M. Sc. (Sem. III) Examination

October - 2022

Organic Chemistry : CHNN-601(O)

(Natural Products)

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

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

  (1) Discuss the occurrence, isolation and properties of Quercetin and establish its relationship to cyanidin chloride.

  (2) Discuss the degradation product of haemin under different conditions. Give synthesis of any one of them.

  (3) Give the classification of natural pigment based on structural unit. Give one general method each for the synthesis of Porphyrin and Flavanone.

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

  (1) Write in detail about chemistry of Zingiberene.

  (2) Prove that cadinene has two double bonds in different ring and isopropyl group on position 4 in ring A.

  (3) Discuss the general method for structure determination of Terpines.

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

(1) Give evidence for the presence of pyrimidine nucleus and position of sulphonic acid in the compound B (which is decomposition by $NaHSO_3$) product of Thiamine.

(2) Give the synthesis of α and β Tocopherols.

(3) Discuss the synthesis of vitamin B_6.

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

(1) Discuss the constitution of Morpholine.

(2) Discuss the degradative and synthetic evidences leading to the structure of Narcotine opium alkaloid.

(3) Using evidence discuss Hoffman's exhaustive methylation in elucidating the structure of alkaloids.

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M. Sc. (Sem. III) Examination

October - 2022

CHNN-602(O) : Organic Chemistry : Paper-2

(Industrial Chemistry)

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

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

   (1)   Define : A unit process. Explain the comparison between batch process and continuous process.

   (2)   Explain in detail : Design flow charts and their importance.

   (3)   Write a note on : Good manufacturing practice and laboratory practice.

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

   (1)   What are surfactants ? Explain their classification and uses.

   (2)   What are fatty acids and essential oils ? Explain their sources and uses with proper examples.

   (3)   Write a note on : Food additives.

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

   (1)   What are vegetable oils ? Explain the general process of hydrogenation.

   (2)   Write a note on : Fungicides.

   (3)   Write a note on : Plant nutrients.

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

    (1)   Explain about the general process of manufacturing of paper.

    (2)   Describe the process of manufacturing of ethanol from sugars.

    (3)   What is a rayon ? Explain any one method to manufacture rayon.

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M. Sc. (Sem. III) Examination

October - 2022

Organic Chemistry : CHNN-603(O)

(New Course)

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

1   Answer any two :   **18**

(1) Discuss receptor site theory. Explain different type of receptor.

(2) Explain diagnostic agents. Describe the use of radioactive isotopes as diagnostic agents.

(3) What is QSAR ? Explain the relationship between molecular structure and biological activity.

2   Answer any two :   **17**

(1) Explain the mechanism action of streptomycin. Give its synthesis.

(2) Write a short note on polyenes. Give the synthesis of any two polyene antibiotics.

(3) Explain the constitution and synthesis of Penicilline.

3   Answer any **two** :   18

   (1) Give the mechanism of action and metabolism of various sulpha drugs.

   (2) Give the synthesis and uses of sulpha guanidine and sulpha furazole.

   (3) Give the synthesis and uses of Trimethoprim and Sulphamerazine.

4   Answer any **two** :   17

   (1) Explain the chemistry of Histamine – Anti Histamine. Give synthesis of chlorphenyramine.

   (2) Define : Local and general anaesthetic. Give synthesis and uses of any two drugs.

   (3) Write short note on Anti cholinergic drugs. Give any two synthesis of cholinergic drugs.

MAH-1197   Seat No._____

M. Sc. (Sem. III) Examination
October - 2022
CHNN-604(O) : Organic Chemistry : Paper-4
(Selected Topics in Organic Chemistry)

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

1   Answer any **two** of following :   18
  (1)   What are monocyclic diheteroatomic compounds?
        Explain chemical reactivity of oxazole.
  (2)   Explain synthesis of pyrazole and imidazole.
  (3)   Explain chemical activity of thiazole and
        isothiazole.

2   Answer any **two** of following :   17
  (1)   Explain electrophilic substitution reactions of
        substituted quinoline.
  (2)   Write a note on : Skraup synthesis.
  (3)   Explain the synthesis of Cinnoline.

3   Answer any **two** of the following :   18
  (1)   Write a note on : applications of oxidation
        reagent : $KMnO_4$.
  (2)   Explain the applications of Sodium dichromate
        as an oxidation reagent.
  (3)   Explain the applications of Aluminium
        isopropoxide as an oxidation reagent.

