GDF-2641

Seat No._____

M. Sc. (Part - I) (Sem. I) Examination

January – 2016

Botany - EBO-502

(Air Pollution & Climate Change)

Time : Hours] [Total Marks : 50

Instructions : (1) The question paper consist of two sections.

(2) Each section carries 25 marks and having two questions.

(3) All questions are compulsory.

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

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

SECTION - I

1 Answer the following :

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

(i) Greenhouse gases.

(ii) Effects of sulphur on plants.

(iii) Metabolism of Nitrogen.

(b) Discuss : (any two) 6

(i) Sources of Fluoride.

(ii) Effect of nitrogen on plants.

(iii) Sulphur metabolism.

(iv) Gseous and suspended particulate pollutants.

(c) Answer in short : (any two) 4

(i) Sources of Sulphur.

(ii) Climate change.

(iii) Draw Nitrogen cycle.

(iv) Effect of fluoride on human health.

2 (a) Answer the following : (any five)

(i) Define : Pollution.

(ii) Name sulphur compounds.

(iii) Name the sources of Nitrogen compounds in nature.

(iv) What is Bioaccumulation ?

(v) Write two effects of fluoride on plants.

(vi) What is climate change ?

(vii) Define Ecosystem.

SECTION - II

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

(i) Mechanism of Toxicity by Oxidants.

(ii) Effect on plants by acid rain.

(iii) Effect of increased CO_2 in plants.

(b) Discuss : (any two) 6

(i) Ozone depletion.

(ii) Biological action spectrum.

(iii) Global warming.

(iv) Acid rain consequences on soil fertility.

(c) Answer in short : (any two) 4

(i) Sources of oxidants.

(ii) UV radiation.

(iii) Sea level rise.

(iv) Formation of Acid rain

4 Answer the following : (any five) 5

(i) What are Oxidants ?

(ii) What is photochemical smog ?

(iii) Name the gas which is made by three molecules of Oxygen.

(iv) What is Albedo ?

(v) Write any two effects of global warming in India.

(vi) What is Acid rain ?

(vii) Name two major gaseous pollutants causing Acid rain.

GDE-1767 Seat No._____

M. Sc. (Sem. I) Examination

January - 2016

CHN-403(P) : Physical Chemistry Paper - III

Time : 3 Hours] [Total Marks : 70

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

1 (a) Write any 02 of the following. 2×5=10

(1) Derive an equation for total energy for a particle in one dimensional box.

(2) Define operator, rules for setting up quantum mechanical operator and derive momentum operator.

(3) Prove that for any trial function ψ, the expected value of energy ($\bar{E}$) is greater than true value (E_0), which is the lowest energy eigen value of the Hamiltonian of the system in variation method.

(4) Derive perturbation equations to calculate correction terms for eigen values and eigen functions for the unperturbed system.

(b) Attempt any one of the following. 1×4=4

(1) Draw the list of first four eigen functions along with eigen values for a particle in a one-dimensional box whose length L and origin($x = 0$) of the coordinates system is in the middle.

(2) Write a note on variation theorem.

GDE-1767 Seat No._____

M. Sc. (Sem. I) Examination

January – 2016

CHN-403(P) : Physical Chemistry Paper - III

Time : 3 Hours] [Total Marks : 70

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(2) All questions carry equal marks.

1 (a) Write any 02 of the following. 2×5=10

(1) Derive an equation for total energy for a particle in one dimensional box.

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(1) Draw the list of first four eigen functions along with eigen values for a particle in a one-dimensional box whose length L and origin($x = 0$) of the coordinates system is in the middle.

(2) Write a note on variation theorem.

2 (a) Answer any two of the following. 2×5=10

(1) Determine all the values of m_j and assign them to the various value of j for a p-electron.

(2) Discuss classical and quantum mechanical concept of angular momentum.

(3) Write a note on Huckel theory of conjugated systems.

(4) Discuss Pauli's exclusion principle and Antisymmetry in quantum mechanics.

(b) Attempt any one of the following. 1×4=4

(1) L_x, L_y and L_z can be specified simultaneously considering them as commutators.

(2) Find the nature of eigen values and eigen functions by the effect of ladder up operator.

3 (a) Do any two the following. 2×5=10

(1) Define partial molar properties and determine the partial molar properties of a binary mixture using apparent molar concept.

(2) Derive a relation of showing effect of ionic strength on activity coefficient using Debye Huckel's limiting law for concentrated solutions.

(3) Explain third law of thermodynamics as law of unattainability and determine the total entropy of liquids.

(4) Define phase rule and descuss its application to three component system.

(b) Attempt any one of the followings. 1×4=4

(1) For a rection

$$H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$$

The values of absolute entropies of H_2, Cl_2 and HCl are 130.60, 222.80 and 188.00 JK^{-1} respectively, and bond energies of H-H, Cl-Cl, H-Cl are 430, 240 and 400 KJ respectively. Calculate the change in entropy, heat content and free energy for above reaction at 298K.

(2) Write a note on partial molar enthalpy.

4 (a) Answer any two of the followings. 2×5=10

(1) Define partition function and explain thermodynamic probability.

(2) Derive equation for Electronic partition function.

(3) Prove that for any chemical reaction in biological system

$$d_i S/dt = \sum J_K X_K$$

where J_k is generalised fluxes and X_k is generalised forces.

(4) Define phenomenological laws. Derive an equation considering gradient of temperature and gradient of chemical potential as force for phenomenological laws.

