UNIVERSITY DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY (UDICT)

MGM Campus, CIDCO, Aurangabad - 431003

Website: https://mgmu.ac.in, www.udict.mgmu.ac.in

ONLINE UNDERGRADUATE ENTRANCE EXAMINATION INFORMATION

For

MGMU – CET 2024

for

Admission to First Year of B. Tech. Programs

1. B. Tech. Information Technology

2. B. Tech. Artificial Intelligence and Machine Learning

3. B.Tech. Data Science

(For Academic Year 2024-25)

PROGRAMs

MGM University Aurangabad invites applications to its 4 years on-campus Undergraduate programs for the Academic year 2024 – 2025. Admissions are open for the following programs to be offered in UDICT, MGM University Aurangabad.

Name of The Program	Approved Intake	Type of program	Duration
B. Tech. Information Technology (with specializations in IoT, Blockchain and Big Data Analytics)	180	Undergraduate	4 Years
B. Tech. Artificial Intelligence and Machine Learning	60	Undergraduate	4 Years
B.Tech. Data Science	60	Undergraduate	4 Years

Help line number for Technical Assistance for Online application form filling for MGMU - CET 2024:

B.Tech.: 9404494299, 8446005311

website: www.mgmu.ac.in, www.udict.mgmu.ac.in

1. MGMU - CET 2024 (B.Tech.) Information

Important Information for MGMU UDICT UG Entrance Examination

Schedule	B.Tech.
Online registration of Confirmation of Application Form on website	5th May 2024 onwards
Application Fees for admission and MGMU-CET Examination Fees Rs. 1500/-	Pay only through online mode
Date and Time	11th May 2024 11 am to 2 pm
Duration of Examination	3 hours
Declaration of Result	The result will be communicated to the candidate on the registered email id.

2. EXAMINATION SCHEDULE

Activity	Time
Log in to Juno ERP module	10.30 AM
First Login to read the instructions.	10:50 AM
Commencement of Online Examination	11:00 AM
End of Online Examination	2:00 PM

Display of Candidate response in his / her log-in	Schedule will be notified and declared separately
Submission of objections on Question Paper	Within 24 hrs. after the examination is over
Declaration of Result	The result will be communicated to the candidate on the registered email ID

3. INTRODUCTION

(a) The MGM University Aurangabad has established "Admission regulating authority and In-charge engineering entrance exam cell" as per the Maharashtra Act No XXVI of 2019).

(b) The In-charge MGMU - CET 2024 Cell, appointed by competent authority is authorized to conduct MGMU - CET 2024 (B.Tech.) and selection of candidates for admission to 4 years Duration Full Time Undergraduate Degree programs in "Engineering and Technology" for the academic year 2024-25.

(c) The Registrar, MGM University Aurangabad has notified the rules to regulate the admissions to the First Year of Full Time Professional Undergraduate in "Engineering and Technology". The admissions shall be carried out as per these Rules and its amendment from time to time.

(d) The In-charge MGMU - CET 2024 cell, shall act as Nodal Officer for the MGMU - CET 2024.

4. DEFINITIONS

(a) "Act" means The MGM University, Aurangabad (Regulation of Admissions and Fees) Act, 2019 (Act XXVI of 2019);

(b) "All India Seats" means seats available to an eligible Indian National Candidate;

(c) "Application Form" means prescribed form filled up online by the Candidate for admission;

(d) "Competent Authority" means the Registrar, MGMU Aurangabad.

(e) "Program" means the postgraduate and undergraduate technical courses in "Engineering and Technology".

(f) "Eligible Candidates" means the candidates who are eligible for different professional courses as notified by the MGMU, Aurangabad.

(g) "SSC" means the Secondary School Certificate (Standard X) examination conducted by Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent certificate awarded by a recognized Board;

(h) "HSC" means the Higher Secondary School Certificate (Standard XII) examination conducted by Maharashtra State Board of Secondary and Higher Secondary Education or its equivalent certificate awarded by a recognized Board;

(i) "MHT-CET 2024" means Common Entrance Test conducted by the Government of Maharashtra;

(j) "Qualifying Examination" means examinations on the basis of which a candidate becomes eligible for admission or its equivalent examination;

5. SCHEME OF EXAMINATION

Date of Examination: The examination will be conducted in ON-LINE MODE on campus from 11th May 2024 for PCM group.

