Exam Code: 103304 **Paper Code: 4182**
(40)

Programme: Bachelor of Science
Semester-IV

Course Title: Zoology (Biochemistry)

Course Code: BSMM-4483 (I)

Time Allowed: 3 Hours **Max Marks: 30**

Note: Attempt five questions in all, selecting one question from each section (A to D). Fifth question can be attempted from any section. Each question carries equal marks.

Section A CO1

1. Write a note on classification and functions of lipids. 6
2. a) Discuss the composition of nucleic acids. 4
   b) What is Chargaff' s rule? 2

Section B CO2

3. a) What is allosteric inhibition? 2
   b) What is coenzyme? Tabulate the difference between apozyme and coenzyme. 4
4. . Write a detailed note on ketosis. 6

Section C

5. Discuss TCA cycle in carbohydrate metabolism. 6
6. What do you know about gluconeogenesis. 6

Section D

7. a) What is decarboxylation? 2
   b) Write a note on hydrolysis of proteins. 4
8. Discuss Orinithine cycle in detail. 6

COE

MOR-14-06-24 KMV-II [M.S.B]

Exam Code: 103304 **Paper Code: 4183**
(40)

Programme: Bachelor of Science
Semester-IV

Course Title: Zoology (Animal Physiology)

Course Code: BSMM-4483 (II)

Time Allowed: 3 Hours **Max Marks: 30**

Attempt five questions in all. Select at least one question from each section (A to D) respectively. Fifth question may be attempted from any section (A-D). Write legibly and Draw well labeled diagrams wherever necessary.

Section-A

1. Describe the mechanism of regulation of digestive processes in Human. (6)
2. Explain briefly:
   (a) Mechanism of Absorption of fats
   (b) Chloride Shift (3+3)

Section-B

3. (a) What is Blood Grouping? Explain the Rh group incompatibility factors during Erythroblastosis foetalis. (6)

(b) Explain the Cardiac cycle with the help of well labeled diagram. (3+3)

4. Discuss the mechanism of osmoregulation by kidneys. (6)

Section-C

5. Explain the following:
   (a) Resting membrane potential
   (b) Biochemistry of Muscle fiber (3+3)
6. Describe the mechanism of nerve impulse propagation across the synapse. (6)

Section-D

7. Discuss in detail the histology of Thyroid gland along with the physiological functions of its hormones. (6)
8. Write short notes on:
   (a) Learning and Reasoning
   (b) Taxes and Reflexes (3+3)

Exam Code: 103304 **Paper Code: 4184**
(30)

Programme: Bachelor of Science
Semester-IV

Course Title: Microbiology (Microbial Ecology)

Course Code: BSMM-4343

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

Note:- Attempt five questions in all, selecting one question from each of the four sections (A-D).The fifth question may be attempted from any section. All questions carry equal marks.

Section A CO1

1. a. Differentiate between an ecological niche and a habitat. 6
   b. Explain how physical factors effect the diversity of microbes in a specific environment. 6
2. a. Along with examples explain how microorganisms are able to survive in aquatic habitat. 6
   b. Discuss the different type of microorganisms present in terrestrial environments. 6

Section B CO2

3. a. Explain why some microorganisms require oxygen for survival in nature. 6

b. Giving examples explain the following terms: antagonism, commensalism. 6

4. a. Briefly discuss how microorganisms compete with one other for nutrients and space for survival in nature. 6

b. Write a short note on 'parasitism'. 6

Section C

5. a. Discuss in detail the role of microorganisms in Nitrogen cycle. 6

b. Giving examples explain how microbial toxins can be used as insecticidal agents. 6

6. a. Briefly explain the phosphorous cycle . 6

b. Explain the use of bacteria as Biofertizers along with examples. 6

Section D

7. a. Discuss the following biological treatment process involved in secondary treatment of waste water: Trickling Filter and Rotating Biological Contactor. 6

b. Giving examples explain the role played by microorganisms in bioremediation of persistent pollutants. 6

8. a. Briefly explain the concept of BOD. 6

b. Write a short note on bioteaching of metals. 6

Paper Code: 4185

Programme	Exam Code	Course Code
Bachelor of Science (Medical)	103304	BSMM-4084 (I)
Bachelor of Science (Non-Medical)	103304	BSNM-4084 (I)

Semester-IV

Course Title: Chemistry (Inorganic Chemistry)

(70)

Time Allowed: 3 Hours **Max Marks: 30**

Note: Candidates are required to attempt any five questions in all selecting one question from each section. The fifth question may be attempted from any section.

