



JJ-1052-N

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2022

CHN-701(O) : Chemistry

Time : 2.30 Hours] [Total Marks : 70

Instructions : (1) All questions are compulsory and carry

equal marks.

(2) The medium of answers is English only.

1. Answer any two.

(i) Discuss the chemistry of nucleic acid.

(ii) Give the synthesis of any two purine bases.

(iii) Give the process of protein synthesis.

(iv) Write a short note on biological important free

Nucleotides.

2. Answer any two.

(i) Explain the general method of structure and ring

size determination of starch.

(ii) Give types and classification of naturally

occurring sugars.

(iii) Write a short note on deoxy sugars.

(iv) Determine the structure of cellulose.

18

17

[Contd...

I

JJ-1052-N]

- 3 Answer any two.
- (i) Explain the general biosynthesis studies of steroids.
 - (ii) Discuss the constitution of Ergosterol.
 - (iii) Give the synthesis of Oestrone.
 - (iv) Write short note on Adrenocortical hormones.
- 4 Answer any two.

- (i) Give conformation analysis of 2-Br cyclohexanone, cyclohexanol and 2-Br 4, 4-dimethyl cyclohexanone.
- (ii) Draw and name the conformers of 1, 3 ditertiary butyl cyclohexane and 4-OH cyclohexane carboxylic acid.
- (iii) What are bridge ring systems? Explain the stereo chemistry of bicyclic [1, 1, 1] pantane and bicycle [2, 1, 1] hexane.
- (iv) Discuss the conformation of per hydro Anthracene and per hydro phenanthrene.



JJ-1055-N

Seat No. .

M. Sc. (Sem. IV) Examination

April - 2022

CHNN-702(O) : Organic Chemistry

Time : Hours]

[Total Marks :

1 Answer any two :

- (1) Write a note on refining of crude oil for getting fuels.
- (2) What is carbonization ?
- (3) Short note on Polyester Fibers and their applications.
- (4) Write a note on aromatic chemicals production. What is Kapron ?

- (1) Explain different method for manufacturing of paints.
- (2) Short note on Raw Materials used in Manufacturing of varnishes.
- (3) Give an account of application methods of paints in brief. What are thinners ?
- (4) Discuss manufacture of Nitroglycerine and Dynamite.

2 Answer any three :

- (1) What is paints ? Classify paints and write a note on fire retardate paints.
- (2) Discuss manufacture of Nitroglycerine and Dynamite.
- (3) Short note on Raw Materials used in Manufacturing of varnishes.
- (4) Give an account of application methods of paints in brief. What are thinners ?

JJ-1055-N]

1

[Contd...

- 3 Answer any three :
- (1) Write a note on cross-linking in polymers.
 - (2) Short note on preparation and application of Bakelite, Nylon-6 and Nylon-6, 6.
 - (3) Give a detailed account of co-polymers of ethylene.
 - (4) Give an account on addition polymers and their uses and productions.
- 4 Answer any three :
- (1) Write a note on small scale detergent manufacture.
 - Which are the classes of detergents ?
 - (2) Give the manufacturing process of phenyl disinfectants.
 - (3) How can you prepare shoe polish ?
 - (4) Short note on Phenol disinfectant soaps and detergents.



JJ-1058-N

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2022

CHNN-703(O) : Organic Chemistry

(Synthetic Drugs)

Time : 2.30 Hours]

[Total Marks : 70

18

1 Answer any two from following :

- (1) What are Antimalarials ? Give the synthesis of any two 9-Aminoacridines and their physiological activity.
- (2) Give the classification of Antiviral drugs and Synthesis of Vioform and Diloxanide furate.
- (3) How is Cancer caused ? What are the limitations of its therapy ? Draw structures of 6-Mercaptopurine and 6-thioguanine.

17

2 Answer any two from following :

- (1) Classify the CNS depressant drugs. Draw structure of Barbiturates and explain this biochemical effects and mechanism of action and synthesis of Carbromal.
- (2) Write a note on :
 - (i) Antipsychotics
 - (ii) Anticonvulsants
- (3) Write a note on :
 - (i) Hallucinogenic drugs
 - (ii) Anti Parkinsonism drugs

[Contd...

