6-5-2017

Sr. No. 2799

Exam. Code: 103206
Subject Code : 1388

B.A./B.Sc. 6th Sem.

(2517)

Botany Paper-VI-A (Ecology)

Time Allowed: 3 hrs. **Max. Marks: 35**

SECTION A

All parts are compulsory Each part of the question carries 1 mark (7 Marks).

I Define the following:

a) Atmosphere **b)** Heliophytes **c)** Abiotic **d)** Alpha diversity **e)** Ecotype **f)** Trophic level **g)** Producers

SECTION B

Attempt any 4 questions out of the given eight questions. Each question carries 7 marks.

II What are the various factors that regulate population size of a species in a community?

III Decomposers play an important role in the nutrient cycling and returning the small molecules back to soil, water or air. Describe the following stages of nitrogen cyle in terrestrial ecosystem **a)** Ammonification **b)** Nitrification **c)** Denitrification

IV What is a food chain and a food web? Provide an example of the same in grassland ecosystem and discuss the various trophic levels.

V Name ten recognizable biogeographical zones of India and provide a brief description of each.

VI Ecological succession is gradual process influenced by various factors. What are the different types of succession that can be observed in a terrestrial ecosystem? Name the factors that can instigate the changes in vegetation structure.

VII Discuss the following a) Producers b) Herbivores c) Carnivores d) Decomposers and provide an example of a food chain that explains their inter-relationship.

VIII Population ecology is the study of how populations — of plants, animals, and other organisms — change over time and space and interact with their environment. Explain the exponential growth and logistic growth models of population.

IX Discuss morphological,anatomical and physiological responses of plants (Hydrophytes and xerophytes) to water, temperature and light.

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Sr. No. 2800

9-5-2017

Exam. Code: 103206
Subject Code : 1389

B. A./B.Sc. - 6th Sem.

(2517)

Botany Paper-VI-B: Economic Botany

Time Allowed: 3 hrs. **Max. Marks: 35**

Note: **Attempt FIVE questions in all including question no.1 which is Compulsory. All questions carry EQUAL (7) marks. (5x7=35)**

1. **Give Short Answers to each of the following questions. Answer to any of the questions should not exceed 3-4 lines. Each such question carries ONE mark. (7x1=7)**

   i) **Giving specific example, explain what do you understand by Surface fibres?**

   ii) **Comment upon the important properties of rubber which makes it so valuable.**

   iii) **Define cereal. Comment upon the morphological nature of rice grain.**

   iv) **Giving specific example, explain what do you understand by semidrying oils?**

   v) **Species are classed as adjuncts and not food. Justify the statement.**

   vi) **Comment upon the medicinal properties of caffine.**

   vii) **Give the trivial name, botanical name and family of one major timber tree of Punjab.**

2. **Name the major cereal crops of Punjab. Give an account of packages and practice of wheat cultivation in Punjab. Enlist some of the major high yielding varieties of wheat which are resistant to common rust diseases infecting wheat crop in Punjab.** **(2+3+2)**

3. **Give the scientific name and family of Potato. Give an account of high yielding varieties and cultivation practices recommended for cultivation of Potato Crop in Punjab.** **(2+2+3)**

PTO

4. What are vegetable oils? How do they differ from fats? Name the different classes of vegetable oils. To which of these classes mustard oil belong? Give an account of cultivation practices including high yielding varieties recommended for the cultivation of mustard crop. (4+3)

5. Give the botanical name, family, plant part used, active principal and medicinal utility of Harar, Bahera, Neem, Amla, Ashwagandha, Datura and Sarpagandha. (7)

6. What are Species? Give an account of botanical name of the plant, part of the plant from which spice is obtained and uses in case of Black pepper, Cloves, Ginger, Fennel, Cardamon and Cinnamomum. (7)

7. a) Define Beverages. Why Tea is categorized amongst the beverages? Name the major source of Tea in the World. Give an account of preparation and uses of Tea.

   b) Write a brief note on Jute as a source of fibre. (5+2)

8. What is the source of Commercial Rubber? Give an account of method employed for obtaining latex for preparation of rubber of Commerce. Give an account of processing of latex into final product and its uses. (3+4)