4 Answer any **two** of following :

(1) Explain the applications of hydrazine as a reducing agent.

(2) Explain the applications of platinum and nickel as reducing agents.

(3) Explain the use of sodium cyano borohydride as a reducing agent.

MAH-1201-02   Seat No._____

M. Sc. (Sem. III) Examination

October - 2022

1. Chemistry(O) : CHNN-605(A)
(Green Chemistry) (Elective)

2. Photo Chemistry : CHNN-605(B)
(Elective Course)

Time : **2** Hours]   [Total Marks : **35**

1. Chemistry(O) : CHNN-605(A)
(Green Chemistry) (Elective)

Instructions :

(1) There are total two questions in question paper.

(2) All questions are compulsory.

(3) Figures to the right side indicate the full marks.

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

   (1) Define term : Green chemistry. Explain green guidelines used in laboratory.

   (2) Describe the uses of green chemistry in everyday life.

   (3) Discuss in detail basic need for green chemistry according to environmental approach and write its benefits.

   (4) Discuss the principle of green chemistry. Explain the classical and manmade appropriate two illustrations of each class.

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

    (1)   Discuss green reaction conditions. Explain green synthesis of adipic acid.

    (2)   Write a note on : Phase transfer catalysts and biocatalysts.

    (3)   Describe the uses of renewable feed stock.

    (4)   Explain brief account of the following terms.

       (i)   Catalysis

       (ii)   Energy efficiency

       (iii) Green solvents

2. Photo Chemistry : CHNN-605(B)
(Elective Course)

Instruction :   All questions are compulsory.

1   Answer the following questions : (any **two**)   18

    (1)   Explain the terms : Fluorescence and Phosphorescence.

    (2)   Write short note on interaction of electromagnetic radiation of matter.

    (3)   Define 1,4- and 1,5-dienes. Discuss the photochemistry of rearrangements of 1,4-dienes with suitable example.

    (4)   Discuss the photochemical cycloaddition reaction between benzophenone and 1,3-butadiene.

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

    (1)   Discuss di-π methane rearrangement in 1,5-pentadiene.

    (2)   Explain Norrish type I and II cleavages in photochemical reactions.

    (3)   What is Fries rearrangement ? Explain photo-Fries arrangement.

    (4)   Discuss the photochemistry of carbonyl compounds in α, β unsaturated compounds.

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MY-1207   Seat No. _____

M. Sc. (Sem. III) Examination
October - 2022
Botany : BOC-301
(Gymnosperms & Fossils)
(New Course)

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

Instructions :   (1)   This question paper consists total four questions.

               (2)   All questions are compulsory and carrying 18, 17, 18 and 17 marks respectively.

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

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

1   Answer the following as per instruction :   **18**

   (a)   Explain in detail - any one :   **8**

       (1)   Geological rise and fall of gymnosperms.

       (2)   Comparison of Angiosperms and Gymnosperms.

   (b)   Explain in brief - any one :   **7**

       (1)   General characters of Gymnosperms.

       (2)   Economic importance of Gymnosperms.

(c) Give short answers - any three :

(1) Define - Gymnosperms.

(2) Write two characteristics of the Gymnosperms ovule.

(3) In which era maximum gymnosperms are seen ?

(4) Which gymnosperm plant is called living fossil ?

(5) Write the name of two division of gymnosperms.

2 Answer the following as per instruction : 17

(a) Explain in detail - any one : 8

(1) Female gametophytes structure of Ephedrales.

(2) Comparative account of the male gametophytes of Cycas and Pinus.

(b) Explain in brief - any one : 6

(1) Describe the structure of female cone of Ephedra.

(2) Describe the structure of male cone of Thuja.

(c) Give short answers - any three : 3

(1) Write uses of Pinus.

(2) Which Gymnosperms is link between Angiosperms and Gymnosperms ?

(3) Which alkaloid contain present in Ephedra ?

(4) Write name of smallest gymnosperms.

(5) Which angiosperm characters seen in Gnetum ?

3 Answer the following as per instruction :   **18**

(a) Explain in detail - any one :   **8**
    (1) Nomenclature of fossils plants.
    (2) Impression types of focsils.

(b) Explain in brief - any one :   **7**
    (1) Geological time sale.
    (2) Factors affecting fossilization.

(c) Give short answers - any three :   **3**
    (1) Who is father of paleobotany ?
    (2) Define - Fossile
    (3) Explain : Trace fossils.
    (4) Explain : Amber
    (5) Define : Psudofossils.

