CDQ-1003 Seat No. _____

M. Sc. (Sem. III) Examination

October - 2019

CHN - 601 (P) : Physical Chemistry

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

Instructions :

(1) Attempt all questions.
(2) Figures to the right indicate marks to the questions.
(3) Write answers of all the question in the same answer books.

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

(i) Explain the role of photo chemistry in isomerism with examples of substituted ethylenes.

(ii) Derive the equation of rate law of the photo chemical reaction between H_2 and Br_2.

(iii) Explain photo oxidation and photo-oxygenation.

2 (a) Give an answer : (any one) **9**

(i) Discuss the method of determination of surface area :

(a) Point B method

(b) Harkins and Jura method.

(ii) Derive BET equation for multilayer adsorption.

(b) Give an answer : (any one) 8

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

(ii) Freundlich gave the following data for the adsorption of acetic acid on blood charcoal :

Con (C)	0.0181	0.618	0.2677	0.8817	2.785
$\frac{X}{m}$	0.458	0.799	1.56	2.84	3.76

Draw the graph and obtain the constant k and n.

3 (a) Write notes on any one of the following : 9

(i) Explain various types of solid state reactions.

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

(b) Give an answer : (any one) 9

(i) Calculate the lattice energy of NaCl where $\alpha_0 = 724$ Pm exponent of repulsion term $n = 9$ and $A = 1.647$

$\gamma_0 = 3.14 \times 10^{-10}$ m, $E_0 = 8.9 \times 10^{12}$

$Z = 1.6 \times 10^{-19} \times$ atomic number of Na^+ ion.

(ii) Discuss methods of crystal growth.

4 (a) Give an answer : (any one) 9

(i) Write an application of ORD - CD.

(ii) Explain the DEPT – ^{13}C spectra in ^{13}C – H coupling.

(b) Give the answer : (any one) 8

(i) Explain : Spin - spin coupling.

(ii) Write a note on optical rotatory dispersion (ORD) and circular discronism (CD).

CDQ-1001 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

CHN-601(O) Paper - I : Organic Chemistry

Time : Hours] [Total Marks :

Instructions :

(1) All questions are compulsory.
(2) Digits to the right indicate full marks of the question.
(3) Start new question from a new page.

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

(a) What are natural pigments ? Explain its classification. How can you determine the number of double bonds and hydroxyl groups in a natural pigment ?

(b) How can you undertake biosynthetic study of cyanin ? Draw structures of 3-hydroxyflavone and flavon.

(c) What are porphyrins ? Explain one method to synthesize dipyrrylmethenes. Draw the structure of mesoporphyrin.

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

(a) Write in detail about chemistry of gibberellic acid.

(b) What class of terpenoids does squalene belongs ? Explain its synthesis from geranylacetone.

(c) Explain biosynthetic study of tetra terpenoids.

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

(a) What is vitamin B1? What are its deficiency diseases ? How will you synthesize pantothenic acid ?

(b) Draw the structure of tocol. From where would you find vitamin E ? Explain the products formed by pyrolysis and oxidation of α-tocopherol.

(c) Explain the importance of vitamin C. What is the other name of vitamin H ? What product is obtained when vitamin H is reacted $Ba(OH)_2$?

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

(a) What kind of alkaloid is reserpine ? Explain the interpretation of alkaline hydrolysis of reserpine.

(b) Draw the structure of colchicine. What is its use ? Explain its hydrolysis with dilute acid and strenuous acid.

(c) Explain the chemistry of narcotine.

CDQ-1015 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

CHN - 602 : Physical Chemistry - II

(Electrochemistry)

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

Instructions :

(1) All questions are compulsory.

(2) Figures to the right indicate maximum marks.

Constants :

$h = 6.627 \times 10^{-27}$ erg · sec.

$R = 1.987$ cal · mol^{-1} · deg^{-1}

$k = 1.38 \times 10^{-16}$ erg · mol^{-1} · deg^{-1}

$N = 6.02 \times 10^{23}$

1 (a) Answer any **one** of the following questions : **9**

(i) Define the term transference number and describe an experimental method for its determination.

(ii) Elaborate Debye - Falkenhagen effect with illustrations.

(b) Solve any **one** of the following : **9**

(i) The equivalent conductance at 18°C of KCl molal solution is 95 mho cm^2 / equ. and for infinite dilution at the same temperature 135 mho · cm^2 / equ. Calculate the degree of dissociation of KCl at this dilution.