Weightage and Pattern of Examination: MGMU - CET 2024 will be conducted for PCM group (Physics, Chemistry and Mathematics). The question paper has multiple choice questions (MCQ) having 4 options. There will be no Negative Marking. The questions will be mainly application based. No marks are awarded for questions not attempted. The questions will be selected at random from a large question bank. All the questions and instructions of the test will be in English only.

The number of questions and marking system is as follows:

Subject	Number of Multiple-Choice Questions (MCQ)	Mark(s) per Question	Total Marks	Duration in Minutes
Mathematics	50	2	100	90
Physics	50	1	100	90
Chemistry	50			
		Total	200	180

6. SYLLABUS FOR MGMU - CET 2024 EXAMINATION

The MGMU - CET 2024 will be conducted based on the syllabus of Physics, Chemistry and Mathematics subjects. The detailed syllabus for MGMU - CET 2024 is as follows:

MATHEMATICS

UNIT 1: SETS, RELATIONS AND FUNCTIONS: Sets and their representation: Union, intersection and complement of sets and their algebraic properties; Power set; Relation, Type of relations, equivalence relations, functions; one-one, into and onto functions, the composition of functions.

UNIT 2: COMPLEX NUMBERS AND QUADRATIC EQUATIONS: Complex numbers as ordered pairs of reals, Representation of complex numbers in the form $a + ib$ and their representation in a plane, Argand diagram, algebra of complex number, modulus and argument (or amplitude) of a complex number, square root of a complex number, triangle inequality, Quadratic equations in real and complex number system and their solutions Relations between roots and coefficient, nature of roots, the formation of quadratic equations with given roots.

UNIT 3: MATRICES AND DETERMINANTS: Matrices, algebra of matrices, type of matrices,

determinants and matrices of order two and three, properties of determinants, evaluation of determinants, area of triangles using determinants, Adjoint and evaluation of inverse of a square matrix using determinants and elementary transformations, Test of consistency and solution of simultaneous linear equations in two or three variables using determinants and matrices.

UNIT 4: PERMUTATIONS AND COMBINATIONS: The fundamental principle of counting, permutation as an arrangement and combination as section, Meaning of $P(n, r)$ and C(n, r), simple applications.

UNIT 5: BINOMIAL THEOREM AND ITS SIMPLE APPLICATIONS: Binomial theorem for a positive integral index, general term and middle term, properties of Binomial coefficients and simple applications.

UNIT 6: SEQUENCE AND SERIES: Arithmetic and Geometric progressions, insertion of arithmetic, geometric means between two given numbers, Relation between A.M and G.M sum up to n terms of special series; $Sn, Sn2, Sn3$. Arithmetic-Geometric progression.

UNIT 7: LIMIT, CONTINUITY AND DIFFERENTIABILITY: Real–valued functions, algebra of functions, polynomials, rational, trigonometric, logarithmic and exponential functions, inverse function. Graphs of simple functions. Limits, continuity and differentiability. Differentiation of the sum, difference, product and quotient of two functions. Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit functions; derivatives of order up to two, Rolle's and Lagrange's Mean value Theorems, Applications of derivatives: Rate of change of quantities, monotonic Increasing and decreasing functions, Maxima and minima of functions of one variable, tangents and normal.

UNIT 8: INTEGRAL CALCULAS: Integral as an anti-derivative, Fundamental Integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integrations by substitution, by parts and by partial functions. Integration using trigonometric identities. Evaluation of simple integrals. Integral as the limit of a sum. The fundamental theorem of calculus, properties of definite integrals. Evaluation of definite integrals, determining areas of the regions bounded by simple curves in standard form.

UNIT 9: DIFFERENTIAL EQUATIONS: Ordinary differential equations, their order and degree, the formation of differential equations, solution of differential equation by the method of separation of variables, solution of a homogeneous and linear differential equation of the type $dy/dx + p(x) = q(x)$

UNIT 10: COORDINATE GEOMETRY: Cartesian system of rectangular coordinates in a plane, distance formula, sections formula, locus and its equation, translation of axes, the slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axis.

Straight line, Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, the distance of a point form a line, equations of internal and external by sectors of angles between two lines coordinate of the centroid, orthocenter and circum-centre of a triangle, equation of the family of lines passing through the point of intersection of two lines.