- 4
- Answer any two from following.
- (1) What is Antidiabetic drugs ? Discuss the types of diabetes. Give the synthesis of Chlorpropamide.
 - (2) Write a note on :
 - (i) Anti Bacterial drugs
 - (ii) Anti Fungal drugs
 - (3) Give a synthesis and Uses of
 - (i) Para Amino salicylic acid
 - (ii) Ithionamide
 - (iii) Promizol
- 17
- 3
- Answer any two from following.
- (1) Explain α -Adrenergic blocking agents and cardiovascular disease. Give synthesis of Furosemide and Ethacrynic acid.
 - (2) What is Hypertension ? What should be normal blood pressure ? Write synthesis and physiological activity of Methyldopa.
 - (3) Name the different drugs acting on Renal system with their mode of action.
- 18



JJ-1061-N

Seat No. _____

M. Sc. (Sem. IV) Examination

April/May - 2022

CHNN-704 : Chemistry

(Selected Topics in Organic Chemistry)

(New Course)

[Total Marks : 70

Time : 2.30 Hours]

1 Answer the following questions. (any Two) 18

- (1) Explain the pinacol-pinacolone rearrangement and features of pinacol rearrangement.
- (2) Short note on mechanism with application of Hoffman rearrangement.
- (3) Explain the Baeyer-Villiger reaction with application.

2 Answer the following questions : (Any Two) 17

- (1) Short note on principle and application of Wittig rearrangement.
- (2) Explain the principle and application of Claisen rearrangement.
- (3) Describe the mechanism and application of Fries rearrangement.
- (4) Explain the mechanism and application of Cope rearrangement.

1

JJ-1061-N]

[Contd...

- 3 Answer the following questions: (any Two)
- (1) Short note on preparation of organo aluminium compounds.
 - (2) Explain the preparation and application of organo lithium compounds.
 - (3) Write a note on organo silicon compounds.
- 4 Answer the following questions : (any Two)
- (1) Explain the mechanism, application limitation of Cannizzaro reaction.
 - (2) Write a note on application of Pechmann reaction.
 - (3) Explain the Diels-alder reaction and application.
 - (4) Short note on application of Reformatsky reaction.
- 17
- 18



Seat No. _____

M. Sc. (Sem. IV) Examination

April/May - 2022

Chemistry : CHNN-705 (A) & (B)

(Elective) (New Course)

(1) CHNN-705 (A) : Disconnection Approach

(2) CHNN-705 (B) : Organic Chemical Toxicity &

Solid Waste Management

Time : 2 Hours]

[Total Marks : 35

(1) CHNN-705 (A) : Disconnection Approach

1 (a) Answer the following questions (Any Two) 12

(1) Define : Disconnection approach, Synthon, Reagents.

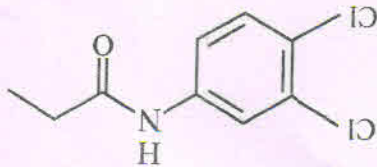
(2) Short note on one group C-X disconnection with suitable example.

(3) Explain the synthetic methods of amine.

(b) Answer the following questions : (any One) 6

(1) Give the retro synthesis of following

molecule.

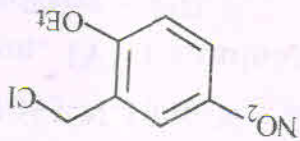


1

JJ-1065-N-1066-N]

[Contd...

- 2 (a) Answer the following questions : (any two) 12
- (1) Explain the methods of protection for carbonyl functional group.
 - (2) Explain the Suzuki reaction.
 - (3) Write a note on Protection of alcohol group.
- (b) Answer the following questions : (Any one) 5
- (1) Explain the Sharpless asymmetric epoxidation.
 - (2) Write a short note on importance of protecting groups in organic reaction.



- (2) Give the synthesis of following molecule.

1 Answer any Two from the following : 18

(1) Explain biochemical effect of ozone, cyanide and methyl isocyanate.

(2) Describe impact of toxic chemicals on enzyme and also explain toxic chemicals in environment.

(3) Explain in detail Kalundborg industrial ecosystem.

2 Answer any two of the following : 17

(1) Explain characteristics and objectives of solid waste management.