9. Write explanatory notes on the following:-

   i) Coconut as a source of vegetable oil.

   ii) Major timber sources of India.

   iii) Turmeric as a source of spice and medicine. (3+2+2)

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16. What are proteins ? Discuss their primary, secondary, tertiary and quaternary structures. 4.5

17. Explain :—

(a) Sanger's method

(b) Zwitterion structure of alpha amino acids

(c) Mutarotation and its mechanism. 1.5 each

Exam. Code: 103206
Subject Code: 1393

B.A./B.Sc. 6th Semester

CHEMISTRY

(Organic Chemistry—IV)

Time Allowed—Three Hours] [Maximum Marks—35

PART—A (Compulsory)

Note :— Attempt **ALL** questions. Each question carries 1 mark.

1. A compound with molecular formula $C_3H_6O_2$ shows a strong absorption band at 1718 cm^{-1} and a broad absorption band at 3000-2500 cm^{-1}. Deduce the structure giving reasons.
2. What is chemical shift ?
3. What are homopolymers and copolymers ? Give one example each.
4. Acetylacetone has pK_a 9.0 while that of acetone is 20. Explain.
5. Why glucose and fructose give same osazone ? Explain.
6. What are essential amino acids ? Name any two.
7. Define Lambert-Beer law.
8. What are mercaptans ? Why are they named so ?

1×8=8

PART—B

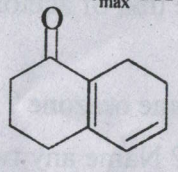
Note :— Attempt **TWO** questions from each of the following sections. Each question carries 4½ marks.

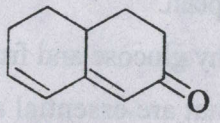
SECTION—I

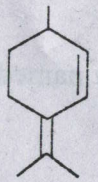
9. Describe the following :—
   (a) Anisotropic effect
   (b) Spin-spin splitting
   (c) Effect of solvent in UV spectroscopy. 1.5 each

10. (a) Distinguish between the following pairs of compounds by the method indicated :—
   (i) $CH_3COOC_2H_5$ and CH_3COOCH_3 (NMR spectroscopy)
   (ii) $CH_3COC_6H_5$ and $C_6H_5OCH_3$ (IR spectroscopy)
   (iii) cis and trans stilbene (UV spectroscopy). 3
   (b) Sketch the NMR spectrum of ethyl alcohol. 1.5

11. Calculate λ_{max} for the following compounds :

(i) 

(ii) 

(iii) 

1.5 each

SECTION—II

12. (a) What are enamines ? How are they prepared ? 1.5
   (b) How will you prepare :
   (i) 4-oxopentanoic acid from ethyl acetoacetate
   (ii) Pentanoic acid from diethylmalonate
   (iii) 2-Butanone from ethyl acetoacetate ? 3

13. (a) Give mechanism of Zeigler Natta polymerization and outline its advantages. 2.5
   (b) How will you convert :—
   (i) Bromobenzene to methyl phenyl thioether.
   (ii) Allyl alcohol to allyl disulphide. 2

14. An organic compound having molecular formula C_7H_8O gave the following spectroscopic data :
   UV : λ_{max} 222, 272 nm.
   IR : 3065-3005, 2950-2850, 604, 1498, 1250, 1040, 750, 688 cm^{-1}.
   NMR : δ 3.70(s, 3H), 6.85 (m, 3H), 7.15 (m, 2H).
   Assign suitable structure to the compound giving explanation. 4.5

SECTION—III

15. Write brief notes on :—
   (a) Killani Fischer synthesis
   (b) Ruff's degardation
   (c) Anomers and epimers. 1.5 each

Exam. Code : 103206
Subject Code : 1394

B.A./B.Sc. Semester—VI

CHEMISTRY

(Physical Chemistry–IV)

Time Allowed—3 Hours] [Maximum Marks—35

Note :— (I) Part A is compulsory. Each question carries **1** mark.

(II) Attempt **TWO** questions each from the Sections I, II and III in Part B. Each question carries 4.5 marks.