Circle, conic sections

A standard form of equations of a circle, the general form of the equation of a circle, its radius and central, equation of a circle when the endpoints of a diameter are given, points of intersection of a line and a circle with the center at the origin and condition for a line to be tangent to a circle, equation of the tangent, sections of conics, equations of conic sections (parabola, ellipse and hyperbola) in standard forms, condition for $Y = mx + c$ to be a tangent and point (s) of tangency.

UNIT 11: THREE-DIMENSIONAL GEOMETRY: Coordinates of a point in space, the distance between two points, section formula, directions ratios and direction cosines, the angle between two intersecting lines. Skew lines, the shortest distance between them and its equation. Equations of a line and a plane in different forms, the intersection of a line and a plane, coplanar lines.

UNIT 12: VECTOR ALGEBRA: Vectors and scalars, the addition of vectors, components of a vector in two dimensions and three-dimensional space, scalar and vector products, scalar and vector triple product.

UNIT 13: STATISTICS AND PROBABILITY: Measures of discretion; calculation of mean, median, mode of grouped and ungrouped data calculation of standard deviation, variance and mean deviation for grouped and ungrouped data. Probability: Probability of an event, addition and multiplication theorems of probability, Baye's theorem, probability distribution of a random variate, Bernoulli trials and binomial distribution.

UNIT 14: TRIGONOMETRY: Trigonometric identities and equations, trigonometric functions, inverse trigonometric functions and their properties, heights and distance.

PHYSICS

UNIT 1: PHYSICS AND MEASUREMENT: Physics, technology and society, S I Units, fundamental and derived units, least count, accuracy and precision of measuring instruments, Errors in measurement, Dimensions of Physics quantities, dimensional analysis and its applications.

UNIT 2: KINEMATICS: The frame of reference, motion in a straight line, Position- time graph, speed and velocity; Uniform and non-uniform motion, average speed and instantaneous velocity, uniformly accelerated motion, velocity-time, position-time graph, relations for uniformly accelerated motion, Scalars and Vectors, Vector. Addition and subtraction, zero vector, scalar and vector products, Unit Vector, Resolution of a Vector. Relative Velocity, Motion in a plane, Projectile Motion, Uniform Circular Motion.

UNIT 3: LAWS OF MOTION: Force and inertia, Newton's First law of motion; Momentum, Newton's Second Law of motion, Impulses; Newton's Third Law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and Kinetic friction, laws of friction, rolling friction. Dynamics of uniform circular motion: centripetal force and its applications.

UNIT 4: WORK, ENERGY AND POWER: Work done by a content force and a variable force; kinetic and potential energies, work-energy theorem, power. The potential energy of spring conservation of mechanical energy, conservative and neoconservative forces; Elastic and inelastic collisions in one and two dimensions.

UNIT5: ROTATIONAL MOTION: Centre of the mass of a two-particle system, Centre of the mass of a rigid body; Basic concepts of rotational motion; a moment of a force; torque, angular momentum, conservation of angular momentum and its applications; the moment of inertia, the radius of gyration. Values of moments of inertia for simple geometrical objects, parallel and perpendicular axes theorems and their applications. Rigid body rotation equations of rotational motion.

UNIT 6: GRAVITATION: The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Kepler's law of planetary motion. Gravitational potential energy; gravitational potential. Escape velocity, Orbital velocity of a satellite. Geostationary satellites.

UNIT 7: PROPERTIES OF SOLIDS AND LIQUIDS: Elastic behavior, Stress-strain relationship, Hooke's Law. Young's modulus, bulk modulus, modulus of rigidity. Pressure due to a fluid column; Pascal's law and its applications. Viscosity. Stokes' law. terminal velocity, streamline and turbulent flow. Reynolds number. Bernoulli's principle and its applications. Surface energy and surface tension, angle of contact, application of surface tension - drops, bubbles and capillary rise. Heat, temperature, thermal expansion; specific heat capacity, calorimetry; change of state, latent heat. Heat transfer- conduction, convection and radiation. Newton's law of cooling.