(2) Discuss treatment like recycling, recovery of papers, recovery of metal ions and waste oil.

(3) Give classification of solid waste and explain vermi composting and sanitary land fill.



JJ-1093

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2022

MSPHY401CC : Nuclear Physics-2

& Bio Physics

(New Course)

Time : 2.30 Hours]

[Total Marks : 70

Instructions : (1) Symbols have their usual meaning.

(2) All Questions are compulsory.

1 (A) Attempt any one : 8

(1) Write a brief description of Nilsson model.

(2) Explain in details.

(a) Single particle Shell Model.

(b) Spin orbital potential.

(B) Attempt any two : 8

(1) Write a note on electric quadrupole

moment.

(2) Explain nuclear isomerism.

(3) For two particles and for l odd show that

$$\Psi_M^l(r_1, r_2) = 0$$

(C) Attempt any one : 2

(1) Explain degenerate state.

(2) Write rotational energy eigen

value equation for nucleus.

What is allowed values of rotational

quantum number J ?

JJ-1093]

1

[Contd...

- (A) Attempt any one : 2
- (1) Discuss hadrons and their properties.
 - (2) Explain quarks in detail.
- (B) Attempt any two : 8
- (1) Write a short note on fundamental interactions.
 - (2) Explain CPT theorem.
 - (3) What is conservation of baryon number? Explain baryon number for neutron and proton.
- (C) Attempt any one : 2
- (1) Write short note on resonance particle.
 - (2) Explain hypercharge.
3. (A) Attempt any one : 8
- (1) What is chromatography? Explain paper chromatography, partition chromatography and ion exchange chromatography.
 - (2) Explain electrophoresis in term of charge, frictional force and viscosity. Discuss low voltage electrophoresis.
- (B) Attempt any two : 8
- (1) Write a note on Gel electrophoresis.
 - (2) Discuss affinity chromatography.
 - (3) Explain molecular exclusion chromatography.
- (C) Attempt any one : 2
- (1) Write the difference between chromatography and electrophoresis.
 - (2) Give the basic principles of chromatography and electrophoresis.

- 4 (A) Attempt any one :
- (1) Discuss biomechanics of the cardiovascular system.
 - (2) Explain physics of membrane potential.
- 7
- (B) Attempt any two :
- (1) Discuss contractile proteins.
 - (2) Write note on the nervous system.
 - (3) Explain mechanism of hearing.
- 8
- (C) Attempt any one :
- (1) What is the sound wave ? Give the relation between frequency and velocity of the sound wave.
 - (2) Explain role of chemical signals in human body.
- 2



JJ-1094

Seat No. _____

M. Sc. (Physics) (Sem. IV) Examination

April / May - 2022

MSPHY-402-CC : Classical Mechanics 2 &

Electrodynamics 2

(New Course)

Time : 3 Hours] [Total Marks : 70

Instructions : (1) Symbol have their- usual mean.

(2) Figure to the right indicate marks of

the question.

1 (a) Answer the following : (any one) 8

(1) Describe Limit cycle and attractor.

(2) Explain Poincare section with

appropriate equations.

(b) Answer the following : (any two) 8

(1) What is Chaos? Explain it.

(2) Explain nonlinear oscillations.

(3) Explain Logistic map and Write down

mathematical properties of logistic map.

(c) Answer the following : (any one) 2

(1) Define singular points.

(2) Define Poincare map.

JJ-1094]

1

[Contd...

- 2 (a) Answer the following : (any one) 7
- (1) Explain proper time and proper velocity.
 - (2) Explain relativistic kinematic with appropriate example or application conservation laws.
- 8 (b) Answer the following : (any two) 8
- (1) Derive proper velocity in terms of ordinary velocity.
 - (2) Write down the Minowski force in terms of Lorentz force and proper velocity.
 - (3) Explain proper charge density and current density-4 vectors.
- 2 (c) Answer the following : (any one) 2
- (1) What is Minicowski force?
 - (2) Write Lorentz force question and application.
- 3 (a) Answer the following : (any one) 8
- (1) Discuss electric wave in rectangular guide.
 - (2) Discuss solution of the Maxwell equation in cylindrical co-ordinate.
- 8 (b) Answer the following : (any two) 8
- (1) Describe TM and TE Waves In Circular guides.
 - (2) Discuss wave impedance for TM wave in cylindrical guide.
 - (3) Talk about quality factor Q for waveguide.