4 Answer the following as per instruction :   **17**

(a) Explain in detail : any one :   **8**
    (1) *Calamitales*
    (2) *Bennettitales.*

(b) Explain in brief - any one :   **6**
    (1) *Lapidodendrales*
    (2) *Coniferales*

(c) Give short answers - any three :   **3**
    (1) Who discover *Pentoxylals* ?
    (2) Write the name of genus belongs to Cordiatales.
    (3) *Cycadoidea* also known as _____ (Bennettites/calamoties)
    (4) *Pentoxylon* evolved in which era ?
    (5) *Lepidodendron* extincted in which era ?

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MY-1208   Seat No. _____

M. Sc. (Sem. III) Examination

October - 2022

Botany : BOT-302

(Molecular Biology of Plants)

(New Course)

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

Instructions : (1) This question paper consists total four questions.

(2) All questions are compulsory and carrying 18, 17, 18 and 17 marks respectively.

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

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

1 Answer the following as per Instructions :   **18**

(a) Explain in detail : (any one)   **8**

   (1) Eukaryotic transcription.

   (2) Types of RNA and their function.

(b) Explain in brief : (any one)   **7**

   (1) DNA replication in eukaryotes.

   (2) Protein synthesis.

(c) Give short answers : (any three)   **3**

   (1) Explain the word : OKAZAKI fragment.

   (2) 'B' form DNA is _____ left handed or right handed.

   (3) What is central dogma ?

MY-1208]   1   [Contd...

(4) Separates the two strands of DNA double helix the enzyme is :
   (a) Helicase
   (b) Polymerase
   (c) Primase
(5) Protein in a polymer of _____

2 Answer the following as per Instructions : 17
   (a) Explain in detail : (any one) 8
      (1) Regulation of gene expression in prokaryotes.
      (2) Human Genome project.

   (b) Explain in brief : (any one) 6
      (1) Mass spectrometers for protein
      (2) Application of proteomics.

   (c) Give short answers : (any three) 3
      (1) What is protein expression profiling ?
      (2) Explain the word : proteomics.
      (3) Lactose can be nutrient source for bacteria, it is a _____
         (a) Monosaccharide
         (b) Disaccharide
         (c) Polysaccharide
      (4) Regulatory protein can act both as an activator and repressor.............. (True or False)
      (5) Define : Gene.

3 Answer the following as per Instructions : 18
   (a) Explain in detail : (any one) 8
      (1) Restriction Endonuclease
      (2) Gene cloning

   (b) Explain in brief : (any one) 7
      (1) cDNA libraries
      (2) Recombinant DNA technology

(c) Give short answers : (any three) **3**
   (1) Explain the word : Cosmid.
   (2) Which enzyme is used to join together two different types of DNA molecules ?
   (3) The restriction enzyme needs to be in the form to cut the DNA:
      (a) Mixed
      (b) Hybrid
      (c) Pure
   (4) Which enzyme is used to cut DNA molecule on rDNA technology ?
   (5) Define : Genome library

4   Answer the following as per Instruction : **17**
  (a) Explain in detail : (any one) **8**
    (1) DNA synthesis
    (2) Polymerase Chain Reaction (PCR)

  (b) Explain in brief : (any one) **6**
    (1) RFLP and its applications.
    (2) DNA microarray

  (c) Give short answers : (any three) **3**
    (1) What is the main enzyme component of Sanger sequencing ?
    (2) Mention the full form of RAPD.
    (3) Polymerase used for PCR is extracted from Thermus aquaticus.... (True or False)
    (4) State any two uses of DNA sequencing.
    (5) Define : DNA fingerprinting.

M. Sc. (Sem. III) Examination
October - 2022
BOC-303 : Plant Ecology
(New Course)

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

Instructions : (1) The numbers to the right of the each question shows the marks of that question.

(2) Illustrate your answer with neat and labelled diagram if required.

1   (a)   Describe : (any one)   8

    (1)   Major Biomes of the world.

    (2)   Analytical Characters of Plant Community.

    (b)   Write short notes : (any one)   7

    (1)   Ecological Niche

    (2)   Mechanism of Ecological Succession

    (c)   Answer in short : (any three)   3

    (1)   Definition : Succession

    (2)   Definition : Plant community

    (3)   What is Phytogeography

    (4)   Which method used for Plant Community Analysis ?

    (5)   Who give life form method in 1934 ?