UNIT 08: OSCILLATIONS AND WAVES: Periodic motion - period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M.) and its equation; phase: oscillations of a spring -restoring force and force constant: energy in S.H.M. - Kinetic and potential energies; Simple pendulum - derivation of expression for its time period: Free, forced and damped oscillations, resonance. Wave motion. Longitudinal and transverse waves, speed of a wave. Displacement relation for a progressive wave. Principle of superposition of waves, a reflection of waves. Standing waves in strings and organ pipes, fundamental mode and harmonics. Beats. Doppler Effect in sound.

UNIT 09: ELECTROSTATICS: Electric charges: Conservation of charge. Coulomb's law-forces between two-point charges, forces between multiple charges: superposition principle and continuous charge distribution. Electric field: Electric field due to a point charge, Electric field lines. Electric dipole, Electric field due to a dipole. Torque on a dipole in a uniform electric field. Electric flux. Gauss's law and its applications to find fields due to infinitely long uniformly charged straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell. Electric potential and its calculation for a point charge, electric dipole and system of charges; Equipotential surfaces, Electrical potential energy of a system of two-point charges in an electrostatic field. Conductors and insulators. Dielectrics and electric polarization, capacitor, the combination of capacitors in series and parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates. Energy stored in a capacitor.

UNIT 10: CURRENT ELECTRICITY: Electric current. Drift velocity. Ohm's law. Electrical

resistance. Resistances of different materials. V-l characteristics of Ohmic and non-ohmic conductors. Electrical energy and power. Electrical resistivity. Color code for resistors; Series and parallel combinations of resistors; Temperature dependence of resistance. Electric Cell and its Internal resistance, potential difference and emf of a cell, a combination of cells in series and parallel. Kirchhoff's laws and their applications. Wheatstone bridge. Meter Bridge. Potentiometer - principle and its applications.

UNIT 11: MAGNETIC EFFECTS OF CURRENT AND MAGNETISM: Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long current carrying straight wire and solenoid. Force on a moving charge in uniform magnetic and electric fields. Cyclotron. Force on a current-carrying conductor in a uniform magnetic field. The force between two parallel current carrying conductors- definition of ampere. Torque experienced by a current loop in a uniform magnetic field: Moving coil galvanometer, its current sensitivity and conversion to ammeter and voltmeter. Current loop as a magnetic dipole and its magnetic dipole moment. Bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. Para-, dia- and ferromagnetic substances. Magnetic susceptibility and permeability. Hysteresis. Electromagnets and permanent magnets.

UNIT 12: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS: Electromagnetic induction: Faraday's law. Induced emf and current: Lenz's Law, Eddy currents. Self and mutual inductance. Alternating currents, peak and RMS value of alternating current/ voltage: reactance and impedance: LCR series circuit, resonance: Quality factor, power in AC circuits, wattless current. AC generator and transformer.

UNIT 13: ELECTROMAGNETIC WAVES: Electromagnetic waves and their characteristics, Transverse nature of electromagnetic waves, Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet. X-rays. Gamma rays), Applications of e.m. waves.

UNIT 14: OPTICS: Reflection and refraction of light at plane and spherical surfaces, mirror formula. Total internal reflection and its applications. Deviation and Dispersion of light by a; prism; Lens Formula. Magnification. Power of a Lens. Combination of thin lenses in contact. Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers. Wave optics: wavefront and Huygens' principle. Laws of reflection and refraction using Huygens principle. Interference, Young's double-slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarization, plane-polarized light: Brewster's law, uses of plane-polarized light and Polaroid.

UNIT 15: DUAL NATURE OF MATTER AND RADIATION: Dual nature of radiation. Photoelectric effect. Hertz and Lenard's observations; Einstein's photoelectric equation: particle nature of light. Matter waves-wave nature of particle, de Broglie relation. Davisson-Germer experiment.

UNIT 16: ATOMS AND NUCLEI: Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars: isotones. Radioactivity- alpha. beta and gamma particles/rays and their properties;

radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission and fusion.

UNIT 17: ELECTRONIC DEVICES: Semiconductors; semiconductor diode: 1- V characteristics in forward and reverse bias; diode as a rectifier; I-V characteristics of LED. the photodiode, solar cell and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor: transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR. AND. NOT. NAND and NOR). Transistor as a switch.

UNIT 18: COMMUNICATION SYSTEMS: Propagation of electromagnetic waves in the atmosphere; Sky and space wave propagation. Need for modulation. Amplitude and Frequency Modulation, Bandwidth of signals. the bandwidth of Transmission medium, Basic Elements of a Communication System (Block Diagram only).