- (c) Answer the following : (any one) 2
- (1) What is electrostatic field term?
 - (2) Write green function equation
- (b) Answer the following : (any two) 8
- (1) Explain in short potential function for sinusoidal oscillation.
 - (2) Discuss Hertzian oscillating electric dipole.
 - (3) Write the Sine and cosine integral in appropriate mathematical step.
- (a) Answer the following : (any one) 7
- (1) Describe potential function and a electromagnetic field.
 - (2) Derive radiation from a quarter wave monopole or half wave dipole.
- (c) Answer the following : (any one) 2
- (1) What is dominant wave?
 - (2) Arise condition for Dielectric slab for perfect conducting surface.



JJ-1096

Seat No. _____

M. Sc. (Sem. IV) Examination

April/May - 2022

MSPHY-403-CC : Physics

(Quantum Mechanics-3 and Solid State Physics-3)

(New Course)

Time : 2.30 Hours]

[Total Marks : 70

Instructions :

- (1) Symbols used have usual meaning
- (2) Figures on RHS indicate marks of respective question.

1 (A) Attempt any One out of two 8

- (1) Discuss Dirac's relativistic Hamiltonian and Obtain Dirac Relativistic equation.
- (2) Obtain plane wave solutions of the Dirac equation for the Relativistic Case

(B) Attempt any TWO of the following questions. 8

- (1) By using relativistic expression for E^2 obtain Klein Gordon equation, for which particle the Klein Gordon equation is applicable as far as spin is concern.
- (2) Explain position probability density and obtain continuity equation for the $P = \Psi^\dagger \Psi$ and $S(X,t) = c (\Psi^\dagger \alpha \Psi)$
- (3) Explain spin of the Dirac Particle.

JJ-1096]

1

[Contd...

- (C) Attempt any ONE of the following
- (1) What are the difference between "Relativistic and Non Relativistic particle" give two points.
- (2) Fill in the blanks
- (i) $\sigma_x \sigma_y = i$ _____
- (ii) $\sigma_x^2 = \sigma_y^2 = \sigma_z^2 =$ _____
- 2 (A) Attempt any ONE out of two
- (1) For the Relativistic theory obtain radial wave equation in the coulomb potential
- (2) Explain series solution of the radial equation for the Dirac wave equation.
- (B) Attempt any TWO out of the following
- (1) Obtain total angular momentum formula for the relativistic electron in a central potential
- (2) Explain energy spectrum and eigen function for the electron in a magnetic field for the Dirac particle.
- (3) Discuss spin magnetic moment.
- (C) Attempt any One of the following
- (1) If the electron is in a central potential field characterized by $V=0$ and $e\Phi=V(r)$ then write down the Dirac Hamiltonian.
- (2) Write down the non relativistic limit
- 2
- 7
- 8

- 3 (A) Attempt any ONE of the following
- (1) Obtain Kramers-Kronig relations by equating real and imaginary part of a Cauchy integral response function.
 - (2) Explain Frenkel Excitons in detail.
- 8 (B) Attempt any two of the following
- (1) Write a note on Optical Reflectance
 - (2) Explain Raman effect in crystal
 - (3) Explain energy loss of fast particles in a solid and obtain a formula for power loss $p(\omega)$
- 2 (C) Attempt any ONE out of Two
- (1) Give the selection rules for the first order Raman Effect.
 - (2) If excitons is tightly bound then it is called _____ exciton and if excitons is weakly bound then it is called _____ exciton.
- 7 (A) Attempt any ONE of the following
- (1) Explain the structure and operation of solar cells in detail.
 - (2) Describe the construction (Structure) of LED with necessary figure.
- 8 (B) Attempt any TWO out of the following.
- (1) Write down the advantage and disadvantage of Solar Cell.
 - (2) Discuss the comparison of p-n junction diode and Schottky junction diode.
 - (3) Write a short note on Photo transistor.
- 2 (C) Attempt any ONE of the following
- (1) Write down which materials used in solar cell.
 - (2) Write down the list of the applications of LED.