2 (a) Describe : (any one)   8

    (1) Climatic Factor - light

    (2) Y shaped Energy Flow pathway

   (b) Write short notes on : (any one)   6

    (1) Nitrogen Cycle

    (2) Structure of Ecosystem

   (c) Answer in short : (any three)   3

    (1) Definition : ecosystem

    (2) Definition : Primary Productivity

    (3) Give the full form of GPP.

    (4) Write the types of Natural Ecosystem.

    (5) Definition : Biogeochemical Cycle.

3 (a) Describe ; (any one)   8

    (1) Role of Biodiversity in ecosystem functions.

    (2) Water Pollution.

   (b) Write short notes : (any one)   7

    (1) Terrestrial Biodiversity Hot Spots

    (2) Effect of Air Pollution on Plants and ecosystem.

   (c) Answer in short : (any three)   3

    (1) Definition : Biological diversity

    (2) Write full form of IUCN.

    (3) Definition : Pollution.

    (4) Definition : Speciation

    (5) Write the source of Soil Pollution.

4 (a) Describe : (any one)   **8**

    (1) Greenhouse gases sources and role.

    (2) Ecological Perturbations and their impact on Plants and Ecosystem.

(b) Write short notes on : (any one)   **6**

    (1) Global Warming.

    (2) Environmental Impact Assessment.

(c) Answer in short : (any three)   **3**

    (1) Definition : Climate Change

    (2) Define : Ozone Hole

    (3) What is Ecological Restoration ?

    (4) Which are the sustainability indicators ?

    (5) Define : Ecological Management.

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M. Sc. (Sem. III) Examination

October - 2022

Botany : BOC - 304

(Plant Physiology) (New Course)

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

1   (a)   Answer the following - Long answer   8
question : (**one** out of two)

   (1)   Describe the Physiological aspects of mobilization of food reserve during seed germination.

   (2)   Write a note on various types and causes of seed dormancy.

   (b)   Answer the following - Short note :   7
(**one** out of two)

   (1)   Discuss about the causes and factors affecting bud dormancy.

   (2)   Write note on hormonal regulation of senescence.

   (c)   Answer the following - Short questions :   3
(**three** out of five)

   (1)   What is Bud dormancy ?

   (2)   Name the hormone delaying senescence.

   (3)   Which hormone is known as anti-gibberellin hormone ?

   (4)   What is stratification ?

   (5)   What is senescence ?

2 (a) Answer the following - Long answer questions : (**one** out of two)   8

(1) Describe about passive and active solute transport in plants.

(2) Write note on absorption and transport of any one micro nutrients in plant.

(b) Answer the following - Short notes :   6

(**one** out of two)

(1) Describe briefly the process of biological nitrogen fixation in plant.

(2) Write note on salinity stress in plants.

(c) Answer the following - short questions :   3

(**three** out of five)

(1) What is Phloem loading ?

(2) Write two roles of Potassium (K) in plants.

(3) What is nitrate reduction ?

(4) Define biotic stress.

(5) What is freezing stress ?

3 (a) Answer the following - Long answer questions : (**one** out of two)   8

(1) Write note on light reaction of photosynthesis.

(2) Describe Calvin cycle / C3 cycle.

(b) Answer the following - short note :   7

(**one** out of two)

(1) Describe the various steps of glycolysis.

(2) Write note on the Phytochromes.

(c) Answer the following - short questions :   3

   (three out of five)

   (1) What is CAM pathway ?

   (2) Define Photorespiration.

   (3) Name two C4 plants

   (4) What is photo phosphorylation ?

   (5) Write full form of TCA.

4 (a) Answer the following - Long answer   8

   questions : (one out of two)

   (1) Describe the natural plants growth regulators and their applications.

   (2) Write note on physiological effects and metabolism of brassinosteroids.

(b) Answer the following - Short notes :   6

   (one out of two)

   (1) Discuss on floral induction and development.

   (2) Describe the types of photoperiodism and its significance.

(c) Answer the following - Objective type   3

   questions : (three out of five)

   (1) Give name of synthetic hormone.

   (2) Which hormone promote fruit ripening ?

   (3) What is Vernallisation ?

   (4) Give the function of auxin.

   (5) What is elicitors ?

MY-1211-1212-1310 Scat No._____

M. Sc. (Sem. III) Examination

October – 2022

Botany : Paper - BOE–301, BOE–302 & EBO–303

(New Course)

BOE-301 : Air Pollution & Climate Change

BOE-302 : Herbal Medicine

EBO-303 : Biostatistics

Time : **2** Hours]   [Total Marks : **35**

BOE-301 : Air Pollution & Climate Change

Instructions : (1) This question paper consists total three questions.

