MJP ROHILKHAND UNIVERSITY BAREILLY

Examination- Faculty of Science

(A) Eligibility

Bachelor of Science in Microbiology
(B.Sc in Microbiology)

1. (a) The examination for the degree of Bachelor of science shall consist of three parts:
   (1) Part I
   (2) Part II
   (3) Part III (Final)
   (b) A candidate who after passing (i) the intermediate examination (Biology) of the Board of High School and Intermediate Education, Utter Pradesh or of and Indian University incorporated by any law for the time being in force, or (ii) any other examination recognized by the University as equivalent there to, has attended a regular course of study in an affiliated college for one academic year, shall be eligible for appearing at the Part I Examination for the B.Sc (Microbiology) Degree.

2. (a) A candidate who after passing the Part I B.Sc Examination of the University, has completed a regular course of the study for one academic year in an affiliated college, shall be eligible for appearing at the Part II B.Sc (Microbiology) Examination.

   A candidate who, after passing Part II B.sc (Microbiology) Examination of the University completed a regular course of study for one academic year in an affiliated college shall be eligible for appearing at the Part III B.sc (Microbiology) Examination.

   (b) A candidate who has passed Part I B.Sc (Microbiology) Examination from University or any other examination recognized by the University as equivalent to the Part I B.Sc (Microbiology) examination of the University may also be admitted to the Part II B.Sc (Microbiology) Examination. Provided that he/she offered for the above mentioned examination of another University a course of an equivalent standard with almost identical syllabus as required for Part I examination of the University and has attended a regular course of study for one academic year in an affiliated college for the University.

3. Every candidate shall be required to pass in all of the following papers for Part I, II and III of B.Sc (Microbiology) examinations:

A. Part I: (1) Bioscience I (Plant Diversity) (2) Bioscience II (Animal Diversity) (3) Cell Biology (4) Organic Chemistry (5) Biochemistry (6) General Microbiology

B. Part II: (1) Biomolecules (2) Biophysics & Biophysical Chemistry (3) Molecular Biology & Animal Cell Culture (4) Microbial Genetics (5) Microbial Physiology (6) Fundamental of Computer & Biostatistics

C. Part III: (1) Medical Microbiology (2) Agriculture, Food & Dairy Microbiology (3) Industrial & Environmental Microbiology (4) Immunology & Virology (5) Information Technology & Bioinformatics (6) Two month training (Entrepreneurship)

4. The examination shall be by means of papers, but candidate shall also be required to undergo a practical examination. Candidates shall be required to pass separately in the Practical Examination.

5. A candidate who desires to enter for an examination under this eligibility criteria must submit his/ her application on a prescribed from so to reach the Registrar not later than 15th November, proceding the date of examination. The application shall be accompanied by an examination fee Rs. 5/- for each for three parts and shall be forwarded by the Principal of the college concerned.

6. There is a uniform pattern of examination in all the papers of for Part I, II and III of B.Sc (Microbiology) Examination and details are as Follows

7. The minimum pass marks to obtain in each paper shall be 33.

8. The distribution of marks for B.Sc (Microbiology) Parts I, Part II and Part III practical examination throughout will be as follows as per UGC norms.

(B) Scheme of Examination

Bachelor of Science (Microbiology)

There shall be three examinations one at the end of each year, the first being the B.Sc. (Microbiology) Part I Examination, the second B.Sc (Microbiology) Part II examination, and the third B.Sc (Microbiology) part III final examination.

Candidates will have to pass separately in each of the three examination, but the marks of the three examination will be counted together for a place on the pass list of the part III examination. A candidate for the B.Sc (Microbiology) examination will be assigned division on the following basis:

First Division	60% of the aggregate marks
Second Division	45%

All the rest in the third Division if the y obtains the minimum pass marks in each paper

Note: Candidates in all papers of B.Sc (Microbiology) Part I or II and III examinations are allowed to answer question-papers through the medium of English or Hindi (Devanagari script)

Part I- B.Sc. I (Microbiology Examination)

(A) Theory papers

S. No.	Papers Code	Year	Title of the Papers	Total Marks
1	(BSBT/BSMB-101)	I	Bioscience I (Plant Diversity)	100
2	(BSBT/BSMB-102)	I	Bioscience II (Animal Diversity)	100
3	(BSBT/BSMB-103)	I	Cell Biology	100
4	(BSBT/BSMB-104)	I	Organic Chemistry	100
5	(BSBT/BSMB-105)	I	Biochemistry	100
6	(BSMB-106)	I	General Microbiology	100
			Total	**600**