JJ-1084

Seat No. _____

M. Sc. (Sem. IV) Examination

April - 2022

Horticulture Science : BOT-CC-401

(New Course)

Time : 2 1/2 Hours]

[Total Marks : 70

Instructions : (1) The numbers to the right side of each question shows marks of that question. (2) Illustrate answers with question number which is shown in question paper. (3) Illustrate your answers with necessary diagrams if required. (4) Write answer of each section in separate answer book.

SECTION - I

1 Describe the Classification of horticultural crop. 14
OR

Discuss : (1) Scope and impact of Horticulture (2) Nutritive value of horticulture crops 7
2 Describe in details of Cutting, Grafting, Budding and Layering. 14
OR

Discuss : (1) Types of vegetative propagation (2) Factors affecting seed germination 7
JJ-1084] 1 [Contd...

- Describe :
- (1) Principle and advantages of Landscaping 7
 - (2) Integrated pest management in horticulture. 7

OR

- 5 Describe in details of Indoor gardening 14
 - (1) Production technology of high value of Tomato and Rose. 7
 - (2) Greenhouse, its advantage and maintenance. 7
- Discuss :

OR

- 4 Describe : harvest and post harvest handling practice in horticultural 14

SECTION - II

- 3 Answer the following : (Seven out of ten) 7
 - (1) What is Floriculture?
 - (2) State any two factors that affect vegetative propagation
 - (3) Who is the Father of Horticulture?
 - (4) Define: Pomology
 - (5) State any two horticulture zone of India
 - (6) Who coined the term Nutraaceutical from Nutrition and Pharmaceutical?
 - (7) What is seed propagation?
 - (8) What is the disadvantage of vegetative propagation?
 - (9) Give the significance of Layering?
 - (10) State any two pre-germination treatments.

- 6 Answer the following : (Seven out of Ten)
- (1) Define: Xeriscaping
 - (2) Explain: Mulching
 - (3) Give any two famous botanical gardens in India
 - (4) Give any two examples of landscape Garden
 - (5) Write the full form of IFOAM
 - (6) Explain: Composting
 - (7) _____ and _____ are the major elements of Garden
 - (8) Mughal and Persian style fall in the category of formal garden. True or False
 - (9) The largest botanical garden of India situated in _____.
 - (10) _____ is an aesthetic branch of horticulture which deals with planting of ornamental plants in such a way that it creates a picturesque effect.



JJ-1087

Seat No. _____

M. Sc. (Sem. IV) Examination

May - 2022

BOTCC - 404 : Mycorrhizae, Mushrooms,
Biofertilizer and Plant Geography

(New Course)

Time : 2 ¹/₂ Hours]

Instructions : (1)

The question paper consists of Two
Sections, Write Each Section in
Separate Answer Sheet

(2)

The numbers to the right of the each
question shows the marks of that

(3)

Illustrate Your answer with neat and
labeled diagram if required.

Section - I

1

(A) Describe : Recent trends in mycorrhizal
Taxonomy.

14

OR

(A) Describe: Mycorrhizae role in Crop
Productivity.

7

(B)

Describe: VAM Fungi

7

2

(A)

Describe: Types of Mushrooms

14

OR

(A) Describe: Medicinal value of Edible
Mushrooms.

7

(B)

Describe: Method of cultivation of Agaricus
bisporus.

7

JJ-1087]

1

[Contd...

- 6 Answer in Short : (Any Seven) 7
- (1) Define: Biofertilizer
 - (2) Define: Strain Selection
 - (3) Define: Symbiosis
 - (4) Write types of biofertilizer
 - (5) Define: Plant Geography
 - (6) Define: Endemism
 - (7) Write types of plant migration
 - (8) Define: Floristic study
 - (9) Define: Native texa

- 5 (A) Describe : Continental drift 7
 (B) Describe : Remote sensing and GIS for plant analysis. 7

OR

- 5 Describe: Pliytogeographical regions of India. 14

- 4 (A) Describe : Characteristics of biofertilizer 7
 (B) Describe : Production technology of biofertilizer. 7

OR

- 4 (A) Describe: Importance of Biofertilizer in agricultural crop. 14

Section - II

- 3 Answer in Short : (Any Seven) 7
- (1) Define: Endomycorrhizae
 - (2) Define: Orchid Mycorrhizae
 - (3) Define: Multification of Mycorrhizae
 - (4) Write full form of PSF
 - (5) Write examples of Poisonous Mushrooms
 - (6) Define: Mushroom Science
 - (7) Define: Morels
 - (8) Write any one Medicinal value of Mushrooms
 - (9) Write biological significance of Mushrooms.