(2) All questions are compulsory and carry **14, 14** and **07** marks respectively.

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

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

1   Answer the following as per Instruction   14

    (a)   Explain in Detail : (any **one**)

        (1)   Effects of sulphur on plants and   08

             human health.

        (2)   Tropospheric ozone.

    (b)   Explain in Brief : (any **one**)   06

        (1)   Photochemical smog.

        (2)   Nitrogen metabolism.

2   Answer the following as per Instruction :   14

    (a)   Explain in detail : (any **one**)   08

        (1)   Green house gases and effects.

        (2)   Effect of acid rain on Ecosystem.

    (b)   Explain in Brief : (any **one**)   06

        (1)   Global warming.

        (2)   Ozone depletion.

3   Give short answer : (any **seven**)   07

    (1)   Define : Pollution.

    (2)   What is deposition ?

    (3)   What is toxicity ?

(4) The main cause of acid rain is _____ .

(5) What do you mean by bioaccumulation ?

(6) Mention the full form of UV-B.

(7) The Ozone layer is present in _____ .

(8) Conversion of ammonia to nitrite and then to nitrates is called _____ .

(9) In terms of efficiency, the most potent greenhouse gas is _____ .

(10) What is a biological action spectrum ?

BOE-302 : Herbal Medicine

Instructions : (1) This question paper consists total three questions.

(2) All questions are compulsory and carry **14, 14** and **07** marks respectively.

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

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

1   Answer the following as per Instruction   14

(a) Explain in Detail : (any **one**)

(1) Write notes on : Diagnostic features   08 and therapeutic value of Sarpgantha.

(2) Write the types of secondary metabolites.

(b) Explain in Brief : (any **one**)   **06**

     (1) Describe : Therapeutic value of *SHATAVARI*.

     (2) Explain in short : Uses of herbal plant in human welfare.

2 Answer the following as per Instruction :   **14**

(a) Explain in detail : (any **one**)   **08**

     (1) Bio prospecting of medicinal plants.

     (2) Nutraceuticals and medicinal plants.

(b) Explain in Brief : (any **one**)   **06**

     (1) Standardization of herbal drug.

     (2) Conservation of medicinal plants using in vitro technique.

3 Give short answer : (any **seven**)   **07**

     (1) Write the two functions of Steroids.

     (2) The genus *Amala* is member of the family____

     (3) Kumari is common name of _____

     (4) Write the Botanical name of *MUSLI*.

(5) Mention the scientific name of *TULSI*.

(6) Nutraceutical products are divided into _____ categories.

(7) What is bio prospecting ?

(8) Write the Botanical name of Giloy.

(9) Write the any two name of secondary metabolites.

(10) Write the name of any one herbal product.

EBO-303 : *Biostatistics*

Instructions : (1) All questions are compulsory.

(2) Figures to the right side indicate marks of sub-questions.

(3) Illustrate your answers with net and labeled diagram if required.

1 (a) Answer the following questions in brief :   08

(any **one**)

(1) What is sampling.

(2) What is the difference between tendency and variability ?

(b) Write short note : (any **one**)   06

    (1) Frequency distribution.

    (2) Multiple range tests.

2 (a) Answer the following questions in brief :   08

    (any **one**)

    (1) Principles of experimental design.

    (2) Introduction to environmental modeling.

  (b) Write short note : (any **one**)   06

    (1) Parametric ordination.

    (2) Data analysis.

3 Answer the following question : (any **seven**)   07

    (1) What do you mean central tendency ?

    (2) What is the mean of a Chi-Square distribution with 6 degrees of freedom ?

    (3) Give types of correlation.

    (4) If the values of two variable move in the same direction _____.

    (5) What is the meaning of the testing of the hypothesis ?

(6) If a Chi-Square goodness of fit test has 6 categories and an N=30, than the Correct number of degree of freedom is _____.

(7) To perform a run test for randomness the data must be _____.

(8) Unlike the non-parametric tests, parametric test certain assumption About _____.

(9) Chi-Square test is an example of _____.

(10) What does Analysis of variance stand for ?

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[660]

M. Sc. (Sem. III) Examination

October - 2022

Physics : MSPHY-301CC

(Nuclear Physics - I & Instruments)

(New Course)

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

Instruction : Symbols used have their usual meaning.

1 (a) Answer the following : (any one out of two) 8

   (1) Discuss the effect of magnetic field on hyperfine structure.