(ii) 0.1 N solution of NaCl was found to have specific conductance of 1.75×10^{-2} $ohm^{-1} \cdot cm^{-1}$ at 18° C. The transference number of cation in this solution is 0.358. Calculate the equivalent conductance of sodium and chloride ions.

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

(i) Give brief explain of the "Ampholytes".

(ii) Discuss EMF method for determination of ionic product of water.

(iii) What is self-ionization of water ? Describe conductrometric method for determination of ionic product of water.

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

(i) Elaborate reversible oxidation and reduction process. Describe the application and factors effecting electrolytic reduction and electrolytic oxidation.

(ii) Explain hydrogen overvoltage on basics of bubble formation concept.

(iii) Discuss decomposition voltage in aqueous solutions.

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

(i) Explain quantum aspects of charge transfer reaction.

(ii) Note on : Tunneling condition and proton transfer curve.

(iii) Elaborate the mechanisms of various electro kinetic phenomena.

CDQ-1014 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

CHN - 602 (I) : Inorganic Chemistry

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

Instructions :

(i) All questions carry equal marks.

(ii) Draw labelled diagram wherever necessary.

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

(a) Briefly discuss the biochemistry of Iron and Discuss the structure and importance of 'Iron-Sulphur protein'.

(b) Write a note Ferredoxin, Haemoglobin and Myoglobin.

(c) Discuss the role of Cytochrom-C in the reduction of O_2.

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

(1) Write a note on 'Zinc Metal Enzymes'.

(2) Discuss the biochemistry of Nickel and Tungsten.

(3) Discuss importance of 'Cu' in biological system.

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

(1) Explain Oxidative Addition with suitable illustrations.

(2) Describe the method to convert synthesis gas into gasoline.

(3) Describe the use of organometallic compounds in Hydroformylation and catalytic cycle.

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

(1) Write a note on magnetic and spectral properties of Lanthanides, Give example of organometallic compound of Lanthanide.

(2) Give brief account of coordination numbers and stereochemistry of trans uranic elements.

(3) Discuss the electronic configuration of trans uranic elements., Write two examples of alkyls of Actinides.

CDQ-1013 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Paper-II : Organic Chemistry : CHN - 602 (O)

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

1 Answer any two : 18

(1) Explain the role of "Research and Development" in the chemical industries.

(2) Write note on importance of Patent in industries.

(3) Define unit process and unit operation. Discuss the industrial importance of Halogenation or Nitration.

2 Answer any two : 17

(1) Give synthesis and importance of Vanila and Monosodium glutamate (MSG)

(2) Discuss the manufacture of Fatty acids and Fatty alcohols.

(3) Give types of detergents. Discuss synthesis and uses of alkyl aryl sulphonate and alkyl - sulphonates.

3 Answer any two : 18

(1) Write a note on Fungicides and Weedicides.

(2) Discuss the hydrogenation of Vegetable oil and its importances.

(3) Give an account on plant nutrients and plant hormones.

4 Answer any two : 17

(1) Give synthesis and uses of cimetidine and piperizine citrate.

(2) What is Pulp ? Explain the manufacture of Pulp by Kraft process.

(3) Discuss the process of manufacturing ethanol from sugar industries.

CDQ-1027 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Physical Chemistry : CHN - 603 (P)

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

1 (a) Give the answers : (any one) **9**

(1) Explain :

(a) Polydispersity index

(b) Degree of polymers.

(2) Explain the optical and geometric isomerism in polymers.

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

(1) A polymer sample is prepared by mixing two components of the number of atom ratio is 0.3 : 0.7. M.W. of these components are 2.5×10^3 and 5.0×10^4 respectively. Calculate the PDI.

(2) Calculate the PDI of polybutadiene sample :

(a) 100 units have M.W. = 50,000

(b) 200 units have M.W. = 70,000

(c) 400 units have M.W. = 1,00,000

2 Give the answer : (any two) 17

(1) Explain the mechanism of cationic polymerisation.

(2) Explain the mechanism of Ziegler - Nattle catalyst.

(3) Explain the kinetics of free - radical co-polymerisation.

3 Give the answers : (any two) 18

(1) Explain the relation between :

(a) T_m and T_g (b) T_g and M.W.

(2) Derive WLF equation.

(3) Define the T_g for states of phase.

4 Give the answers : (any two) 17

(1) Explain the mechanism of cyclisation in natural rubber.

(2) What is crystallisability ? Explain factors affecting on crystallisability.