Section- A

1. (a) Does the following compounds follow the EAN rule ?
   (i) $NiCO_4$
   (ii) $[Pd(NH_3)_4]^{4+}$ (3)
   (b) Describe the bonding in $[Fe(CN)_6]^{3-}$ and $[Fe(H2O)_6]^{3+}$. (3)
2. (a) Describe in detail the chemistry of liquid Sulphur dioxide as a solvent. (3)
   (b) Discuss the following reactions in liquid ammonia:
   (i) acid-base reactions

(ii) complex reactions (3)

Section-B

3. (a) What is Frost diagram. Explain in detail. (3)
   (b)What do you understand by redox stability in Water? (3)

4. (a) Calculate the magnetic moment of Dy^{3+} with outer electronic configuration $4f^9\ 6s^0$. (3)
   (b) What is Lanthanide contraction? What are its consequences? (3)

Section-C

5. (a) How does Lanthanides are Actinides differ from each other? (3)
   (b) How will you account for the colour in case of Actinides. (3)

6. (a) Give synthesis of Californium and Neptunium. (3)
   (b)How will you separate Np, Pu and Am from Uranium? Discuss the basics of separation of these elements from Uranium. (3)

Section-D

7. (a) Give the role of sodium-potassium pump in biological system. (3)
   (b)What is Cooperativity effect in Hb? (3)

8. (a) What are trace elements. Give their role in the biological systems with examples. (2)
   (b) Give the structure and biological role of Haemoglobin and Myoglobin. (4)

Paper Code: 4186

Programme	Exam Code	Course Code
Bachelor of Science (Medical)	103304	BSMM-4084 (II)
Bachelor of Science (Non-Medical)	103304	BSNM-4084 (II)

Semester-IV

Course Title: Chemistry (Organic Chemistry)

(70)

Time Allowed: 3 Hours **Max Marks: 30**

Instructions:

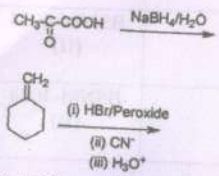
1) The students are allowed to use Non-Programmable Calculator. Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Section-A

1. (a) What is decarboxylation reaction? Give the mechanism. 2

   (b) Which one of the two is stronger acid m-Chlorobenzoic acid or p-Chlorobenzonic acid? Give reasons. 2

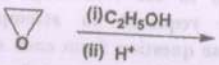
(c) Predict the product (s) of the following reactions: 2



2. (a) Why acyl chlorides are more reactive than esters toward nucleophiles? 2
(b) Give the detailed mechanism of Hoffmann bromide degradation reaction. 4

Section-B

3. (a) Compare the following reactions 2



$C_6H_5OC_2H_5 + HNO_3/H_2SO_4 \longrightarrow$

(b) Discuss the base catalyzed ring opening reactions with orientation of epoxides. 4

4. (a) Explain why epoxy ethane reacts with CH_3ONa but diethyl ether does not? 2
(b) Write short on 4
(i) Williamson synthesis of ethers and its limitation
(ii) Reaction of Grignard reagent with epoxides

Section-C

5. (a) How will you synthesise p-bromoaniline from aniline? 2
(b) What is Hoffman elimination reaction? Explain with mechanism. 4

6. (a) How will you differentiate between secondary and tertiary amine? 2
(b) What is exhaustive methylation reaction? Discuss its application. 4

Section-D

7. (a) What is organozinc compound? Give one reaction involving it. 2
(b) Give one method of preparation of Alkyl lithium reagent from alkyl halides. Why alkyl lithium compounds are more reactive than Grignard reagents? 4

8. (a) Why thiophene is more aromatic than furan? 2
(b) Explain Simmons-Smith reactions. 4

Exam Code: 103304 **Paper Code: 4187**

Programme: Bachelor of Science (Semester: IV)

Course Title: Physics (Quantum Mechanics)

Course Code: BSNM/ BCSM-4395 (I)

Time Allowed: 3 Hours **Max Marks: 30**

Note: Attempt five questions in all, selecting atleast one question from each section. The fifth question can be done from any section. Each question carries 6 marks.

Section A

1	(a)Give the mathematical theory of Compton effect. Show that the change in wavelength of X-ray photon on scattering from a free and stationary electron is independent of the wavelength of the incident radiation.	4
	(b)Show that photon cannot transfer whole of its energy to the electron in Compton effect.	2
2	(a)Explain Heisenberg's uncertainty principle. Why is it important for microscopic particles, but insignificant in practical life?	2
	(b)Define particle velocity, phase velocity and group velocity of a wave packet. Show that the particle velocity equals the group velocity of the wave packet	4

Section B

3	(a)State and prove orthogonality of energy eigen functions for one dimensional case.	3
	(b) State the fundamental postulates of wave mechanics.	2
	(c) What are orthonormal wave functions?	1
4	(a)What is correspondence principle? Illustrate with Ehrenfest derivations.	4
	(b) What is Hermitian operator? Show that Hermitian operator has real eigen value.	2

Section C

5	What do you mean by a particle in a box? Obtain expression for energy levels and normalised wave functions for a particle in a box.	6
6	Differentiate between classical and quantum mechanical explanation for reflection and transmission through a potential barrier. Hence explain what tunnelling barrier for an energy is less than the barrier height.	6

Section D

7	Derive an expression for the transmission co-efficient of a particle through a rectangular potential barrier for an energy less than the barrier height. Discuss how a decay is explained in the light of the above derivation.	6
8	(a) Solve the angular parts of Schrodinger equation for a spherically show that the solutions are eigen functions of L, operator	5
	(b) What are radiative transitions	1

Paper Code: 4188

Programme	Exam Code	Course Code
Bachelor of Science (Non-Medical)	103304	BSNM-4395 (II)
Bachelor of Science (Computer Science)	103304	BCSM-4395 (II)

Semester-IV

Course Title: Physics (Atomic and Molecular Spectra)

(40)

Time Allowed: 3 Hours **Max Marks: 30**

All questions carries equal marks (6). Candidates are required to attempt five questions in all, Selecting at least one question from each section. Fifth question can be attempted from any section. Students can use Non-Scientific calculators or logarithmic tables.

