

સરકારી વિનયન,વિજ્ઞાન અને વાણિજ્ય કોલેજો ખાતે માઈક્રોબાયોલોજી ના મદદનીશ પ્રાધ્યાપક,વર્ગ-૨ નો અભ્યાસક્રમ જા.ક.૧૨૭/૨૦૧૧-૧૨

પ્રશ્નપત્ર-૧	વિષય :	માધ્યમ	પ્રશ્નોની સંખ્યા	પ્રશ્નોના ક્રમ	પ્રશ્નદીઠ ગુણભાર	પ્રશ્નપત્ર ના કુલ ગુણ
	સામાન્ય જ્ઞાન, ઇતિહાસ,ભૂગોળ, ગણિતશાસ્ત્ર,વિજ્ઞાન,રાજનીતિ અને રોજબરોજના બનાવો ઉપરાંત ભારતનું બંધારણ	ગુજરાતી	૧૦૦	૧ થી ૧૦૦	એક ગુણ	૧૦૦

પ્રશ્નપત્ર-૨	વિષય: Microbiology	અંગ્રેજી	૧૦૦	૧ થી ૧૦૦	બે ગુણ	૨૦૦
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**1: Fundamental of Microbiology and Microbial Diversity**

Origin of life; cellular structure and organisation of microbial cell; Bacterial classification; New approach to bacterial taxonomy; Microbes in extreme environment ; Principles and concept of microbial diversity ; Introduction to microbial habitat, ecological niches, distribution and abundance; Morphological, metabolic and genomic diversity of microorganisms. Method used for studying microbial diversity; Exploitation of microbial diversity; Ecosystem conservation.

**2: Microbial Physiology and Biochemistry**

Phases of bacterial growth; Batch, continuous, synchronous and diauxic growth; Growth measurement techniques; Growth kinetics; Evolution of energy metabolism; Bioluminescence; Quorum sensing ; Bacterial differentiation : endospore formation and spore germination ; Cell division and microbial response to stresses; Mechanism of antibiotic resistance; Membrane structure and transport mechanism; Cell signal and signal transduction; Metabolism of carbohydrate, protein, lipids and nucleotides; Oxidative phosphorylation.

**3 Microbial Genetics and Molecular Biology**

DNA structure and genome organisation; Modes of gene exchange in bacteria: transduction, transformation, conjugation and transposable elements; Genetics of T4 and T7 phage ; Use of gene exchange processes in gene structure analysis; DNA replication; Transcription and translation ; Regulation of gene expression in prokaryotes; Mutation: types of mutation, mutation rate and its determination; DNA damage and its repair pathway; Enzymes involved in rDNA technology; purification, amplification and sequencing of microbial DNA, cloning vectors, blotting Techniques, Gene library.

P.T.O.

  
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**4: Fundamentals of Immunology and Enzymology**

Types of immunity; Cells and organs of immune system; Role of cell receptor and protein in immunity; Antigen and antibody characteristics; Antigen-antibody reaction; Major histocompatibility complex; Hypersensitivity reactions; Cytokines; Compliment system; Classification of enzymes; Enzymes as biocatalyst; Enzyme kinetics: single and multisubstrate ; Enzyme inhibition; property and functions of co-enzyme, isoenzymes, ribozymes, abzymes, allosteric enzymes. General account of diseases caused by bacteria ( Cholera, Typhoid, gastroenteritis);viruses (Polio, Hepatitis, AIDS);protozoa (Amoebic dysentery, Malaria).Cancer and transplantation immunology.

**5: Environmental Microbiology**

Global environmental problems; Environmental monitoring; Characterization of wastewater and solid waste; Principles and techniques of domestics and industrial waste treatment; Principles and strategies of Bioremediation, biodegradation and biodeterioration; Techniques of bioremediation; Bioleaching; Biobenefication and biosorption of metals; Microbial enhanced oil recovery; Microbial desulphurization of coal; Use of GMO in bioremediation

**6: Industrial Microbiology**

Basic concept of microbial technology; isolation, screening, improvement and preservation of industrially useful microbial stains, Microbial production of major antibiotics, enzymes, organic acids vitamins, alcoholic beverages, polymer, bioplastics, solvents dairy products ,biomass, amino acid, biofertilizer, microbial insecticides DNA products and biotransformation of steroids. Intellectual property rights, Patenting of biological materials implication of patenting

**7: Bioprocess Technology**

Main components of a Fermentor; Design of typical Fermentor; Types of Fermentor for microbial process; Formulation and Modification of fermentation media; Handling of solids and liquid ; Sterilisation of media and air for fermentation process; Aeration and agitation in microbial fermentation; Determination of KLa; Recovery and purification of microbial products; Concepts of fermentation scale-up; Major problems of scale-up and their remediation , Micro process control of fermentation process; immobilization techniques for microbial cells and enzymes.

**8: Biostatistics, Bioinformatics and Bioinstrumentation**

Principles of biostatistics, use of biostatistics in microbiology, determination of central tendency and dispersion of data, test of significance, correlation and regression analysis. Various biological databases. Sequence analysis microbial genomics, proteomics and phylogenetic analysis. Basic principles and applications of microscopy, spectroscopy, chromatography electrophoresis, and centrifugation in microbiology.

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