(3) Explain the oxidative degradation of Phenol - Formaldehyde resin.

CDQ-1025-1026-1066 Seat No. _____

M. Sc. (Sem. III) Examination

October – 2019

(1) Inorganic Chemistry : CHN - 603 (I)

(Coordination Chemistry)

(2) Inorganic : CHN - 603

(Corrosion)

(3) CHN - 603 (I) Inorganic Chemistry : Paper - III

(Coordination Chemistry)

Time : **2.30** Hours] [Total Marks : **70**

(1) Inorganic Chemistry : CHN - 603 (I)

(Coordination Chemistry)

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

(1) Discuss the splitting of d-orbitals in Tetrahedral and Square planar Coordination compounds.

(2) Starting from the Secular determinant prove that the values of energy for E_g and T_{2g} are +6 Dq and –4 Dq respectively.

(3) Explain Theoretical principles and applications of CFT.

2 Answer any two of the following questions : 17

(1) Write a short note on R-S Coupling.

(2) Discuss the derivation and uses of the equation

$$X(\alpha) = \frac{\sin(1 + 1/2)\,\alpha}{\sin \alpha/2}$$

(3) Discuss the step up and step down operators.

3 Answer any two of the following questions : 18

(1) Prove that $< 3, -2 > = \Phi_{-2}\,\Phi_0$.

(2) Discuss the calculation of energy of the term $^2A_{2g}$ and $^3T_{1g}$ derived from $^3F(d^2)$ in strong octahedral field.

(3) Explain the Descending Symmetry method for the determination of Multiplicities.

4 Answer any two of the following questions : 17

(1) Discuss the Vibronic coupling spectra of Ti(III), Co (III) Complexes.

(2) Explain "Jahn -Teller Theorem".

(3) Discuss the Selection Rules for Electronic Spectra.

(2) Inorganic : CHN - 603
(Corrosion)

1 Answer any two : **18**

(1) Write short note on differential aerration current.

(2) Discuss the factors that encourage the intergranular corrosion and write the step to decrease this corrosion.

(3) What is Pourbex diagrams ? Explain their utility and limitations.

2 Answer any two : **17**

(1) Discuss the corrosion of nickel in atmosphere.

(2) What is polarized cell ? Discuss the influence of polarization on the corrosion rate in the acidic solution with example.

(3) What is application of passivators.

3 Answer any two : **18**

(1) Explain Wagner theory of oxidation.

(2) Write a short note on underground corrosion and its prevention.

(3) Write short note on "Corrosion fatigue".

4 Answer any two of the following : 17

(1) Explain sheradizing process.

(2) Write a short note on Hydrogen cracking.

(3) Discuss the factors affacting on the corrosion and its prevention.

(3) CHN - 603 (I) Inorganic Chemistry : Paper - III

(Coordination Chemistry)

Instruction : Attempt all questions.

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

(a) Discuss the theoretical principles of CFT.

(b) Evaluate the integral $\int_0^{\pi} \theta_2^1 \theta_4^0 \theta_2^1 \sin\theta d\theta$.

Given :

$$\theta_2^1 = \sqrt{\frac{15}{4}} \sin\theta \cos\theta, \quad \theta_4^0 = \sqrt{\frac{9}{128}} (35\cos^4\theta - 30\cos^2\theta + 3)$$

(c) Discuss crystal field splitting diagram for square planar system.

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

(a) Discuss about step up and step down operators of angular momentum.

(b) Derive the equation $\chi(\alpha) = \dfrac{\sin\left(l + \dfrac{1}{2}\right)\alpha}{\sin\dfrac{\alpha}{2}}$.

(c) Discuss, in short, JJ and RS coupling.

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

(a) For $E = -6$ Dq, prove that

$$\Psi_1 = \frac{1}{\sqrt{24}} \left[\sqrt{15} \langle +3 \rangle - 3 \langle -1 \rangle \right].$$

(b) Prove that $<\pm 3> |V_o| <\pm 3> = -3$ Dq.

(c) Prove that wave function,

$$\Psi_6 = \sqrt{\frac{1}{2}} [< 2 > + < -2 >] \text{ for } E = 12 \text{ Dq}.$$

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

(a) Explain vibronic coupling spectra for Ti(III) metal complexes.

(b) Explain the 'selection rule'.

(c) Discuss the Jahn - Teller theorem.

CDQ-1024 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Organic Chemistry : CHN - 603 (O)

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

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

(1) What is QSAR ? Explain approaches of the drug design.