PART—A

1. What is Hamiltonian Operator ? Give one example.
2. What are limitations of Bohr Theory ?
3. State and explain Heisenberg's uncertainty principle.
4. What are zero point energies of rigid rotator and harmonic oscillator ?
5. Draw radial and angular distribution functions for 2p.
6. Define unit cell.

7. Define quantum yield.

8. Draw crystal structure of NaCl.

PART—B

SECTION—I

9. (a) Give brief account of Compton Effect.

   (b) The threshold wavelength for potassium metal is 564 nm. What is the kinetic energy of electrons ejected if incident radiation of wavelength 410 nm is used ?

10. State and explain postulates of quantum mechanics.

11. What is separation of variables method ? Apply this to solve Schrodinger equation for particle in two dimensional box.

SECTION—II

12. Solve Schrodinger equation for simple harmonic oscillator and show that energy is quantized.

13. Write Schrodinger equation for rigid rotator and transform into spherical polar coordinates.

14. (a) Separate the Schrodinger equation for hydrogen atom into radial and angular parts.

   (b) The general solution of Φ part of Schrodinger equation of hydrogen atom is $\Phi(\varphi) = A \exp(im\varphi)$. Find the value of A.

SECTION—III

15. (a) Define the laws related to crystallography.

   (b) Derive Bragg's equation.

16. Draw Jablonski diagram depicting various processes occurring in excited state. Define all the processes.

17. (a) Compare thermal and photochemical processes.

   (b) What are photosensitized reactions ? Explain with minimum one example.

Sr. No. 2816

Exam. Code: 103206
Subject Code : 1398

B.A./B.Sc. 6th Sem.

(2517)

Paper - Food Science & Quality Control

FSQC-11: Food Plant Layout & Management

Time allowed: 3 hrs. **Max. Marks: 75**

Note- All questions carry equal marks. Attempt any FIVE questions with atleast one from each section and not more than TWO from any section.

Section-A

1. Explain in details the situation of food in India and outside the country? (15)

2. (a) Discuss about maintenance and replacement of equipments and machinery?(8)

   (b) Discuss sociological and psychological dimensions of food consumption pattern? (7)

3. Discuss in detail about layout of any food industry and importance of plant layout? (15)

Section-B

4. (a) Write in detail about fast foods? (8)

   (b) Discuss about fabricated foods in details? (7)

5. (a) Describe about management set up in a food industry? (8)

   (b) Write a short note on product innovation by using social trends as a framework? (7)

Section- C

6. Write short notes on: (5*3=15)

   (a) Quick cooking foods
   (b) Market and consumer research
   (c) Convenience foods

7. (a) Describe the status and need of traditional and non-traditional food? (8)

   (b) Discuss in detail the needs and types of food consumption trends? (7)

8. (a) Discuss in detail the unconventional post-harvest losses? (8)

   (b) Describe in detail the primary and secondary processing of product development? (7)

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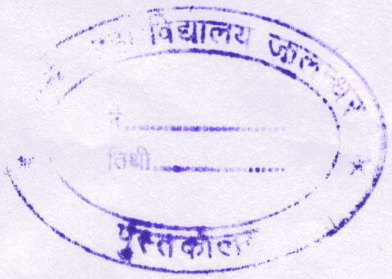
Sr. No. 2817



Exam. Code: 103206
Subject Code : 1402

B.A./B.Sc. 6th Sem.

(2517)

Paper - Microbiology

(Applied Microbiology-II)

Time allowed: 3 hrs. **Max. Marks: 75**

Instructions : Q No 1 is compulsory. Attempt one question from each unit. All questions carry equal marks. (10 × 1·5 = 15)

Q1. Write briefly

a) Name bacterial cultures used in yoghurt production.
b) Homolactic acid bacteria
c) Name three fungi used as mushrooms
d) citric acid producing microganism
e) acetone-butanol producing bacteria
f) Whisky
g) glucoamylase
h) riboflavin
i) lysine and glutamic acid producing bacteria
j) give equation for conversion of ethanol to acetic acid and name the organism invoved

Unit I

Q2 What are the different types of cheese? Explain process for making any one cheese **15**

Q3 How is saurekraut fermented? What are the biochemical changes occur during the process? **15**

Unit II

Q4 What is SCP how it is produced explain the complete prcess for producing fungal biomas? **15**

