray crystallography in coordination compounds.

(vi) What is thermodynamic stability of complex compounds ?

(vii) What is instability constant ?

(viii) Derive degree of complex formation.

(ix) Write the factors affecting the stability of complex ions.

(x) Write Bregg's equation.

HCH-1391-92-93-94-95 Seat No._____

M. Sc. (Sem. IV) Examination

April / May – 2015

Paper - CHN - 704 (A), (B), (C), (D) & (E)

(1) 704(A) : Organometallic Chemistry (Elective)

(2) 704(B) : Organic Chemistry *(Organic Synthesis)*

(3) 704(C) : Chemistry of Material

(4) 704(D) : Computational Chemistry

(5) 704(E) : Advance Quantum Chemistry

(Inorganic Chemistry) (Sub. Elective) (New Course)

Time : Hours] [Total Marks :

(1) 704(A) : Organometallic Chemistry (Elective)

1 (A) Answer any two of the following.

(1) Discuss the preparation, structure and bonding in transition metal alkyne complexes.

(2) Define: Organometallic compounds. Give its classification based on metal carbon bond in detail.

(3) How do the π-acceptor ligands increase the stability of Octahedral complexes?

(4) Write a note on structural characteristic of carbines coniplexes.

(B) Answer any two of the following.

(1) Define: Transition metal hydrides. How are they characterized?

(2) Differentiate the characteristic between Fischer carbene complexes and Schrock Carbene complexes?

(3) Explain why the transition metal aryl compounds are more stable than the corresponding alkyl compounds?

(4) Write short note on Zeuises salt.

(C) Answer any two of the following.

(1) Define the following terms with appropriate examples.

A) Oxidative - addition reaction

B) Insertion reaction.

(2) Distinguish between carbyne and alkylidene complexes.

(3) How will you prepare Ir Me_3L_3 starting from $IrCIL_3$, $LiCH_3$ and Ch_3CI?

(4) What is sandwicch Boded compounds.

2 (A) Answer any two of the following.

(1) Discuss the structure and bonding in transition metal hybrides with bridging H-atom.

(2) Write down the mechanism of polymerization of propene catalyzed by Zeigler-Natta catalyst.

(3) Write down Method of preparation, structure, bonding and important reaction of carbyne complexes.

(4) Distinguish between carbyne and Alkylidene complexes.

(B) Answer any two of the following.

(1) What is ZSM-5? How Methanol can be transformed into gasoline using ZSM-5 as a catalyst.

(2) Show that the Mannich and nitration reaction with Ferrocene.

(C) Answer any two of the following.

(1) Discuss in brief : Structure and bonding in bisbenzene chromium compound.

(2) What are the limitations of 18-electron rule?

(3) What is Homogeneous catalysis?

(4) Discuss the nature of bonding Inn Dihydrogen complexes?

3 Answer the following.

(1) What is catalytic Reaction?

(2) Draw the structure of $Fe_2(CO)g$.

(3) Give the classification of OMC.

(4) Give the structure of Olefine.

(5) How could the complex Cr $(CO)_3$ $(C_6H_5)2$ attain the 18 electron (configuration_?

(6) In what conditions transition metal alkyls can be stable?

(7) Define: Hydrogenation reaction with suitable example.

(8) Give the name of catalyst used by Monsanto acetic acid synthesis.

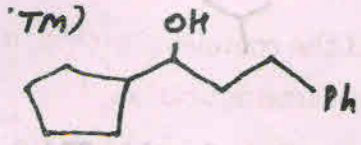
(9) What do you mean by activation energy?

(10) How can the Fluxionality behaviour of Organometallic compounds be detected with the help of ^1H NMR spectroscopy?

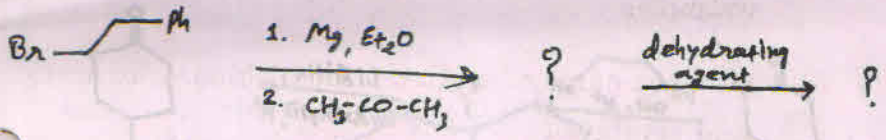
(2) 704(B) : Organic Chemistry *(Organic Synthesis)*

1 Answer any three : **20**

(i) Do the disconnection and give the synthesis of target molecule (TM)



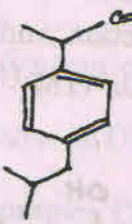
(ii) Complete the following synthetic scheme.



Explain the synthetic equivalance of above reaction.

