[N.S.B] COE-OFFICE

Exam Code: 121302 KMV-II [EVE] Paper Code: 2188 8-05-2024

Programme: Bachelor of Science (Semester- II)

Course Title: Zoology (Ecology)

Course Code: BSMM-2483 (I)

Time Allowed: 3 Hours **Max Marks: 40**

Note: Attempt five questions in all, selecting one question from each section. Fifth question may be attempted from any section. Each question carries 8 marks.

Section A

1.	Write a note on terrestrial biomes of the world.	8
2.	Discuss role of light as ecological factor with suitable examples.	8

Section B

3.	How oxygen and carbon dioxide circulation take place in the biosphere.	8
4.	Discuss cursorial adaptations in detail with the help of suitable examples.	8

Section C

5.	a) Explain population growth curves and its types.	4
	b) Explain the following:	
	(i) Competition	2
	(ii) Mutualism	2
6.	Explain ecological succession and its types with examples	8

Section D

7.	Discuss non-renewable resources and its conservation.	8
8.	Explain major atmospheric pollutants and their sources in detail.	8

Exam Code: 121302 **Paper Code: 2189**

Programme: Bachelor of Science (Semester-II)

Course Code: Zoology (Biodiversity-II)

Course Code: BSMM-2483 (II)

Time Allowed: 3 Hours **Maximum Marks: 60**

Note: Attempt five questions in all, selecting at least one from each section. The fifth question may be attempted from any section. Each question carries equal 12 marks. Write legibly and Draw well labeled diagrams wherever necessary.

Section-A

1. (a) Give an account of mouth parts of Cockroach.
   (b) Describe the structure and working of the eye of Cockroach. (6+6)
2. (a) Discuss the social organization in Termites.
   (b) Differentiate between Queen, Drone and Workers of Honey Bee. (8+4)

Section-B

3. Give an account of the respiratory organs of *Pila globosa* and explain their functioning. (12)
4. Explain briefly-
   (a) Pearl formation (b) Organs of Pallial complex. (6+6)

Section-C

5. Give an account of Haemal and Perihaemal Systems in Star fish. (12)
6. Write short notes on-
   (a) Structure of Bipinnaria Larva
   (b) Functions of Tube feet. (6+6)

Section-D

7. Explain the external features of Balanoglossus with special refernce to proboscis and collar regions. (12)
8. Describe the affinities of Hemichordates with Non-Chordates and Chordates. (12)

Exam Code: 121302 **Paper Code: 2190**
(20)

Programme: Bachelor of Science Semester-II

Course Title: Microbiology (Basic Food Microbiology)

Course Code: BSMM-2343

Time Allowed: 3 Hours **Max Marks: 60**

Instructions for students:

Candidates are required to attempt five questions, selecting at least one question from each section; A, B, C, D. The fifth question may be attempted from any of these four sections. Each question carries 12 marks.

Section — A

1. (a) Explain the role of bacteria and molds in deterioration of food quality? Give a detailed list of name of these microbes during period of spoilage of food? (8 marks)

   (b) What are the various extrinsic factors which speed up and slow down the speed of growth of microbes in foods? (4 marks)

2. What are the various sources of contamination of foods? Explain the role of various fungi in spoilage of food materials? (12 marks)

Section — B

3. Give the detailed process for the production of following fermented foods
   a) Miso
   b) Idli
   c) Warri (3x4=12 marks)
4. Explain extensively the procedure for production of various types of fermented foods studied by you? What are the advantages of consuming fermented foods? (12 marks)

Section — C

5. Explain the role of various preservatives and aseptic/inert packaging in preservation of foods? Explain role of any two chemical preservatives in prevention of food spoilage? (12 marks)
6. Write a detailed note on use and application of prebiotics and probiotics in food industry, as is studied by you? Write down various advantages associated with use of these foods also? (12 marks)

Section — D

7. Write a detailed notes on microbiology of spoilage of
   a) Milk and milk products
   b) Vegetables and fruits (12 marks)

8. Give the impact of Staphylococcal and Salmonella bacterial growth in various foods? Also give a detailed list off microbes involved in spoilage of canned food? (12 marks)

Exam Code: 121302 **Paper Code: 2191**

Programme: Bachelor of Science (Semester-II)

Course Code: Chemistry (Inorganic Chemistry)

Course Code: BSMM/BSNM-2084 (I)

Time Allowed: 3 Hours **Maximum Marks: 60**

Note: Attempt five questions in all, selecting at least one from each section. The fifth question may be attempted from any section. Each question carries equal 12 marks.