CHEMISTRY

UNIT 1: STATES OF MATTER: Matter and its nature, Dalton's atomic theory: Concept of atom, molecule, element and compound: Physical quantities and their measurements in chemistry, precision and accuracy, significant figures. S. I. Units, dimensional analysis: Laws of chemical combination; Atomic and molecular masses, mole concept, molar mass, percentage composition, empirical and molecular formulae: Chemical equations and stoichiometry.

Classification of matter into solid, liquid and gaseous states. Gaseous State: Measurable properties of gasses: Gas laws -Boyle's law, Charle's law. Graham's law of diffusion, Avogadro's law, Dalton's law of partial pressure; Concept of Absolute scale of temperature; Ideal gas equation; Kinetic theory of gasses (only postulates); Concept of average, root mean square and most probable velocities; Real gasses, deviation from Ideal behavior, compressibility factor and van der Waals equation.

Liquid State: Properties of liquids - vapor pressure, viscosity and surface tension and effect of temperature on them (qualitative treatment only). Solid State: Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Braggs Law and its applications: Unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, an imperfection in solids; Electrical and magnetic properties.

UNIT 2: ATOMIC AND MOLECULAR STRUCTURE: Thomson and Rutherford atomic models and their limitations; Nature of electromagnetic radiation, photoelectric effect; Spectrum of the hydrogen atom. Bohr model of a hydrogen atom - its postulates, derivation of the relations for the energy of the electron and radii of the different orbits, limitations of Bohr's model; Dual nature of matter, de Broglie's relationship. Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanics, the quantum mechanical model of the atom, its important features. Concept of atomic orbitals as one-electron wave functions: Variation of ψ and $\psi2$ with r for 1s and 2s orbitals; various quantum numbers (principal, angular momentum and magnetic quantum numbers) and their significance; shapes of s, p and d - orbitals, electron spin and Spin quantum number: rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements, extra stability of half-filled and completely filled orbitals. Chemical bonding and molecular structure: Kossel - Lewis's approach to chemical bond formation, the concept of ionic and covalent bonds. Ionic bonding: Formation of ionic bonds, factors affecting the formation of ionic bonds; calculation of lattice enthalpy. Covalent bonding: Concept of electronegativity, Fajan's rule,

dipole moment: Valence Shell Electron pair repulsion (VSEPR) theory and shapes of simple molecules. Quantum mechanical approach to covalent bonding: Valence bond theory - its important features, the concept of hybridization involving s, p and d orbitals; Resonance. Molecular orbital theory - Its important features are LCAOs, types of molecular orbitals (bonding, antibonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, the concept of bond order, bond length and bond energy. Elementary idea of metallic bonding. Hydrogen bonding and its applications.

UNIT 3: THERMODYNAMICS: Basic concepts: System and surroundings, extensive and intensive properties, state functions, types of processes. The first law of thermodynamics - Concept of work, heat internal energy and enthalpy, heat capacity, molar heat capacity; Hess's law of constant heat summation; Enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ionization and solution. The second law of thermodynamics -Spontaneity of processes; ΔS of the universe and ΔG of the system as criteria for spontaneity. $\Delta G°$ (Standard Gibbs energy change) and equilibrium constant.

UNIT 4: PHYSICAL AND CHEMICAL EQUILIBRIA: Different methods for expressing the concentration of solution – molality, molarity, mole fraction, percentage (by volume and mass both), the vapor pressure of solutions and Raoul's Law - Ideal and non-ideal solutions, vapor pressure - composition, plots for ideal Andon-ideal solutions; Colligative properties of dilute solutions - a relative lowering of vapor pressure, depression of freezing point, the elevation of boiling point and osmotic pressure; Determination of molecular mass using colligative properties; Abnormal value of molar mass,Van't Hoff factor and its significance. Equilibrium: Meaning of equilibrium, the concept of dynamic equilibrium. Physical equilibrium: Solid-liquid, liquid - gas and solid-gas equilibria, Henry's law. General characteristics of equilibrium involving physical processes.