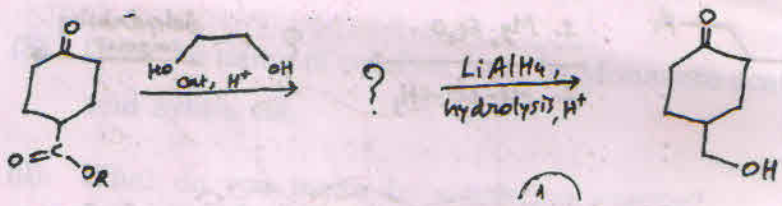
(iii) Do the disconnection of following TM and give synthesis of target molecule.

(iv) Do the disconnection and plan the synthesis of following TM.



What is synthon for this TM ?

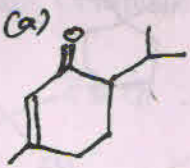
(v) What is protecting group ? Complete the following reaction by using protecting group.

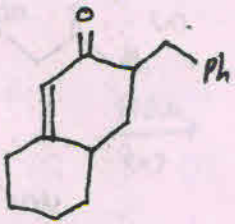


2 Answer any three : 12

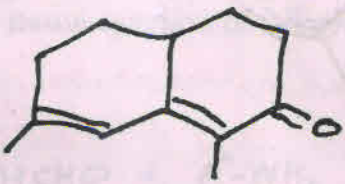
(i) Do the disconnection of following compounds.

(ii) Do the disconnection and plan for the synthesis of target molecule.

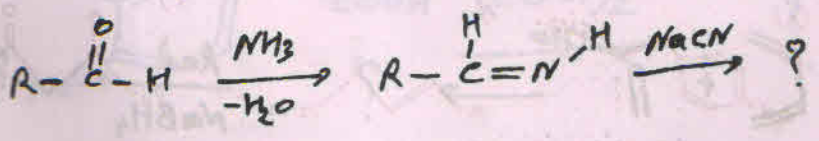
(a) 

(b) 

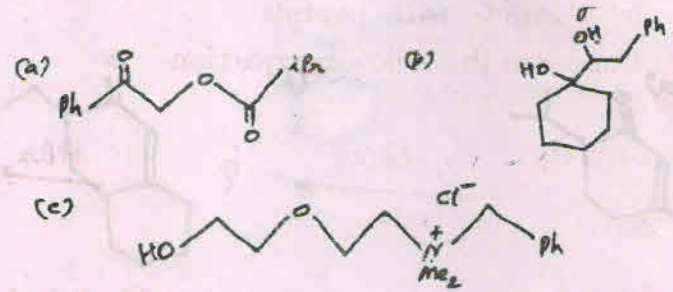
(iii) (a) Do the disconnection of following TM and which type of FGI comes first ?



(b) Complete the following synthesis.



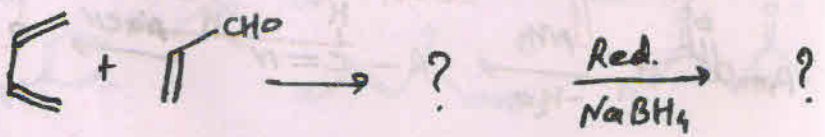
(iv) Do the disconnection of following molecule.



(v) Do the disconnection and give synthesis of following.

3 Answer any five : 10

(i) Complete the synthesis :

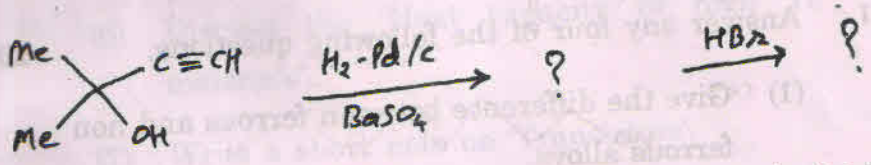


(ii) Phthalamide derivatives are used for the synthesis of _____ compound. Give the reaction.

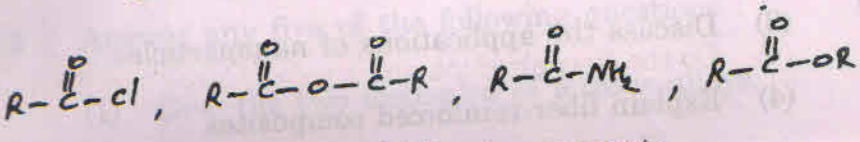
(a) amine (b) amide

(c) anilide (d) peptide

(iii) Complete the following reaction.