Section A

1. A) Using Bohr's theory, deduce an expression for Rydberg Constant for hydrogen atom. Explain the spectrum of hydrogen. (4)

B) What are possible values of quantum numbers l,s,j and m_j for a f electron. (2)

2. A) Give brief description of Stern- Gerlach experiment along with its significance. (4)

B) What do you mean by units in spectroscopy and term values. (2)

Section B

3. A) Explain the effect of spin orbit interaction on spectra of Na atom. (4)

B) What are selection rules for doublets? (2)

4. What is Zeeman effect? Under what conditions one obtains the Normal Zeeman effect? Describe and explain it by taking any example. (6)

Section C

5. What is the difference between the energy level diagrams of hydrogen and helium atoms. Explain its fine structure by drawing energy level diagram. (6)

6. How do non-equivalent electrons differ from equivalent electrons? Explain it by considering p-p and s-s configuration (6)

Section D

7. A) Explain the origin of Stokes and anti strokes lines in Raman effect on basis of quantum theory (4)

B) Calculate the maximum frequency of the continuous X Rays from an X Ray tube whose operating voltage is 50,000 Volts (2)

8. A) Show that diatomic molecule can have discrete values of rotational energy governed by quantum number J. (4)

B) Why X Ray line spectra is called Characteristics X Rays? (2)

COE
KMV-II [N.S.B]

Exam Code: 103304
(30)

Paper Code: 4189

MoR-16-05-2024

Programme: Bachelor of Science
Semester-IV

Course Title: Botany (Diversity of Seed Plants and their Systematics-I)

Course Code: BSMM-4075 (I)

Time Allowed: 3 Hours **Max Marks: 30**

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

Section A

1. Write a note on distinguishing features of Angiosperms. (6)
2. Discuss the origin and evolution of Angiosperms. (6)

Section B

3. Write illustrated note on fossil gymnosperms. (6)
4. Define geological time scale. (6)

Section C

5. Discuss in detail about the male gametophyte of Cycas. (6)
6. Draw neat and labelled diagrams to explain the life cycle of Pinus. (6)

Section D

7. Draw diagrammatic life cycle of Ephedra. (6)
8. Give details of morphology and reproductive parts of Ginkgo. (6)

Exam Code: 103304 **Paper Code: 4190**
(30)

Programme: Bachelor of Science Semester-IV

Course Title: Botany (Diversity of Seed Plants and their Systematics-II)

Course Code: BSMM-4075 (II)

Time Allowed: 3 Hours **Max Marks: 30**

Note: Candidates are required to attempt five questions, selecting one question from each section. The fifth question may be attempted from any section. Each question carries equal 6 marks.

Section A

1. Describe following terms:
   a. Taxonomic literature
   b. Aims and Objectives of taxonomy 3x2=6
2. Describe different keys use in identification of plants. 6

Section B

3. Give an outline of Bentham and Hooker system of classification and discuss its merits and demerits. 6

4. What is phytochemistry? Discuss the role of phytochemistry in plant taxonomy. 6

Section C

5. Write a note on diversity of flowering. plants and their characteristics of family Apiaceae. 6
6. Distinguish between the following :
   (a) Ranunculaceae and Brassicaceae by their gynoecium.
   (b) Caesalpinoideae and Papilionoideae (Faboideae) on the basis of corolla and stamens only. 3X2=6

Section D

7. Give a comparative account of Liliaceae and Chenopodiaceae. 6
8. Give an account of characteristics of family Euphobiaceae. 6

Exam Code: 103304 **Paper Code: 4191**

Programme: Bachelor of Science (Semester – IV)

Course Title: Food Science and Quality Control

(Vocational) (Quality Assurance)

Course Code: BSMM-4255

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

Note: 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

Question 1. Discuss the importance of various manufacturing techniques of various food products.

Question 2. What are the major microbial quality control tests for food products, discuss in detail.

Section- B

Question 3. Explain in detail the quality testing methods in fruits and vegetable products.

Question 4. Describe in detail about color properties of food products and discuss about equipments used for testing of color properties.

Section- C

Question 5. Discuss in detail the importance of food sampling. What are the major sampling methods used in food industries.

Question 6. Discuss the nine point hedonic scale method used in sensory analysis of food products.

Section- D

Question 7. Explain the role of GMP in food safety and analysis.

Question 8. Discuss about FPO, AGMARK and FSSAI in detail.