Section-A

1. (a) Explain the concept of Inner pair effect taking Group 14 elements as an example. (4)

(b) Electron affinity of Flourine is less than Chlorine whereas electro-negativity of Flourine is greater than electro-negativity of Chlorine. Explain. (4)

(c) Write structure and properties of Borazine. (4)

2. Explain the following:

i. Bonding in Diborane (3)

ii. Oxyacids of Group 14 elements (3)

iii. Ionisation Enthalpies of Nitrogen family (3)

iv. Reactions of Diborate with Water and HCl. (3)

Section-B

3. (a) What is Lux-Flood Concept for acids and bases. Explain with the help of examples. (4)

(b) Give four Arrhenius acids and bases each. Also explain limitations of Arrhenius Theory. (8)

4. (a) Explain diagonal relationship of S – block elements with suitable examples. (4)

(b) Discuss the factors responsible for solvation tendency of S – block elements. (4)

(c) Discuss atleast four similarities between Lithium and Magnesium. (4)

Section-C

5. (a) Write formula for tetra sulfur tetra nitride. Discuss its bonding, properties and applications. (6)

(b) What are polyhalides? How they are formed? Also discuss their uses. (6)

6. (a) What is the difference between Silicone and Silica. Discuss various applications of Silicone. (6)

(b) What are Zeolites? Write their structure and atleast three applications. (6)

Section-D

7. Write a brief note on the following:

(a) Variable oxidation states of transition metals. (4)

(b) Magnetic behaviour of l- Block elements. (4)

(c) Crystal Field theory w.r.t. geometry of Complexes. (4)

8. (a) What is coordination number? How will you calculate coordination number taking two examples of Iron and Copper Complexes each? (6)

(b) Give general characteristics of second transition series. Also explain how they are similar and dissimilar with third transition series. (6)

Exam Code: 121302 **Paper Code: 2192**

Programme: Bachelor of Science (Semester: II)

Course Title: Chemistry (Physical Chemistry)

Course Code: BSMM/BSNM-2084(II)

Time Allowed: 3 Hours **Max Marks: 40**

Note: Attempt five questions in all. Selecting at least one question from each section. The fifth question may be attempted from any section. Simple calculators and log tables are allowed. Each question carries 8 marks.

Section A

1. (a) What are ideal and real gases? Explain graphically in terms of compressibility factor how real gases show deviation from ideal behavior. Also derive expression for the equation of state for real gases (van der Waals equation).

   (b) Derive expressions for critical constants in terms of van der Waal's constants and hence derive the relationship between them. (4, 4)

2. (a) Briefly describe Andrew's experiments on isotherms of carbon dioxide. What do you mean by continuity of state?

   (b) What is mean free path? Derive the expression for mean free path when molecular diameter is σ. (4, 4)

Section B

3. (a) Briefly describe the applications of liquid crystals in medical field. What type of liquid crystals are used?

   (b) What do you mean by liquid crystals? Write differences between nematic, cholesteric and smectic liquid crystals. (4, 4)

4. (a) Describe the principle of working of liquid crystal cell.

(b) Explain the difference between liquid crystal, solid and liquid. (4, 4)

Section C

5. (a) Explain Hardy Schultze rule. What do you mean by coagulation value or flocculation value of an electrolyte? How is it related to the coagulating or precipitating power?

(b)Write differences between lyophilic and lyophobic colloids. (4, 4)

6. (a) Explain the terms dialysis and electrodialysis. Briefly describe one important application of dialysis.

(b) Explain the following:
(i) Tyndall Effect (ii) protective action (4, 4)

Section D

7. (a) Derive a relationship between molecular mass and depression in freezing point of a non-volatile solute.

(b) Briefly describe one method of determination of elevation in boiling point. (4, 4)

8. (a) Write the differences between ideal and non-ideal solution.