Chemical equilibrium: Law of chemical equilibrium, equilibrium constants (Kp and Kc) and their significance, the significance of ΔG and $\Delta G°$in chemical equilibrium, factors affecting equilibrium concentration, pressure, temperature, the effect of catalyst; Le Chatelier's principle.

Ionic equilibrium: Weak and strong electrolytes, ionization of electrolytes, various concepts of acids and bases (Arrhenius. Bronsted-Lowry and Lewis) and their ionization, acid-base equilibria (including multi stage ionization) and ionization constants, ionization of water. pH scale, common ion effect, hydrolysis of salts and pH of their solutions, the solubility of sparingly soluble salts and solubility products, buffer solutions.

UNIT 5: REDOX REACTIONS AND ELECTROCHEMISTRY: Electronic concepts of oxidation and reduction, redox reactions, oxidation number, rules for assigning oxidation number, balancing of redox reactions. Electrolytic and metallic conduction, conductance in electrolytic solutions, molar conductivities and their variation with concentration: Kohlrausch's law and its applications. Electrochemical cells - Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half - cell and cell reactions, emf of a galvanic cell and its measurement: Nernst equation and its applications; Relationship between cell potential and Gibbs' energy change: Dry cell and lead accumulator; Fuel cells.

UNIT 6: CHEMICAL KINETICS: Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and

molecularity of reactions, rate law, rate constant and its units, differential and integral forms of zero and first-order reactions, their characteristics and half-lives, the effect of temperature on the rate of reactions, Arrhenius theory, activation energy and its calculation, collision theory of bimolecular gaseous reactions (no derivation). Surface Chemistry: Adsorption- physisorption and chemisorption and their characteristics, factors affecting adsorption of gasses on solids - Freundlich and Langmuir adsorption isotherms, adsorption from solutions. Catalysis: Homogeneous and heterogeneous, activity and selectivity of solid catalysts, enzyme catalysis and its mechanism. Colloidal state: distinction among true solutions, colloids and suspensions, classification of colloids - lyophilic, lyophobic; multimolecular, macromolecular and associated colloids (micelles), preparation and properties of colloids - Tyndall effect. Brownian movement, electrophoresis, dialysis, coagulation and flocculation: Emulsions and their characteristics.

UNIT 7: PROPERTIES OF ELEMENTS AND ISOLATION OF METALS: Classification of elements and periodicity in properties: Modem periodic law and present form of the periodic table, s, p. d and f block elements, periodic trends in properties of elements atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states and chemical reactivity. General principles and processes of isolation of metals: Modes of occurrence of elements in nature, minerals, ores; Steps involved in the extraction of metals - concentration, reduction (chemical and electrolytic methods) and refining with special reference to the extraction of Al. Cu, Zn and Fe; Thermodynamic and electrochemical principles involved in the extraction of metals.

UNIT 8: HYDROGEN AND S-BLOCK ELEMENTS: Hydrogen: Position of hydrogen in periodic table, isotopes, preparation, properties and uses of hydrogen; physical and chemical properties of water and heavy water; structure, preparation, reactions and uses of hydrogen peroxide; classification of hydrides - ionic, covalent and interstitial; hydrogen as a fuel. s-block elements (alkali and alkaline earth metals): Group 1 and 2 Elements: General introduction, electronic configuration and general trends in physical and chemical properties of elements, anomalous properties of the first element of each group, diagonal relationships. Preparation and properties of some important compounds - sodium carbonate and sodium hydroxide and sodium hydrogen carbonate; Industrial uses of lime, limestone. Plaster of Paris and cement: biological significance of Na, K. Mg and Ca.

UNIT 9: P- , D- AND F- BLOCK ELEMENTS: p-block elements: General introduction, electronic configuration and general trends in physical and chemical properties of elements across the periods and down the groups; unique behavior of the first element in each group. Groupwise study of the p – block elements, Group -13: Preparation, properties and uses of boron and aluminum; Structure, properties and uses of borax, boric acid, diborane, boron trifluoride, aluminum chloride and alums. Group -14: The tendency for catenation; Structure, properties and uses of Allotropes and oxides of carbon, silicon tetrachloride, silicates, zeolites and silicones. Group -15: Properties and uses of nitrogen and phosphorus; Allotropic forms of phosphorus; Preparation, properties, structure and uses of ammonia, nitric acid, phosphine and phosphorus halides, (PCl_3. PCl_5); Structures of oxides and oxoacids of nitrogen and phosphorus. Group -16: Preparation, properties, structures and uses of ozone: Allotropic forms of Sulphur; Preparation, properties, structures and uses of sulphuric acid (including its