(2) Write a note on diagnostic agents. Explain use of radioactive isotopes as a diagnostic agent.

(3) Write definition examples and uses of vehicles, suspending agents, surfactants and emulsifying agents.

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

(1) Explain the constitution and synthesis of chloramphenicol.

(2) Explain the constitution of penicillin by the use of infrared spectra. Give synthesis of 6-Aminopenicillanic acid.

(3) What is the general structure of Actinomycin ? Give detailed account of it.

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

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

(2) Give the synthesis and uses of sulphathiadiazole and sulphafurazole.

(3) Give the synthesis and uses of sulphaguanidine and sulphathiazole.

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

(1) What is local anesthetics ? Give an account on local anesthetics having amide group.

(2) Give an account on cholinergic drugs. Explain synthesis and uses of any two cholinergic drugs.

(3) Give an account on Histamine drugs and synthesis of mepyramine and chlorphenyramine.

CDQ-1042 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Chemistry : CHN - 604(E)

(Bioorganic Chemistry)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **50**

1 (a) Answer any **two** : **14**

(1) Discuss some typical enzyme for chymotrypsin, ribonuclease, lysozyme and carboxypeptidase-A.

(2) Mechanism of transition state theory for enzyme action.

(3) Discuss the Displacement reactions and the coupling of ATP cleavage to endergonic processes.

(b) Answer any **one** : **6**

(1) Discuss enzyme catalyzed carboxylation and decarboxylation.

(2) Discuss the classification, Extraction and Purification method of enzymes.

2 (a) Answer any **two** : 14

(1) Discuss clinical uses of enzyme and enzyme therapy.

(2) Applications of immobilized enzymes, uses of enzymes in food and drink industries-brewing and cheese making and starch corn syrup.

(3) Discuss Vitamin B_{12} and mechanism of reaction catalyzed by coenzyme.

(b) Answer any **one** : 6

(1) Discuss the mechanism of enzyme as targets for drug design and its clinical use.

(2) Discuss the large scale productions and purifications process of enzymes.

3 Answer any **five** : 10

(1) Define enzymes and coenzymes.

(2) What is the coupling of ATP cleavage ?

(3) Applications of immobilized enzymes.

(4) Write a note on ribonuclease.

(5) Explain effect of immobilization on enzyme activity.

(6) Define specificity and regulations.

(7) Define Prosthetic groups and apoenzymes.

CDQ-1037 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Inorganic Chemistry : CHN - 604(B)

(Photoinorganic Chemistry)

Time : 2 Hours] [Total Marks : 50

Instruction : Attempt all questions.

1 Answer any **two** questions from the following : **20**

(i) Explain energy dissipation by radiative process.

(ii) Discuss Franck-Condon principle in photochemistry.

(iii) Explain the photochemical kinetics in photochemical reactions.

2 Answer any **two** questions from the following : **20**

(i) Compare the exited states of metal complexes with organic compounds.

(ii) Differentiate energy transfer under conditions of weak interaction and strong interaction in redox reactions.

(iii) Discuss the reducing and oxidising character of Ruthenium^{2+} complex.

3 Answer the following questions in short : 10

(i) What are 'lability and selectivity' in ligand field photochemistry ?

(ii) What are metal complex sensitizers ?

(iii) Write is water photolysis ?

(iv) What is quantum yield ?

(v) What is biomolecular deactivation ?

CDQ-1039 Seat No. _____

M. Sc. (Sem. III) Examination

October - 2019

Chemistry : CHN-604(RM)

(Research Methodology)

Time : 2 Hours] [Total Marks : 50

1 Answer any **two** of the following questions : 20

(1) Define research and explain the characteristics of scientific research.

(2) Explain the importance of selection of research problem.

(3) Discuss the merits and demerits of observation method.

(4) What are the current challenges and opportunities for the researchers in India ?

2 Answer any **four** of the following questions : 20

(1) Differentiate between primary and secondary data.

(2) Describe various concepts for designing good research.

(3) What is research report ? Describe the steps in writing the research report.

(4) Compare the scenario of research in India versus world.

(5) Elaborate the process of research work.

(6) Describe the various probability sample methods with examples.

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

(1) Write about research activity of institute of plasma research briefly.

(2) What is the role of the research funding agencies in India ?

(3) Which are main funding agencies in India ?

(4) What are the criteria of a good sample ?

(5) Explain conceptualization in research survey of literature.