(b) A sugar syrup of mass 214.2 g contains 34.2 g of sugar. Calculate molality and mole fraction of sugar. (4, 4)

Exam Code: 121302 **Paper Code: 2193**

Programme: Bachelor of Science
Semester: II
Course Title: Physics (Relativity and Electromagnetism)
Course Code: BSNM-2395 (I) for B.Sc.(Non-Medical)
BCSM-2395 (I) for B.Sc. (Computer Science)

Time Allowed: 3 Hours **Max Marks: 60**

Note:

i. Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries equal marks.
ii. Use of Non-Scientific calculators or logarithmic tables is allowed.

Section A

1. What are the postulates of special theory of relativity? Derive the Lorentz transformations and inverse Lorentz transformations. What is their physical significance? (12)
2. Derive an expression for an increase in mass of an object when it undergoes an inelastic collision and is observed from another inertial frame having relative motion with respect to the object. (12)

Section B

3. (a) What do you meant by surface current density? Drive the formula for difference in magnetic field at two parallel surfaces of a current carrying thin sheet using Ampere Circuital law? (6)

(b) Explain Hall effect and find expression for Hall coefficient? (6)

4. (a) What are magnetic scalar and vector potentials? Discuss the conditions for vector to uniquely define the magnetic vector potential? (8)
(b) Find the vector potential of a current element? (4)

Section C

5. (a)Discuss the phenomenon of mutual induction and find the expression for mutual inductance of two coils and hence prove the reciprocity theorem? (8)

(b) Calculate the coefficient of self-induction of an iron cored solenoid having area of cross-section 5 cm^2, length 2 m and number of turns 3000? $\mu_r = 50$. (4)

6.Find the expression for current and impedance in a series LCR circuit which is powered by a source of an alternating voltage? Discuss the condition when the current in ciurcuit is maximum? (12)

(I)Section D

7. Discuss the propagation of electromagnetic waves through a conductor by driving the wave equation and its solution? Find expression for skin depth and discuss the factors on which the attenuation of electromagnetic waves in a conductor depends? (12)

8. (a) What do you mean by Poynting vector? Explain its physical significance and drive its expression. (8)

(b) Give Maxwell's four equations in differential form and explain physical significance of each? (4)

Paper Code: 2194

Programme	Exam Code	Course Code
Bachelor of Science Non Medical	121302	BSNM-2395 (II)
Bachelor of Science Computer Science	121302	BCSM-2395 (II)

Semester-II

Course Title: Physics (Vibration and Waves)

(40)

Time Allowed: 3 Hours **Max Marks: 40**

Attempt five questions selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 8 marks. Use of non-scientific calculators and Logarithmic tables is allowed.

Section-A

1. (a) Prove that average Kinetic energy of a harmonic oscillator is equal to its average potential energy and each is equal to half the total energy. 5

(b) An object of mass 0.2 kg excecutes SHM along X-axis. At x= 0.04m its Kinetic energy is 0.5J and potential energy is 0.4 J. Find amplitude of oscillations. 3

2. (a) What is a compound pendulum. Derive an expression for its time period. Find the condition for its time period to be minimum. 5

(b) What is the phase relation between velocity and displacement in SHM. Show it graphically also. 3

Section-B

3. (a) What are damped oscillations? Obtain the expression for displacement. Discuss the case of light damping. 5

(b) What are units of damping constant and what is the effect of damping on frequency of the oscillator? 3

4. (a) What is meant by relaxation time and quality factor of a damped harmonic oscillator. Deduce their values. 5

(b) Examine whether the discharge of a capacitor of 1 μF through a resistor 400Ω and inductor 0.1H is oscillatory or not. 3

Section-C

5. (a) What is forced electrical oscillator? Discuss variation of current amplitude with driving em$f$ frequency. 5

(b) How is steady state behavior of a forced oscillator different from its transient behavior? 3

6. (a) Show that the average power supplied by the driving force is equal to the average power dissipated against damping force in case of a forced damped oscillator. 5

(b) Show that band width of the resonance absorption curve defines the phase angle range tan Ø =±1. 3

Section-D

7. (a) What are transverse waves and longitudinal waves? Derive an expression for characteristic impedence of a string in terms of its linear density and wave velocity. 5

(b) Two strings of linear densities 0.5 gcm^{-1} and 2 gcm^{-1} are joined together and strectched with a force of 50 N. Find coefficients of reflection and transmission of amplitude. 3

8. (a) Consider reflection and transmission of transverse wave on a string at a boundary. Find reflection and transmission coefficients of amplitude. 5

(b) Define phase velocity and group velocity of waves. 3

Exam Code: 121302 **Paper Code: 2195**

Programme: Bachelors of Science
Semester: II
Course Title: Botany (Cell Biology)
Course Code: BSMM-2075 (I)

Time Allowed: 3 Hours **Max Marks: 40**

Note: Attempt five questions selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 8 marks each.