   (2) Discuss ground state of Deuteron in detail.

   (b) Attempt any two of the following (any two out of three)   8

   (1) Explain magnetic moment of Deuteron.

   (2) Discuss Scattering length. Explain how it is obtained ?

   (3) Explain excited state of Deuteron.

   (c) Answer the following : (any one out of two) 2

   (1) What is nuclear spin ? Explain.

   (2) Write formula of Differential cross section for elastically scattered particles for all values of l.

2 (a) Answer the following : (any one out of two)   7

    (1) Discuss in brief nuclear reaction and cross sections.

    (2) Explain statistical theory of nuclear reactions.

  (b) Attempt any two of the following :   8
(any two out of three)

    (1) Describe compound nucleus.

    (2) Explain wave mechanical description of stripping reaction.

    (3) Explain continuum theory of cross sections.

  (c) Answer the following : (any one out of two)   2

    (1) What is resonance in nuclear reactions ?

    (2) Write down the equation of the nuclear reaction or scattering of the amplitude of the outgoing spherical wave (Ψ_{sc})

3 (a) Answer the following : (any one out of two)   8

    (1) Explain principle and working of transmission electron microscopy (TEM).

    (2) What is tunneling effect ? Explain scanning tunneling microscopy in detail.

  (b) Attempt any two of the following : (any two   8
out of three)

    (1) Write down the advantages, disadvantages and applications of SEM.

    (2) Explain preparation of the specimen for the electron microscopy.

    (3) Discuss Scanning force microscopy.

(c) Answer the following : (any one out of two) **2**

    (1) Explain constant height mode of STM.

    (2) Give the differences between SEM and TEM.

4 (a) Answer the following : (any one out of two) **7**

    (1) Discuss instrumentation of UV-Visible spectroscopy in detail.

    (2) Explain the working of UV-visible double beam spectrometer.

(b) Attempt any two of the following : **8**
(any two out of three)

    (1) Explain photodiode array spectrometers.

    (2) Explain Beer - Lambert Law.

    (3) Describe the principle of UV - Visible spectroscopy.

(c) Answer the following : (any one out of two) **2**

    (1) Write down any four applications of UV-Visible spectroscopy.

    (2) Why tungsten-halogen lamp is more useful than tungsten filament lamp ?

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MY-1242   Seat No. _____

M. Sc. (Sem. III) Examination
October - 2022
Physics : MSPHY-302CC
(Statistical Mechanics-2 & Computer-2)
(New Course)

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

Instructions : (1) Symbols have their usual meaning.
(2) Figure indicated on right hand side individual marks.

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

(1) Explain Ginzburg - Landau (GL) theory in detail.

(2) Describe phase transition in Ferromagnetic materials with equation.

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

(1) Derive equation for equilibrium conditions.

(2) Explain Liquid Helium in detail.

(3) Discuss classification of phase transition.

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

(1) What is phase transition ?

(2) What is importance of phase equilibrium ?

MY-1242]   1   [Contd...

2   (a)   Answer the following : (any one)   7

    (1)   Discuss in brief Photoelectric effect.

    (2)   Derive Maxwell distribution from Boltzmann's equation.

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

    (1)   Describe mean collision time.

    (2)   Explain distribution function in space and time.

    (3)   Derive equation for Einstein's relation for mobility.

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

    (1)   Define Thermionic emission.

    (2)   What is Boltzmann's H theorem ?

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

    (1)   Discuss formulas. Differentiate formulas and function.

    (2)   Explain search and replace with necessary steps.

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

    (1)   Discuss any two mathematical functions in MS Excel.

    (2)   Explain manipulating date in MS Excel.

    (3)   Explain the formatting spreadsheet in MS Excel.

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

　　(1) Give the applications of MS Excel.

　　(2) Write down different types of charts options available in MS Excel.

4 (a) Answer the following : (any one)　　　　　7

　　(1) Explain computer network LAN, MSN and WAN.

　　(2) Describe importance of internet and web browser, search engine.

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

　　(1) Explain ISP.

　　(2) Describe applications of electronic mail.

　　(3) Compare internet and intranet.

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

　　(1) What is URL ?

　　(2) Write difference between MSN and WAN.

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MY-1244   Seat No._____

M. Sc. (Sem. III) Examination
October - 2022
MSPHY-304 CC : Physics
(Electronics-III)

(New Course)

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

Instructions : (1) Symbols have their usual meaning.
            (2) Figures on R.H.S. indicate marks.