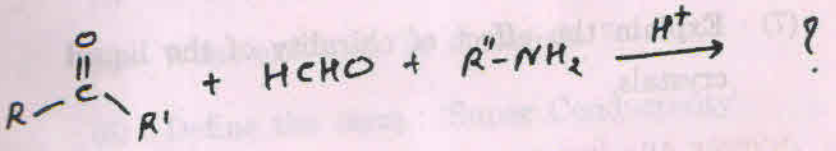
(iv) Which acid derivative is most stable ? And which acid derivative is more reactive ?



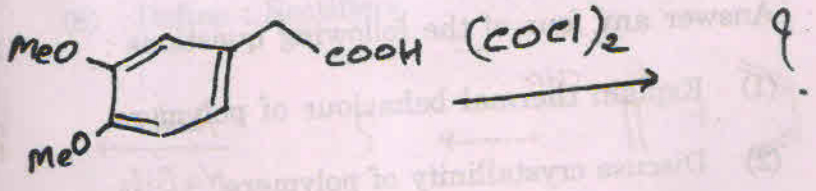
(v) Write the use of following reagents.

NBS, $AlCl_3$, $K_2Cr_2O_7$

(vi) Which is name reaction of following ? Complete the reaction.



(vii) Complete the following reaction.



(3) 704(C) : Chemistry of Material

Instruction : All questions carry equal marks.

1 Answer any four of the following questions. 20

(1) Give the difference between ferrous and non ferrous alloys.

(2) Discuss 'Al-Si' Alloys.

(3) Discuss the applications of nanoparticles.

(4) Explain fiber-reinforced composites.

(5) Explain the applications of glasses.

(6) Explain chemical process of the preparation of thin films.

(7) Explain the effect of chirality of the liquid crystals.

2 Answer any four of the following questions :

(1) Explain thermal behaviour of polymers.

(2) Discuss crystallinity of polymers.

(3) Explain types of ionic conductors.

(4) Write a short note on 'Organic Super conductors'.

(5) Explain 'low dimensional quantum structures'.

(6) Discuss the 'Heat capacity of high Tc materials'.

(7) Write a short note on 'Transistors'.

3 Answer any five of the following questions : **10**

(1) Give the two examples of ferrous alloys.

(2) Give two examples of non-ferrous alloys.

(3) What are nano materials ?

(4) List the organic super conductors.

(5) What are high Tc materials ?

(6) Define the term : 'Super Conductivity'.

(7) What is Frenkel jump ?

(8) Define : Rectifiers.

(4) 704(D) : Computational Chemistry

Instruction : Attempt all questions

1 Answer **any four** of the following **4×5=20**

(a) Explain Bisection method in solving polynomial equations.

(b) List out methods for solving linear simultaneous equation and discuss one in detail.

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

(d) Describe interpolation method considering Newton forward and backward difference.

(e) Explain the Role of Runge Kurta method in solving simple differential equations.

(f) Discuss Polynomial wiggle problem and its role in interpolation.

(g) Write a note on errors and ill conditioning.

2 Write a note on any one of the following 2×8=16

(a) Simulation packages

(b) GAMES

(c) MOPAC

(d) Semi- empirical methods

3 (a) What do you mean by global networking and explain its uses in chemical research ? 1×6=6

OR

(a) How usage internet can improve the standard of education and research in sciences ? Comment on it.

4 Attempt four from the following as short questions 2×4=08

(i) Fortran

(ii) Convergence

(iii) Pivoting

(iv) langrange method

(v) Romberg integration

(vi) CHARM

(vii) QUANTA

(viii) Interpolation.

(5) 704(E) : Advance Quantum Chemistry

(Inorganic Chemistry) (Sub. Elective) (New Course)

Instructions : (1) Q. 1 and 2 carry equal 20 marks.

(2) Q. 3 carry 10 marks.

(3) All questions are compulsory.

1 Answer any three of the following. **20**

a) Discuss the Born-Oppenheimer approximation method.

b) Write notes on "Size Consistency".

c) Give the treatment for EHT & PPP.

d) Derive the Hohenberg-Kohn theorem.

2 Answer any two of the followings. **20**

a) Discuss the experiments on computers which uses quantum chemistry.

b) Derive the equation for Hartee-Foac self consistence field method.

c) Explain the Kohn-Sham Formulation.

3 Answer any one of the following. 10

a) Give report on some empirical theories.

b) Explain the ZDO approximation method.

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HCH-1374 Seat No._____

M. Sc. (Sem. - IV) Examination

April / May – 2015

Botany : CBO-504

(Plant Breeding and Horticulture)

Time : 3 Hours] [Total Marks : 70

Instructions : (1) The question paper consists of two sections, each has three questions.