(6) What is null hypothesis ?

(7) Explain the importance and limitations of impact factor and h-index.

(8) Give the difference between Descriptive and Analytical research.

(9) What do you mean by fundamental research.

(10) Write the name of two reputed research journals of the world.

(11) What is the need of interdisciplinary research ?

(12) List the sophisticated instruments used in laboratory for chemical research ?

CDQ-1041 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

CHN - 604(C) : Biophysical Chemistry

(Elective)

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

Instructions :

(1) This question paper carries four questions.

(2) Figures to the right indicate full marks of the questions.

1 Answer any **three** : **15**

(1) Discuss role of DNA and RNA in living system.

(2) Explain membrane potential.

(3) Describe structures of polypeptide and protein.

(4) Discuss standerd free energy change in bio-chemical reactions.

(5) Give introduction to protein folding problem.

2 Answer any **three** : **15**

(1) Discuss forces involved in bio-polymer intereaction.

(2) Explain muscular contraction and energy generation in mechanochemical system.

(3) Discuss thermodynamics of bio-polymer solutions.

(4) Describe ion transport through cell membrane.

(5) Write a note on hydrophobic forces.

3 Answer any **two** : 12

(1) Write a note on low angle x-ray scattering.

(2) Discuss diffusion method for bio-polymers.

(3) Explain synthesis of ATP from ADP.

(4) Write short note on nerve conduction.

4 Answer any **eight** : 8

(1) What is an enzyme ?

(2) Define exergonic and endergonic.

(3) What is macromolecule ?

(4) What is osmotic pressure ?

(5) What is electrophoresis ?

(6) What is standard free energy change ?

(7) What is sedimentation velocity ?

(8) Explain chemical bonding in polymers.

(9) Define dispersion force.

(10) What is bio polymer ?

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CDQ-1040 Seat No._____

M. Sc. (Chemistry) (Sem. III) Examination

October - 2019

CHN - 604 : Organic Photochemistry (Elective) (New Course)

Time : 2 Hours] [Total Marks : 50

1 Answer any three : 20

(1) Explain geometrical isomerism with example.

(2) Write a short note on rearrangement of 1, 4-diene.

(3) Explain the behaviour of matter with electromagnetic radiation.

(4) Discuss the mechanism of transfer of excitation energy.

(5) Write a note on Photo chemical reaction.

2 Answer any three : 20

(1) Discuss mechanism of substitution reaction of aromatic compounds.

(2) Explain the intramolecular reaction of cyclohexadienones.

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

(4) Write a note on smog formation.

(5) Discuss the d-π methane rearrangement.

3 Answer the following in short : **10**

(i) What is dimerization ?

(ii) Define Quantum yield.

(iii) Give the difference between Intramolecular and Intermolecular reactions.

(iv) Give suitable example of photo degradation of polymers.

(v) Give types of excitation in organic molecules.

(vi) What is nitrogen fixation ?

(vii) Give two reactions of Cope rearrangement.

(viii) What is phosphorescene ?

(ix) Write addition reaction of aromatic compounds.

(x) Explain photodissociation.

CDQ-1040 Seat No.

M. Sc. (Chemistry) (Sem. III) Examination

October - 2019

CHN - 604 : Organic Photochemistry (Elective) (New Course)

Time : 2 Hours] [Total Marks : 50

1 Answer any three : 20

(1) Explain geometrical isomerism with example.

(2) Write a short note on rearrangement of 1, 4-diene.

(3) Explain the behaviour of matter with electromagnetic radiation.

(4) Discuss the mechanism of transfer of excitation energy.

(5) Write a note on Photo chemical reaction.

2 Answer any three : 20

(1) Discuss mechanism of substitution reaction of aromatic compounds.

(2) Explain the intramolecular reaction of cyclohexadienones.

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

(4) Write a note on smog formation.

(5) Discuss the d-π methane rearrangement.

3 Answer the following in short : **10**

(i) What is dimerization ?

(ii) Define Quantum yield.

(iii) Give the difference between Intramolecular and Intermolecular reactions.

(iv) Give suitable example of photo degradation of polymers.

(v) Give types of excitation in organic molecules.

(vi) What is nitrogen fixation ?

(vii) Give two reactions of Cope rearrangement.

(viii) What is phosphorescene ?

(ix) Write addition reaction of aromatic compounds.

(x) Explain photodissociation.