(b) Do any one of the followings. 1×4=4

(1) Derive an equation for internal energy in terms partition function.

(2) Calculate the translation energy of $H_2(1,1,2)$ for an oxygen molecule in a container of side a = 0.1 m. Express the results in S. I. units.

5 Attempt any 07 from the following. 2×7=14

(1) Laplacian operator

(2) R-S coupling

(3) Generalised angular momentum

(4) Grand canonical ensamble

(5) Irreversible thermodynamics

(6) Second law of thermodynamics

(7) Phase point

(8) Significance of Fugacity

(9) Define a harmonic oscillator

(10) Degree of freedom in phase rule.

GDE-1778

Seat No._____

M. Sc. (Sem. I) (Part-I) Examination

January - 2016

Biodiversity : EBO-401

(Botany) (ES)

Time : 2 Hours] [Total Marks : 50

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 in right side indicate marks of sub-question.

SECTION - I

1 Answer the following : 20

(a) Describe any two : 10

(i) Factors affecting in loss of biodiversity.

(ii) Aesthetic values.

(iii) Species Diversity.

(b) Write short notes : (any two) 6

(i) Loss of Ecosystem Diversity.

(ii) Significance of Biodiversity.

(iii) Uses of plants as Rattans and Canes.

(iv) Process of extinction of species.

(c) Answer any two : 4

(i) List the commercially important ornamental plants.

(ii) Loss of genetic diversity.

(iii) Uses of plants as food. Give the names of the plants.
(iv) What is Ethical values of biodiversity ?

2 Answer the following (any five) : 5
(i) Definition : Biodiversity.
(ii) Definition : Ecosystem diversity.
(iii) WHO has listed over _____ plant species world wide which are reportedly of medicinal value.
(iv) Species diversity is high in Gujarat as seen in th documented _____ species of plants.
(v) Give the name of the plants used as fodder.
(vi) What is Biodiversity values ?
(vii) Give the name of the types of biodiversity.

SECTION - II

3 Answer the following : 20
(a) Describe any two : 10
(i) Role of educational institute in biodiversity conservation.
(ii) Biodiversity laws.
(iii) Role of biotechnology in biodiversity conservation.
(b) Write short note : (any two) 6
(i) WWF
(ii) Biodiversity convention
(iii) Chipko Movement
(iv) UNESCO
(c) Answer any two :
(i) Why conservation of biodiversity ?
(ii) List the current practice in conservation in India.
(iii) Why social approaches need in conservation of biodiversity.
(iv) What is IPR ?

4 Answer the following (any five) : 5

(i) Definition : In situ consrvation.

(ii) Definition : Ex-situ conservation.

(iii) Give the full name of IUCN

(iv) Give the full name of GEF.

(v) Give the example of Insitu conservation.

(vi) Give the example of ex-situ conservation.

(vii) Give the full name of ICSU.

GDE-1768

Seat No._____

M. Sc. (Sem. I) Examination

January – 2016

Botany : CBO-403

(Cell Biology & Genetics)

Time : 3 Hours] [Total Marks : 70

Instructions : (1) There are total six(6) questions in this qustion paper. All questions are compulsory.

(2) First two questions in each section carry 14 marks each, while the last one carry 7 marks.

(3) Figures to the right indicate marks of questions and in parentheses of sub-questions.

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

SECTION - I

1 Describe or Discuss in detail (Any two): 14

(1) Structure and functions : Nuclear membrane.

(2) Structure, composition and functions : Lysosome.

(3) Structure and composition : Polytene chromosome.

2 Write short notes on (Any Three) : 14

(1) Significance of male sterility 5

(2) Peroxisome 5

(3) Pleotropy 5

(4) Extra chromosomal inheritance 4

(5) Non chromosomal genes in *Chlamydomonas* 4

3 Give answer in brief (Any four): 0

(1) Functions : Golgi body

(2) Explain : Complementary genes 1

(3) Functions : Cell wall 1

(4) Chemical composition of cell wall in plants 2

(5) Explain: Hypostasis and Epistasis 2

(6) Structure of *petite* in yeast. 2

SECTION - II

4 Describe or Discuss in detail(Any two): 14

(1) Physical characters

(2) Analysis of quantitative characters

(3) Genetic mapping

5 Write short notes on (Any Three): 14

(1) Factors affecting gene frequency 5

(2) Hardy-Weinberg genetic equilibrium 4

(3) Genetic drift 5

(4) Formula of ratio of allele frequency change under drift 4

(5) Law of assortment and Independent assortment 5

6 Give answer in brief (Any four): 07

(1) Explain types of oncogenes 2

(2) Distinguish : Monohybridization and Dihybridization 2

(3) Explain : Mutation 2

(4) Define : Natural Selection 1

(5) Explain : Cancer 2

(6) Genotypic and Phenotypic Monohybrid ratio 2

GDE-1778 Seat No._____

M. Sc. (Sem. I) (Part-I) Examination

January - 2016

Biodiversity : EBO-401

(Botany) (ES)

Time : 2 Hours] [Total Marks : 50

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GDF-2641

Seat No._____

M. Sc. (Part - I) (Sem. I) Examination

January - 2016

Botany - EBO-502

(Air Pollution & Climate Change)

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

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(i) Sources of Fluoride.

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(i) Sources of Sulphur.

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(iii) Draw Nitrogen cycle.

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(i) Define : Pollution.

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SECTION - II

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

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