(2) All questions are compulsory. In each section first two questions carry 14 marks and Last questions carry 7 marks each.

(3) There is no overall choice. However, an internal choice has been provided in each question.

(4) Write answers of each section in separate answer sheet.

(5) Illustrate your answers with necessary diagrams, if required.

SECTION – I

1 Answer the following: (two out of three) each of 07 marks. **14**

(1) Mention the objectives of plant breeding.

(2) Explain in detail : Hybrid vigour.

(3) Discuss the difference between pedigree and bulk method.

14

2 Answer the following: (three out of five) each of 05, 05 and 04 marks. 14

(1) Write the rights of plant breeding.

(2) Explain: Bio-safety.

(3) Mention in brief: GATT.

(4) Describe in detail: Seed certification.

(5) Write note on: Genetically modification of plants.

3 Answer the following: (four out of six) each 02, 02, 02 and 01 marks. 7

(1) Define: Plant breeding. (2)

(2) Explain the term: Clonal propagation.(2)

(3) Write the full form of: NBPGR.(1)

(4) What is bioethics? (2)

(5) State any two benefits of plant breeding.

(6) Write the full form of: IPR .(1)

SECTION – II

4 Answer the following: (two out of three) each of 07 marks. 14

(1) Describe: Plant propagation.

(2) Write the method of grafting.

(3) Mention the important horticulture crop of India.

15

5 Answer the following: (three out of five) each of 05, 05 and 04 marks. **14**

(1) Describe: Landscape cultivation.

(2) Write the short note on: Organic farming.

(3) Explain: Indoor gardening.

(4) Mention the advantages of greenhouse.

(5) Explain in brief: Mulching.

6 Answer the following: (four out of six) each 02, 02, 02 and 01 marks. **7**

(1) Define: Budding. (2)

(2) What do you mean by viability? (2)

(3) State the definition of layering(1)

(4) What is composting? (2)

(5) Mention any two principles of landscaping. (2)

(6) Write the full form of IPM. (1)

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HCH-1381

Seat No._____

M. Sc. (Part - II) (Sem. IV) Examination

April / May - 2015

Botany : Paper - CBO - 505

(Mycorrhizac, Mushrooms, Ethnobotany & Plant Geography)

Time : 3 Hours] [Total Marks : 70

Instructions :

(1) The question paper consists of two sections each has three questions.

(2) All questions are compulsory. In each section first two questions carry 14 marks and last question carry 7 marks.

(3) There is no overall choice. However an internal choice has been provided in each question.

(4) Illustrate your answers with necessary diagrams, if required.

(5) Write answer of each section in separate answer sheet.

SECTION I

1 Answer the following : (any two) 14

(i) Describe – Orchit mycorrhizac.

(ii) Describe – Phosphate solubilizing fungi (PSF)

(iii) Describe – Mycorrhizac role in crop productivity.

18

2 Answer the following : (any three) 14

(i) Explain – Oyster and white button mushrooms.

(ii) Explain – method of cultivation of Agaricus bisporus.

(iii) Explain – Medicinal value of edible mushrooms.

(iv) Explain – Effect of chemical factors on mushrooms formation.

(v) Explain – Scope of mushrooms cultivation.

3 Answer the following : (any four)

(i) Define – Mycorrbiza.

(ii) Why the morphology of spores are basis for identification of AM fungi.

(iii) Mycorrhiza consists of a mutually less Efical association of _____ and _____.

(iv) Write the name of poisonous mushrooms.

(v) Define – Paddy straw.

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

SECTION II

4 Answer the following : (any two) 14

(i) Describe – Ethnobotany's role in conservatin of native plant genetic resources.

(ii) Describe – Ethinobotany in health care programme.

(iii) Describe – Metico-ethnobotanical surveys and their role in Ayurveda.

19

5 Answer the following : (any three) 14

(i) Explain – Forest types of Gujarat.

(ii) Explain – Importance of phytogeography.

(iii) Explain – Land flora of Gujarat.

(iv) Explain – Endomism.

(v) Explain – Continental drift.

6 Answer the following : (any four) 7

(i) What is the difference between ethnobotany and economic botany ?

(ii) Define – major tribes in India.

(iii) _____ is the father of Indian ethnobotany.

(iv) Mention any two importance of plant geography.

(v) Give the definition of discontinuity.

(vi) _____ suggest the idea of continental drift.