1   (a)   Attempt any **one** :   8
       (1)   Explain pulse code modulation and give advantages and disadvantages of pulse code modulation.
       (2)   State three types of digital modulation technique. Explain frequency shift keying (FSK) in detail.

   (b)   Attempt any **two** :   8
       (1)   Write note on 'Phase shift keying (PSK)'
       (2)   Give the classification of modulation.
       (3)   What are different applications of PAM and PWM ?

   (c)   Attempt any **one** :   2
       (1)   Why digitization is necessary in communication ?
       (2)   Explain what do you mean by matched filter ?

2 (a) Attempt any **one** :   7

        (1) What is detector ? Explain linear diode detector in brief.

        (2) Define PLL and explain PLL as a FM demodulator with proper diagram.

   (b) Attempt any **two** :   8

        (1) Explain about automatic volume control (AVC).

        (2) Define demodulators and give the difference between square law detectors and linear detectors.

        (3) Give merits and demerits of balanced slope detector.

   (c) Attempt any **one** :   2

        (1) Classify frequency and phase discriminators.

        (2) Define efficiency of detection. On which factors it depends ?

3 (a) Attempt any **one** :   8

        (1) What is platform in Remote Sensing ? Discuss different types of platforms.

        (2) Discuss the importance and advantages of GIS.

   (b) Attempt any **two** :   8

        (1) Discus about radio metric resolution.

        (2) How GIS is helpful in modern life ? Explain it.

        (3) Discuss in brief passive remote sending.

   (c) Attempt any **one** :   2

        (1) What is IRRADIANCE ?

        (2) List out the key components of Geographic Information System.

4 (a) Attempt any **one** :   7
   (1) Give general aspect of convertor and discuss the phase convertor with form factor and ripple factor.
   (2) Discuss about induction motor with Principles, construction and advantages - disadvantage.

(b) Attempt any **two** :   8
   (1) Discuss about DC servo motor.
   (2) Explain about single phase series converter.
   (3) What are the advantages and disadvantages of synchronous motors ?

(c) Attempt any **one** :   2
   (1) Give difference between induction motors and transformer.
   (2) What is stepper motor ?

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MY-1243   Seat No._____

M. Sc. (Sem. III) Examination

October – 2022

Solid State Physics - 3 : Paper - MSPHY- 303 - CC

(Quantum Mechanics - 3)

(New Course)

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

1   (a)   Attempt any **one** :   8

      (1)   Explain wave mechanical picture of scattering.

      (2)   Discuss Born approximation.

   (b)   Attempt any **Two** :   8

      (1)   Describe Kinematics of scattering.

      (2)   Describe Born series.

      (3)   Briefly describe Eikonal approximation.

   (c)   Attempt any **two** :   2

      (1)   Dimension of scattering cross sections is same as....

         (a)   length

         (b)   volume

         (c)   area

         (d)   electric charge of electron

      (2)   In scattering detector is kept......

         (a)   close to the target

         (b)   in asymptotic region

         (c)   anywhere

         (d)   none of these

(3) Notation for differential cross section...

(a) $\langle q^2 \rangle_e = \sum q_i^2$ (b) $\langle q^2 \rangle_e = N \sum q_i^2$

(c) σ (d) $\dfrac{d\sigma}{d\Omega}$

2 (a) Attempt any **one** :   7

   (1) Describe low energy scattering.

   (2) Discuss scattering by a coulumb potential mutual scattering of two particles.

(b) Attempt any **Two** :   8

   (1) Derive formula for scattering amplitude in terms phase shift.

   (2) Explain Optical theorem.

   (3) Describe scattering by square well potential.

(b) Attempt any **two** :   2

   (1) Partial wave analysis is valid for potential.....

      (a) weak only

      (b) strong only

      (c) for both a and b

      (d) none of these

   (2) What is Ramsauer-Townsend effect ?

   (3) "Scattering by coulomb potential is exactly soluble problem" True or False?

3 (a) Attempt any **one** :   8

   (1) Explain curie point and exchange integral.

   (2) Discuss Transition Region between Domains.

   (b) Attemp any **Two** :   8

   (1) Explain Single Particle domain.

   (2) Describe Coercivity and Hysteresis

   (3) Discuss Neutorn magnetic Scattering.

   (c) Attempt any **two** :   2

   (1) What is magnon ?

   (2) What is Neel Temperature ?

   (3) What is saturation moment ?