Q5 Explain the process for acetic acid fermention and recovery. **15**

Unit III

Q 6 What is beer how it differes from wine? Expalin process for beer making? 15

Q7 How is enzymes produced in Industres? what are different kinds of enzymes used in detergents ? **15**

Unit IV

Q8 Expalin the process for lysine production at industrial level. **15**

Q9 Explain the process for Streptomycin fermentation. 15

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Exam. Code : 103206
Subject Code : 1404

B.A./B.Sc. Semester—VI

NUCLEAR PHYSICS

Paper–Physics–A

Time Allowed—3 Hours] [Maximum Marks—35

Note : Section A is compulsory. Attempt **ONE** question each from Sections B, C, D and E. All questions carry equal marks.

SECTION—A

1. (a) What is packing fraction ?

   (b) What are the reasons for assigning spin to the electron ?

   (c) What do you mean by even and odd parity of a nucleus ?

   (d) What are the important features of β -ray spectra and what is end point energy ?

   (e) Explain the relation between statistics and mass number.

   (f) Write down the similarities between a nucleus and a liquid drop.

   (g) Define internal conversion and electron capture.

SECTION—B

2. (a) Explain the different causes for the failure of proton-electron hypothesis of nuclear constitution.

   (b) Using the semi-empirical mass formula, find the most stable isobar for a nucleus having odd A.

3. (a) Discuss the following :

   (i) Nuclear electrical quadrupole moment

   (ii) Non-existence of electrons in nucleus.

   (b) Explain the nuclear force's responsibility for holding the nucleus together. Discuss the nature of these forces.

SECTION—C

4. (a) Explain with the help of the Gamow's theory how α-particles with energies less than the height of the potential barrier are emitted from a radioactive nucleus.

   (b) What are the selection rules obeyed in β-decay ?

5. (a) Give the elementary theory of β-decay. Explain how this is accounted for the existence of neutrino.

   (b) A sample of RaE (At. Wt. 210) containing 4.0 mgm shows β-activity and radiates energy at the rate of 1 watt. Find the average energy of β-particles emitted assuming the half life of the sample to be of 5 days.

SECTION—D

6. (a) Describe kinematics of nuclear reaction, obtain the expression of its Q-value and explain its significance.

   (b) Explain different types of nuclear reactions with examples.

7. (a) Explain the term nuclear reaction cross-section and differential cross-section. Derive an expression for nuclear reaction cross-section.

   (b) The cross-section of Cd^{113} for capturing thermal neutrons is 2×10^4b, the mean atomic mass of natural Cd is 112 amu and its density is 8.648×10^3 kg/m^3. What fraction of an incidental beam of thermal neutrons is absorbed by a Cd sheet of 0.1 mm thinness ?

SECTION—E

8. (a) What are basic features of Shell model of nucleus and how it accounts for the existence of magic number ? Discuss schematic energy level diagram.

   (b) Why stable nuclei have more neutrons than protons ?

9. (a) Write down the limitation of Shell model.

   (b) Write down the experimental evidences of magic number.

   (c) Using shell model predict the ground state angular momenta and parities of $_{13}Al^{27}$ and $_{16}S^{33}$.

Exam. Code : 103206
Subject Code : 1405

B.A./B.Sc. Semester—VI

PHYSICS

Paper–B (Radiation & Particle Physics)

Time Allowed—3 Hours] [Maximum Marks—35

Note :— All parts of question **1** in section A are compulsory. Attempt **ONE** question each from sections B, C, D and E. All questions carry equal marks.

SECTION—A

1. (a) What are the main processes by which gamma radiation interacts with matter ?

   (b) A proton and an alpha particle enter simultaneously in a thick material with equal kinetic energy. Which particle will stop earlier in the material and why ?

   (c) What is the advantage of colliding beam experiments over the fixed target experiments ?

   (d) What is the advantage of halogen quenching gas over organic quenching gas in G. M. tubes ?

   (e) Why electrons cannot be accelerated in a cyclotron ?

(f) What is charge conjugation ?