CDQ-1038 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Chemistry : CH-503

(Environmental Chemistry)

Time : $2\frac{1}{2}$ Hours] [Total Marks : **50**

Instruction : All questions are compulsory and carry equal marks.

1 (a) Explain the condition of current Earth Atmosphere with respect to pollution. **10**

(b) Explain the generalized solar energy budget of the earth.

OR

What is environment ? Explain various components of physical environment with their significance.

2 Define water pollution. Explain the important water quality parameters and their standards for drinking purpose. **10**

OR

(a) Explain BOD and its significance.

(b) Describe the effects of chemical fertilizers on the soil quality.

3 (a) Explain the mechanism of air quality monitoring giving standards. 10

(b) Explain the ozone cycle.

OR

(a) Explain formation of photo-chemical smog.

(b) Explain the formation and deposition of acid rain.

4 Write an explanatory note on thermal pollution and its impacts on environment. 10

OR

(a) Explain : Bio-degradation and Bio-remediation.

(b) Explain the benefits of waste water treatment.

5 Write a short note on any **two** : 10

(1) Cleaner Production in Industries

(2) Waste management

(3) Effects of NOx on environment

(4) Bio-pestisides

CDQ-1004 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Botany : CBO - 501

(Plant Physiology)

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

Instructions :

(1) There are two sections in this question paper, both are compulsory and carry equal marks.
(2) Write answers of section-I and section-II in separate answer books.
(3) Figures to the right indicate marks of sub-questions.

SECTION - I

1 Discuss in detail : (any **two**) **14**

(1) Influence of hormones and environmental factors on senescence.
(2) Causes of seed dormancy.
(3) Imbibition and Growth phases associated with germination of seed.

2 Discuss in detail : (any **three**) **14**

(1) Hypersensitive response. **5**
(2) Stress and stressful environments. **5**
(3) Mechanism of acquisition and transport of phosphorous of Potassium in plants. **5**
(4) Salt stress. **4**
(5) Oxidative stress. **4**

3 Explain in short : (any **four**) 7

(1) Role of potassium in plant life. 2

(2) Active transport. 2

(3) Hormone responsible for delaying abscission of leaves. 1

(4) The form of iron usually taken up by the plants from the soil. 1

(5) Secondary dormancy. 2

(6) Reactive oxygen species. 2

SECTION - II

4 Discuss in detail : (any **two**) 14

(1) Phosphorylation and mechanism of electron transport in chloroplasts.

(2) Photochemical and biochemical properties of Phytochromes.

(3) CAM cycle and its ecological significance.

5 Discuss in detail : (any **three**) 14

(1) Photoperiodism. 5

(2) Physiological effects of Indole acetic acid on plants. 5

(3) Role of light in floral induction. 5

(4) Inclusion of ethylene as a Plant hormone. 4

(5) Polyamines. 4

6 Explain in short : (any **four**) 7

(1) Oxidative phosphorylation and its location. 2

(2) Give the name of enzymes used in the process of Gluconeogenesis other than Glycolysis. 2

(3) Vernalisation. 1

(4) Cytokinins and Abscisic acid. 2

(5) Importance of PPP in plants. 2

(6) Write full name of IBA. 1

CDQ-1043 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Botany : EBO - 501

(Biofertilizer Technology)

(Elective)

Time : 2 Hours] [Total Marks : 50

Instructions :

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

(2) All questions are compulsory and internal choice is provided.

(3) Write each section in separate answer sheet.

(4) Illustrate your answers with necessary diagrams.

SECTION – I

1 Answer the following :

(a) Answer any **two** out of three : **10**

(1) Explain the importance of Biofertilizer in the agriculture.

(2) Describe the biochemistry of the symbiosis.

(3) Write note on Nitrogenase enzyme and their regulation.

(b) Answer any **two** out of four : 6

(1) Characteristics of phosphate solubilizing microorganisms.

(2) Molecular genetics of symbiosis.

(3) Describe hydrogenase enzymes.

(4) Write note on Mycorrhizae as Biofertilizer.

(c) Answer any **two** out of four : 4

(1) Definition and types of Biofertilizer.

(2) Role of hydrogenase enzyme.

(3) Write note on types of symbiosis.

(4) Explain the role of azolla in Biofertilizer.

2 Answer the following **five** out of seven : 5

(1) What is Biofertilizer ?

(2) Define : Symbiosis.

(3) Give two name of nitrogen fixing bacteria.

(4) Write two importance of Azo-spirillum.

(5) Define : Mycorrhizae.