SECTION-A

1. Write a short note on the following
   a) Prokaryotic cell (3)
   b) Difference between plant cell and animal cell (3)
   c) Structure of nuclear envelope (2)
2. Differentiate between the following:
   a) Euchromatin and Heterochromatin (4)
   b) Nucleus and Nucleolus (4)

SECTION-B

3. What is cytoplasmic inheritance? Explain plastid inheritance with example. (8)
4. Write short notes on the following:
   a) Plasmids (4)
   b) Vacuoles (2)
   c) Peroxisomes (2)

SECTION-C

5. What do you mean by chromosomal alterations? Enlist the types and explain any one of them in detail. (8)
6. Define polyploidy? How it develops in nature? Discuss the origin of at least two allopolyploids. (8)

SECTION- D

7. Write a note on the following:
   a) Primary wall and Secondary wall (4)
   b) Fluid Mosaic Model (4)
8. Write notes on the following
   a) Phospholipids (2)
   b) Functions of cell wall (3)
   c) Diffusion (3)

Exam Code: 121302 **Paper Code: 2196**

Programme: Bachelor of Science (Semester: II)

Course Title: Botany (Genetics)

Course Code: BSMM-2075(II)

Time Allowed: 3 Hours **Max Marks: 60**

Note: Candidates are required to attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 12 marks.

Section A

1. a) Explain the various steps involved in the replication of DNA. **(8)**
   b) Write about the Meselson-Stahl experiment on semi conservative nature of DNA replication. **(4)**
2. a) Write in detail about the Nucleosome-solenoid model of DNA packaging. **(9)**
   b) What is genetic code? What do you understand by non ambiguous nature of genetic code? **(3)**

Section B

3. a) Differentiate between meiosis and mitosis. **(9)**
   b) Discuss the importance of mitosis in multicellular organisms. **(3)**
4. a) What is epistasis? Differentiate between dominance and epistasis. **(5)**
   b) Define linkage. Write its importance. **(3)**
   c) Differentiate between incomplete dominance and co- dominance. **(4)**

Section C

5. a) Explain the various steps involved in the process of translation. **(9)**
   b) Give the detailed structure of t-RNA. **(3)**
6. a) Describe how the Gene regulation occurs in Eukaryotes? **(9)**
   b) Write with suitable example, the various bonds found in 1D & 2D structure of proteins. **(3).**

Section D

7. a) What are gene mutations? Describe the various types of gene mutations. **(9)**
   b) Explain the process of DNA repair. **(3)**
8. a) Write in detail with examples, the various structural changes which occur in chromosomes . **(8)**
   b) Write about transposable genetic elements. **(4)**

COE
KM-II [N.S.B]
EVE-13.05-2024

Exam Code: 121302
(20)

Paper Code: 2197

Programme: Bachelor of Science
Semester-II

Course Title: Food Science and Quality Control (Vocational)
(Food Plant Hygiene and Sanitation) (Vocational)

Course Code: BSMM-2255

Time Allowed: 3 Hours

Max Marks: 60

Candidates are required to attempt any five questions selecting one question from each section. The fifth question may be attempted from any section. Each question carries 12 marks.

Section-A

1. Please Elaborate in detail the various cleaning agents and disinfectants used in food Industry. Also indicate the importance of cleaning in food Industry? 12
2. Please explain the following
   a. Difference between cleaning in place and cleaning out of place. 6
   b. Difference between good laboratory practices and good hygience practices. 6

Section-B

3. What do you understand by sanitizer strength? What are the different chemical tests done to check its strength? 12
4. Please Elaborate on the use of heat and chemicals as sterilization/disinfactory agents. 12

Section-C

5. Please give a complete detail on the food sanitation measures followed in dairy Industry? 12
6. (a) Define SOPs and state their importance in food Industry. 6

   (b) Define Sanitation. Enlist and explain the different benefits of Sanitation. 6

Section-D

7. What different training programmer are Conducted for heath professionals? 12
8. Explain in detail the waste disposal treatment/affluent treatment in food Industry? 12