JJ-1088-1089-1090 Seat No. _____

M. Sc. (Sem. IV) Examination

April/May - 2022

Botany

(1) BOTEC-401 : Conservation and Restoration

Ecology

(New Course)

(2) BOTEC-402 : Bioinformatics

(New Course)

(3) BOTEC-403 : Phytochemistry and Pharmacology

(New Course)

Time : 2.30 Hours]

[Total Marks : 70

(1) BOTEC-401 : Conservation and Restoration Ecology

(New Course)

Instructions :

- (1) The figures to the right of the each question shows the marks of that question.
- (2) Illustrate your answers with neat and labeled diagrams if required.

(A) Describe : Introduction , Principles and Ethics of Conservation Ecology.

OR

- (A) Write short notes on :
 - (1) Mechanism of Population Regulation 5
 - (2) Species and Habitat Conservation 5
 - (3) Genetics Variation and its loss. 5

JJ-1088-1089-1090]

1

[Contd...

OR

1 Answer the following :
Describe : Structure and classification of database. 15

Instructions :
(1) All questions are compulsory.
(2) Figures to the right indicate marks of sub-question.
(3) Illustrate your answers with nat and labelled diagrams if required.

(New Course)

(2) BOTEC-402 : Bioinformatics

3 Answer in short (Any Five) 5
(1) Define : Ecology.
(2) Define : Conservation
(3) Define : Population Dynamics
(4) Define : Reserve Design
(5) Define : Sustainable Development
(6) Write the Aims of Restoration
(7) Define : Ecosystem
(8) Write major tools used in restoration.

(A) Write short notes on : 5
(1) General Principles of management. 5
(2) Impact of disturbances on the structure of Ecosystem. 5
(3) Concept of Restoration. 5

OR

2 (A) Describe : Degradation and Restoration of Natural Ecosystem. 15

Instructions :
 (1) This question paper consists of three questions.
 (2) Illustrate your answers with necessary diagrams, if required.

(New Course)

(3) BOTEC-403 : Phytochemistry and Pharmacology

- 3
- Answer the following : Any Five
- (1) Explain the word : Database
 - (2) The polymer of amino acid is _____ Lipid/Protein/Carbohydrate
 - (3) What do you mean by bioinformatics ?
 - (4) Mention the name of three components of nucleotide.
 - (5) Define : Transcription
 - (6) To study the expression of many genes at once is called _____. Microarray/ Microsoft
 - (7) What is gene prediction ?
- 5
- 5
- 5
- 5
- 5
- Write short note on :

OR

- 2
- Answer the following :
- (1) Nucleotide sequence database.
 - (2) Tools for sequence alignment.
 - (3) Applications of informatics.
- 5
- 5
- 5
- 5
- Write short note on :
- Describe : Various methods of gene prediction.
- 15

- (vii) Protoalkaloids are also called as _____
- (vi) _____ Drugs is used as antihypertensive.
- True or False.
- (v) Essential oils are a secondary metabolite. It is _____
- (iv) What is abrin ? _____
- (iii) The biological source of Indian gum is _____
- &
- (ii) Glycosides are condensation products of _____
- (i) Who is known as father of medicine ? _____

(Any Five)
Answer the following questions in short : 5

- (iii) Anti-microbial agent
- (ii) Marine flora as source of bioactive compounds
- (i) Anti-diabetic agent

Each of 5 marks.
Answer the following questions in brief :

OR
Phyto-pharmacological evaluation. 15

- Describe in detail : 2
- (iii) Biosynthesis of glycosides and terpenes.
- (ii) Phenols and steroids as a secondary metabolites.
- (i) Drugs derived from alkaloids and volatile oils

Each of 5 marks
Answer the following questions in brief :

OR
Plants as source of drugs. 15
Describe in detail :