(B) Practical

S. No.	Papers Code	Year	Title of the Papers	Sessional Marks	Theory Marks	Total Marks
7	Practical (BSBT/BSMB-107 P)	I	Bioscience I	25	75	100
8	Practical (BSBT/BSMB-108 P)	I	Bioscience II	25	75	100
9	Practical (BSBT/BSMB-109 P)	I	Biochemistry & Chemistry	25	75	100
10	Practical (BSMB-110 P)	I	Microbiology	25	75	100
					Total	**400**
					(Grand Total (Theory + Practical) =	**1000**

Part II- B.Sc. II (Microbiology Examination)

(A) Theory papers

S. No.	Papers Code	Year	Title of the Papers	Total Marks
1	(BSBT/BSMB-201)	II	Biomolecules	100
2	(BSBT/BSMB-202)	II	Biophysics & Biophysical Chemistry	100
3	(BSBT/BSMB-203)	II	Molecular Biology & Animal Cell Culture	100
4	(BSMB-204)	II	Microbial Genetics	100
5	(BSMB -205)	II	Microbial Physiology	100
6	(BSMB -206)	II	Fundamental of Computer & Biostatistics	100
			Total	**600**

(B) Practical

S. No.	Papers Code	Year	Title of the Papers	Sessional Marks	Theory Marks	Total Marks
7	Practical (BSBT/BSMB-207 P)	II	Biomolecules	25	75	100
8	Practical (BSBT/BSMB-208 P)	II	Biophysical chemistry	25	75	100
9	Practical (BSMB-209 P)	II	Fundamental of Computer & Biostatistics	25	75	100
10	Practical (BSMB-210 P)	II	Microbiology	25	75	100
					Total	**400**
					(Grand Total (Theory + Practical) =	**1000**

Part III -B.Sc. III (Microbiology Examination)

(A) Theory papers

S. No.	Papers Code	Year	Title of the Papers	Total Marks
1	(BSMB-301)	III	Medical Microbiology	100
2	(BSMB-302)	III	Agriculture, Food & Dairy Microbiology	100
3	(BSMB-303)	III	Industrial & Environmental Microbiology	100
4	(BSMB-304)	III	Immunology & Virology	100
5	(BSBT/BSMB-305)	III	Information Technology & Bioinformatics	100
			Total	**500**

(B) Practical

S. No.	Papers Code	Year	Title of the Papers	Sessional Marks	Theory Marks	Total Marks
6	Practical (BSMB- 306 P)	III	Microbiology	25	75	100
7	Practical (BSBT/BSMB-307 P)	III	Information Technology & Bioinformatics	25	75	100
8	**Entrepreneurship**	**III**	**Two Months Training**	75	225	300
					Total	**500**

(Grand Total (Theory + Practical) = 1000

Bioscience I (BSBT/BSMB-101)

M.M:100

Unit I: Cyanobacteria & Lichens

General features, taxonomic position, distribution, cell structure heterocyst, water bloom, reproduction and economic importance with special reference to *Nostoc*.

General features, classification, distribution, range of thallus structure, reproduction, ecological significance, economic importance of Lichens.

Unit II: Algae

General features, classification, distribution, range of thallus organization, reproductuion, economic importance with special reference to C*hlamydomonas* , *Volvox, Oedogonium, Chara, Vaucheria, Polysiphonia,* and *Laminaria.*

Unit III: Fungi

General features, classification, distribution, range of thallus organization, reproductuion, parasexual cycle and economic importance with special reference to *slime mold*, *Albugo, Penicillium, Agaricus, Puccinia,*

Unit IV: Bryophyta

General features, classification, distribution, range of thallus organization, reproductuion, economic importance with special reference to *Riccia, Marchantia* and *Anthoceros.*

Unit V: Pteridophyta, Gymnosperms & Angiosperms

General features, out line classification, structure, reproductuion, Alternation of generation, stelar evolution, and heterospory and seed habit. Type study *Lycopodium, Selaginella, Equisetu*m and *Pteridium*.

General features of Gymnosperms & Angiosperms with examples.

Bioscience II (BSBT/BSMB-102)

M.M:100

Unit I: Introduction to Invertebrate

General principle of taxonomy and animal classification. Salient features and outline classification upto order in nonchordates.

Unit II: Phylum- Protozoa, Porifera and Coelenterata

General characters of Protozoa: Protozoa and human Diseases, type study of *Paramecium caudatum,* General idea of origin of Metazoan, metamerism and symmetry. General character of Porifera: Type study of Sycon. General character of Coelenterate: Type study of *Obelia.*

Unit III: Phylum-Playtehelminthes, Annelida and Arthropoda

General characters of Playtehelminthes, type study of Taenia, Parasitic adaptation. General characters of Annelida: Type study of Leech. General characters of Arthropoda: Type study of *Palaeomon,* Economic importance of insects, Sericulture, Apiculture,

Unit IV: Phylum- Mollusca, Echinodermata and Minor Phyla

General characters of Mollusca: Type study of *Pila globosa.* General characters of Echinodermata: External feature of Star - fish, General introduction of minor phyla and their examples.