(6) Name two cynobacteria used as Biofertilizer.

(7) Write any two role of Nitrogenase enzyme.

SECTION - II

1 Answer the following :

(a) Answer any **two** out of three : **10**

(1) Write note on marketing Biofertilizer.

(2) Explain the technology Biofertilizer production through fermentation.

(3) Describe application of Biofertilizer in field and tree crop.

(b) Answer any **two** out of four : **6**

(1) Describe : Extension strategies.

(2) Write note on application in nursery plant.

(3) Explain the technology for quality control.

(4) Describe the strain, selection and sterilization.

(c) Answer any **two** out of four : **4**

(1) Describe application technology for seed and seedlings.

(2) Write note on diagnosis for the effectiveness of inoculation.

(3) Explain the mass production of Biofertilizer.

(4) Describe various improvements in distribution system.

2 Answer the following **five** out of seven : 5

(1) Define : fermentation

(2) Mention two criteria for strain selection.

(3) Name two methods for sterilization.

(4) Name two improvement commercial products for crop improvement.

(5) Write name of two distribution system.

(6) Write two applications for Seed Company.

(7) Role in seedling development.

CDQ-1016 Seat No._____

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

October - 2019

Botany : CBO - 502

(Plant Resource Utilization Conservation & Biometry)

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

SECTION - I

1 Answer the following : (two out of three) **7+7=14**

(1) Give general account of Adulteration in plant products.

(2) Origin, evolution, botany, cultivation and uses of Groundnut.

(3) Describe : Textile fibres.

2 Answer the following : (three out of five) **5+5+4=14**

(1) Atropa belladona as medicinal plant.

(2) Explain dyes yielding plant : Butea monosperma.

(3) Chemical composition and uses of Rubber.

(4) Acacia nilotica as timber plant.

(5) Plantation and production of Rubber.

3 Answer the following : (four out of six) **2+2+2+1=7**

(1) Give chemical constituents in saffron.

(2) Give uses of Gram.

(3) Give importance of Turmeric.

(4) Give two plant names used as firewood.

(5) Give two plant name which produce rubber.

(6) Medicinal uses of Rauvolffia serpentine.

SECTION - II

1 Answer the following : (two out of three) **7+7=14**

(1) Protected areas in India : National Parks. Describe.

(2) Explain : NBPGR.

(3) Strategies of Ex-situ conservation.

2 Answer the following : (three out of five) **5+5+4=14**

(1) Homogeneity Chi-square.

(2) Analysis of variance.

(3) Regression.

(4) Mann Whitney (U) test.

(5) Probability distribution.

3 Answer the following : (four out of six) **2+2+2+1=7**

(1) What is coral reef ?

(2) Give definition of Mangroves and mention two importance of Mangroves.

(3) Role of Department of Biotechnology.

(4) What is in-situ conservation ?

(5) What is binomial distribution ?

(6) How many are types of correlation ? Explain.

CDQ-1028 Seat No. _____

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

October - 2019

Botany : CBO - 503

(Molecular Biology & Biotechnology)

Time : $2\frac{1}{2}$ 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.

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

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

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

SECTION - I

1 Answer the following questions 14

(two out of three) each of 07 marks :

(1) Explain the enzymes involved in DNA replication.

(2) Describe the alternate forms of DNA.

(3) Describe the gene expression in prokaryotes.

2 Answer the following questions (three out of five) 14

each of 05, 05 and 04 marks :

(1) Describe the transcription in prokaryotes.

(2) Write a short note on : tumor inducing viruses.

(3) Point out the properties of genetic code.

(4) Explain : proto-oncogenes

(5) Explain : overlapping genes.

3 Answer the following questions (four out of six) 7

each 02, 02, 02 and 01 marks :

(1) What do you mean by termination codon ? (2)

(2) Explain in very short : new genetic code. (2)

(3) Define : DNA transcription. (1)

(4) Explain the word : allellomorphism. (2)

(5) Explain : muton.(2)

(6) Mention the full form of CDKs. (1)

SECTION - II

4 Answer the following questions (two out of three) **14**

each of 07 marks :

(1) Describe : DNA sequencing.

(2) Mention the principles of gene cloning.

(3) Write a short note on : DNA fingerprinting.

5 Answer the following questions (three out of five) 14

each of 05, 05 and 04 marks :

(1) Write a short note on : germ plasm storage.

(2) Describe : cryopreservation.

(3) Discuss in brief : Production of secondary metabolites.

(4) Discuss in brief : pollen culture.