(g) List the names of fundamental forces and their mediating particles. 7×1=7

SECTION—B

2. Derive the mathematical expression for the loss of energy of a heavy charged particle passing through matter. What are the assumptions used in this derivation ? 7

3. What is Compton effect ? Derive an expression for Compton shift and kinetic energy of recoiled electron. 7

SECTION—C

4. Discuss the principle, construction and working of a semiconductor detector. Compare its advantages and disadvantages with scintillation detector. 7

5. Using suitable diagrams, explain the principle and applications of the following detectors :

(i) Cherenkov detector (ii) Bubble chamber 3+4

SECTION—D

6. Write a brief note on the following colliding machines :

(i) Large Hadron Collider

(ii) Fermilab Tevatron. 4+3

7. Discuss the principle, construction and working of a linear accelerator. 7

SECTION—E

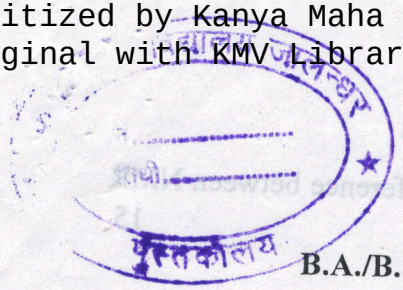
8. (a) What are leptons, mesons and baryons ? 5

(b) Determine the baryon number and strangeness of particle 'X' in the following strong interactions :

(i) $p + p \rightarrow p + X + \Sigma^0$

(ii) $K^- + p \rightarrow X + K^+ + K^0$ 2

9. What are quarks ? Give qualitative description of quark model. 7



Exam. Code : 103206
Subject Code : 1412

B.A./B.Sc. Semester—VI

BIOINFORMATICS

(Structural Biology & Molecular Modelling)

Time Allowed—3 Hours] [Maximum Marks—75

SECTION—A

1. Explain the following terms :

   (a) Chromatography

   (b) Secondary structure of Protein

   (c) Lattice

   (d) GOR

   (e) Regular expression

   (f) ADMET

   (g) Lipinsky's rule

   (h) Free energy

   (i) Simulated annealing

   (j) Ligand. 10×1.5=15

SECTION—B

2. Define Bragg's law. Explain difference between NMR and x-ray crystallography. 15

OR

3. What is primary structure of protein ? Discuss method used to determine primary structure of protein. 15

SECTION—C

4. What is homology modeling ? Explain steps involved in homology modeling. 15

OR

5. What is PDB ? Explain significance of protein structure databases with example. 15

SECTION—D

6. Explain structure based drug design. Discuss steps involved in structure based drug design. 15

OR

7. Explain Hansch equation. What do you understand by QSAR descriptors ? 15

SECTION—E

8. Explain simulated annealing. Discuss its application. 15

OR

9. What do you understand by simulation ? Explain application of molecular dynamics in biological research. 15

Exam. Code : 103206

Subject Code : 1416

B.A./B.Sc. Semester—VI

ZOOLOGY

Paper—Zoo—VI A, Opt. (i), Medical Zoology

Time Allowed—3 Hours] [Maximum Marks—35

1. **ALL** questions are compulsory :

   (a) Define adjuvant.

   (b) Name the causal agent of disease meningitis.

   (c) Write the common names of disease American Trypanosomiasis and lymphatic filariasis.

   (d) What is the significance of pentameric structure of immunoglobulin M ?

   (e) What is the habitat of *Leishmania* sp. in the host ?

   (f) How does the Ancylostoma enter into its host ?

   (g) Give the symptoms of disease Boutonneuse fever.

2. Give an account of the life history, mode of infection and pathogenicity of *Waucheria and Giardia*.

OR

3. Describe the taxonomy, classification and pathogenicity of bacteria.

4. Describe the epidemiology and eradication program of typhoid and smallpox diseases.

OR

5. Give an account of life cycle of an arthropod causing malaria. What are the symptoms, diagnosis and treatments of it ?

6. Differentiate between an antigen and an antibody. Give the structures and functions of all the immunoglobulins.

OR

7. Explain the physical and chemical properties of antigens. How do antibodies work to neutralize antigens ?

8. Describe the following :

   (a) ELISA

   (b) Precipitation.

OR

9. Define vaccination. Explain the vaccination schedule from the birth of the child to ten years of age.