4 (a) Attempt any **one** :   7

   (1) Discuss equation of motion with respect to nuclear magnetic moment.

   (2) Explain hyperfine splitting.

   (b) Attempt any **Two** :   8

   (1) Explain Ferromagnetic resonance.

   (2) Describe principle of MASER action.

   (3) Explain Spin wave Resonanace.

   (c) Attempt any **two** :   2

   (1) Give a full form of NMR.

   (2) What is e Knight Shift ?

   (3) What is the fundamental condition for magnetic resonance absorption ?

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MY-1245-46   Seat No. _____

M. Sc. (Sem. III) Examination

October - 2022

Physics : MSPHY-301ES & MSPHY-302ES

MSPHY-301ES : Research Methodology
MSPHY-302ES : Microcontroller

Time : **2** Hours]   [Total Marks : **35**

MSPHY-301ES : Research Methodology

Instructions : (1) Symbols have their usual meaning.
                    (2) Figures to the right side indicate marks of the question.

1   (a)   Answer the following : (any **one**)   6
            (1)   Briefly describe the different steps involved in a research process.
            (2)   Write and explain types of research in detail.

     (b)   Answer the following : (any **two**)   6
            (1)   Write a short note on science and research.
            (2)   What is citation index and discuss any one method to calculate it.
            (3)   Discuss importance of references in research.

2   (a)   Answer the following : (any **one**)   6
            (1)   Describe in brief the layout of a research report, covering all relevant points.
            (2)   Discuss the difference between field work and laboratory work.

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(b) Answer the following : (any **two**)   6

    (1) "Report writing is more an art that hings upon practice and experience". Discuss.

    (2) Write short notes on "the techniques of writing report".

    (3) Discuss briefly the precautions in presenting scientific data in research report.

3   (a) Answer the following : (any **three**)   6

    (1) What is research ?

    (2) List out computer aided tools for scientific documentation.

    (3) Define reference card.

    (4) What is difference between Project report and thesis ?

    (5) State different types of referencing formal used in research report.

   (b) Answer the following : (any **five**)   5

    (1) What is impact factor ?

    (2) What is full form of ISSN ?

    (3) What is Review Process ?

    (4) States types of Research.

    (5) Which types data are organized in Appendices ?

    (6) Write use of abbreviation in writing.

    (7) What is full form of ISBN ?

    (8) State any one website, which can be used for referencing?

Instructions : (1) Figures to the right side indicate marks of the question.

(2) Symbols used have usual meaning.

1 (a) Attempt any **one** :   **06**

(1) Differentiate microprocessor and microcontroller with block diagram.

(2) Describe 8051 flag bits and PSW register.

(b) Attempt any two :   **06**

(1) Briefly explain the structure of TCON register for 8051 microcontroller.

(2) Explain operation of stack and stack pointer.

(3) Explain IE register of 8051.

2 (a) Attempt any **one** :   **06**

(1) Describe memory organization of AVR microcontroller.

(2) Explain AVR status register.

(b) Attempt any **two** :   **06**

(1) Show the status of the C, H and Z flags after the addition of 0×38 and 0×2F in the following instructions.

(2) What are assembler directives ? List different assembler directives and explain any one with suitable example.

(3) Describe rules for labels in Assembly language.

3 (a) Attempt any **three** :   **06**

(1) Specify the size of Internal ROM and RAM in 8051.

(2) Define BAUD rate in UART. List the factors affecting Baud rate.

[Contd...

(3) List out some of the features of the 8051.

(4) Find the ROM memory address of ATtiny25 with 2KB AVR chip.

(5) Differentiate between RISC and CISC architectures.

(b) Attempt any **five** :　　　　　　　　　　05

(1) 8051 microcontrollers are manufactured by which of the following companies ?
　(a) Motorola
　(b) Philips
　(c) Intel
　(d) All of the mentionaned

(2) The 8051 contains _____ general purpose, or working, register.
　(a) 34　　　　　　　(b) 10
　(c) 52　　　　　　　(d) 25

(3) The _____ register is also used for all data transfers between the 8051 and any external memory.
　(a) A　　　　　　　(b) B
　(c) Both a and b　(d) None of these

(4) A programme that consists of 0s and 1s is called _____language.
　(a) Machine　　　　(b) Assembly
　(c) Programming　　(d) None of these

(5) AVR is a(n) _____ -bit register.

(6) Is the following instruction correct LDI R3,50?

(7) What do CISC stand for ?

(8) Name any two groups of AVR family.