(5) Explain : partical gun.

6 Answer the following questions (four out of six) 7

each 02, 02, 02 and 01 marks :

(1) Define : Recombination of DNA. (2)

(2) Mention any two names of vectors used in biotechnology. (2)

(3) State the one name of restriction enzymes. (1)

(4) Explain the word: artificial seeds. (2)

(5) Mention any two applications of somaclones. (2)

(6) Discuss in very short : secondary metabolites. (2)

CDQ-1045

CDQ-1045 Seat No._____

M. Sc. (Sem. III) Examination

October - 2019

Botany : EBO - 503

(Research Methodology & Scientific Presentation)

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

Instructions :

(i) The question paper consists of two sections, each with two questions.

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

(iii) All questions are compulsory, however internal choice is provided.

(iv) In each section first question is of 20 marks and last one of question of 5 marks.

SECTION - I

1 (a) Describe in detail : (any **two**) **10**

(1) Characteristics of academic research.

(2) True experimental research.

(3) Characteristics of scientific research.

(b) Explain : (any **two**) **6**

(1) Distinguish: Basic and Applied research.

(2) Various steps in research procedure.

(3) Quasi-experimental research.

(4) Pre-experimental design.

(c) Write in brief : (any **two**) 4

(1) Role of review of literature in research.

(2) Criteria for scientific research.

(3) Private research.

(4) The static group comparison study.

2 Give answers in brief : (any **four**) 5

(1) Define : 'Research'.

(2) One-shot case study ?

(3) Explain role of 'Hypothesis' in research.

(4) Role of selection of research problem.

(5) What is pretest posttest non-equivalent group.

(6) Explain : Pretest posttest equivalent group study.

(7) Major points to be written in 'Abstract' of research paper.

SECTION - II

3 (a) Describe in detail : (any **two**) 10

(1) Various methods for data collection in research.

(2) Methods for data analysis in research.

(3) Prepare a project proposal for scientific topic.

(b) Explain : (any **two**) 6

(1) Major steps of a manuscript of research paper.

(2) Presentation and delivery of scientific research.

(3) Give two examples for reference citing in the thesis.

(4) Distinguish between : Research paper and Review paper.

(c) Write in brief : (any **two**) 4

(1) Major points in acknowledgement of Ph.D. Thesis.

(2) Focus on major points during reviewing a research paper.

(3) Criteria for book review.

(4) Prepare a brief report of national seminar organized by your institute.

4 Give answers in brief : (any **four**) 5

(1) Explain types of data.

(2) Write the acknowledgement of your research paper.

(3) Name the funding agencies for conducting research project.

(4) Conclusion of your research paper.

(5) Write in reference section: A chapter published in proceedings.

(6) Abbreviations used in the thesis with full name.

(7) Approximate duration of oral presentation in conference/seminar.

CEQ-7404

Seat No._____

M. Sc. (Sem. III) Examination

November - 2019

Botany : CBO - 504

(Plant Breeding & Horticulture)

Time : $2\frac{1}{2}$ 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 carries 7 marks.

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

(4) Write answer 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 7 marks. 14

(1) Describe : Cross pollination in crop improvement.

(2) Comparison between pedigree and bulk selection method.

(3) Describe on objective of plant breeding.

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

(1) Describe in short; concepts and benefits of IPR.

(2) Describe : Plant breeders rights.

(3) Write short note : Seed certificate.

(4) Give the advantages of genetically modified crops.

(5) Write short note : GATT.

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

(1) What is self pollinated crops? 2

(2) Explain the word: Hybrid vigour. 2

(3) Write the full form of TRIPs. 1

(4) Define : Emasculation. 2

(5) What is biosafetye ? 2

(6) Mention the full form of WIPO. 1

SECTION - II

4 Answer the following : (**two** out of three) each of 7 marks. **14**

(1) Describe : Seed dormancy.

(2) Write note on : Grafting.

(3) Describe the anatomical aspect of layering.

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

(1) Write the principle of landscape gardening.

(2) Explain : Advantages of green house.

(3) Write short note : Indoor gardening.

(4) Describe in short : Organic farming.

(5) Write in short : Gardens of India.

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

(1) Write the types of budding (any two). **2**

(2) Define : Mulching. **2**

(3) What is root cutting ? **1**

(4) Define : Vegetative propagation. **2**

(5) Write the names of hormones used for the breaking of seed dormancy. **2**

(6) Define : Floriculture. **1**