Unit V: Phylum- Introduction of Chordata

General characters and outline classification of phylum chordata. General characters and classification of class mammalia.

Cell Biology (BSBT/BSMB-103)

M.M:100

Unit: I

Cell as a basic unit of living system, Biochemical composition of cell, protein, lipid, carbohydrate, nucleic acid. The cell theory, Ultra structure of cell, Membrane composition, Early studies on Plasma Membrane. The lipid bilayer membrane. A summary of membrane function – simple diffusion, Facilitated transports, Active transport, Endocytosis, Pinocytosis, Phagocytosis, Exocytosis.

Unit: II

Structure and function of Mitochondria, chloroplast, Endoplasmic reticulum, Golgi complex, Lysosome, Ribosome and Peroxisome. Brief introduction to photosynthetic processes. Evolution of Mitochondria and Chloroplast.

Unit: III

Structure and function of nucleus, Nuclear Envelope, chromatin, Nucleolus and chromosome. Cell cycle, Mitosis and Meiosis.

Unit: IV

Nucleic acids, structure of DNA, DNA as genetic material- discovery of transformation & experiment of Hershey & Chase, Meselson-Stahl experiment, Griffith experiment and DNA replication. Structure and types of RNA, transcription, post transcriptional modifications, methylation, capping & splicing, polyadenylation.

Unit: V

Genetic Code: Evidence & Essentiality of Codon, Triplet code, start and stop codons. Overlapping genes and reading frames, universality of genetic code, protein synthesis, in Prokaryotes and eukaryotes and its regulation

Organic Chemistry (BSBT/BSMB-104)

M.M:100

Unit: I Structure and Properties

Electronic configuration, Atomic and Molecular orbital's, Covalent bond , Hybrid orbital: sp, sp^2, & sp^3, Bond length, Bond angle and Bond dissociation energy, Polarity of bonds and molecules, Intermolecular forces, Melting point, Boiling point, Solubility, Acid & Base in organic chemistry.

Unit: II Alkanes, Alkene and Alkyne

Structure, physical properties, reaction of alkanes, alkene and alkyne: combustion, pyrolysis and halogenations, Free radical reaction, hemolytic bond dissociation energies, halogenations of methane, halogenations of higher alkanes, other important radical chain reaction.

Unit: III Alkyl halides and Ionic reactions

Structure, classification, nomenclature and physical properties, reactions of alkyl halides (mono, di, tri and tetra halide). Nucleophilic substitution reactions (Nucleophiles & leaving groups, SN^1 & SN^2 reactions: mechanism), elimination reaction of alkyl halides; dehydrohalogenation, E_1 & E_2 reaction and cleavage of alkanes: halogenations and ozonolysis.

Unit: IV Alcohols

Structure & Nomenclature, Physical properties, reaction of alcohols: reaction with hydrogen halide, phosphorous trihalide and thionyl chloride, alkyl halide & alkyl phosphates, dehydration, synthesis of ethers from alcohols, Williamson synthesis, oxidation of alcohols.

Unit: V Aldehydes and Ketones

Structure, Nomenclature and physical properties, Nucleophilic addition to carbon- oxygen double bond, reaction of aldehydes and Ketones, Oxidation, Bayer villager oxidation , reduction to alcohols & hydrocarbons: Clemmensen & Wollf Kishner reduction, addition of water & alcohols (hydrates, hemiacetal, hemiketal ,thioacetal , and thioketals), addition of derivatives of ammonia (reaction with hydroxylamine, hydrazine, phenylhydrazine and semicarbazide), addition of hydrogen cyanide & addition of halides, Witting reaction, Aldol reaction.

Unit: VI Aliphatic Carboxylic acids and their derivatives

Structure, Nomenclature, physical properties and acidity of carboxylic acids reaction of carboxylic acids: Nucleophilic substitution at acyl carbon, reduction of carboxylic acids, decarboxylation of carboxylic acids.

Unit: VII Amines and Amides: Structure, nomenclature, physical properties and basicity of amines, reaction of amines; oxidation, reaction of amines with nitrous acids, Hoffmann and cope elimination, Reaction of amides; hydrolysis, conversion to imides, Hoffmann degradation.

Biochemistry (BSMB/BSBT-105)

M.M:100

Unit: I Carbohydrates

Monosaccharide: classification, configuration, conformation and derivatives, common disaccharides, structure and occurrence of storage and structural polysaccharides, glycoprotein: structure and functions.

Unit: II Lipids

Fatty acids, triacylglycerole, glycerophospholipids, sphingolipids: sphingomyelins, cerebrosides, and gangliosides, cholesterols, micelles, bilayers, liposome, lipoprotein structure and function.

Unit: III Amino acids and Protein

Amino acids: structure, nomenclature and general properties, peptide bonds, primary structure of

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