industrial preparation); Structures of oxoacids of Sulphur. Group-17: Preparation, properties and uses of hydrochloric acid; Trends in the acidic nature of hydrogen halides; Structures of interhalogen compounds and oxides and oxoacids of halogens. Group-18: Occurrence and uses of noble gases; Structures of fluorides and oxides of xenon. d - and f- block elements: Transition elements: General introduction, electronic configuration, occurrence and characteristics, general trends in properties of the first-row transition elements - physical properties, ionization enthalpy, oxidation states, atomic radii, colour, catalytic behavior, magnetic properties, complex formation, interstitial compounds, alloy formation; Preparation, properties and uses of $K_2Cr_2O_7$, and $KMnO_4$. Inner transition elements: Lanthanide: Electronic configuration, oxidation states and lanthanide contraction. Actinoids: Electronic configuration and oxidation states. Coordination compounds: Introduction to coordination compounds. Werner's theory; ligands, coordination number, denticity, chelation; IUPAC nomenclature of mononuclear coordination compounds, isomerism; bonding-valence bond approach and basic ideas of crystal field theory, color and magnetic properties; importance of coordination compounds (in qualitative analysis, extraction of metals and in biological systems).

UNIT10: ENVIRONMENTAL CHEMISTRY: Environmental pollution: Atmospheric, water and soil. Atmospheric pollution: Tropospheric and Stratospheric Tropospheric pollutants: Gaseous pollutants - Oxides of carbon, nitrogen and Sulphur, hydrocarbons; their sources, harmful effects and prevention; Greenhouse effect and Global warming: Acid rain. Particulate pollutants: Smoke, dust, smog, fumes, mist; their sources, harmful effects and prevention. Stratospheric pollution: Formation and breakdown of ozone, depletion of the ozone layer - its mechanism and effects. Water Pollution: Major pollutants such as pathogens, organic wastes and chemical pollutants; their harmful effects and prevention. Soil pollution: Major pollutants such as; Pesticides (insecticides. herbicides and fungicides), their harmful effects and prevention. Strategies to control environmental pollution.

UNIT 11: PRINCIPLES OF ORGANIC CHEMISTRY AND HYDROCARBONS: Tetravalency of carbon: Shapes of simple molecules - hybridization (s and p): Classification of organic compounds based on functional groups: and those containing halogens, oxygen, nitrogen and Sulphur; Homologous series: Isomerism - structural and stereoisomerism. Nomenclature (Trivial and IUPAC), Covalent bond fission - Homolytic and heterolytic: free radicals, carbocations and carbanions; stability of carbocations and free radicals, electrophiles and nucleophiles. Electronic displacement in a covalent bond - Inductive effect, electromeric effect, resonance and hyperconjugation. Common types of organic reactions - substitution, addition, elimination and rearrangement. Hydrocarbons: Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions. Alkanes: Conformations: Sawhorse and Newman projections (of ethane): Mechanism of halogenation of alkanes. Alkenes: Geometrical isomerism: Mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoffs and peroxide effect): Ozonolysis and polymerization. Alkynes: Acidic character: Addition of hydrogen, halogens, water and hydrogen halides: Polymerization. Aromatic hydrocarbons: Nomenclature, benzene - structure

and aromaticity: Mechanism of electrophilic substitution: halogenation, nitration. Friedel - Craft's alkylation and acylation, directive influence of the functional group in monosubstituted benzene.

UNIT 12: ORGANIC COMPOUNDS CONTAINING OXYGEN, NITROGEN AND HALOGEN FUNCTIONAL GROUPS: Organic Compounds Containing Oxygen: General methods of preparation, properties, reactions and uses. Alcohols: Identification of primary, secondary and tertiary alcohols: mechanism of dehydration. Phenols: Acidic nature, electrophilic substitution reactions: halogenation, nitration and sulphonation. Reimer - Tiemann reaction. Ethers: Structure Aldehyde and Ketones: Nature of carbonyl group; Nucleophilic addition to >C=O group, relative reactivities of aldehydes and ketones; Important reactions such as - Nucleophilic addition reactions (addition of HCN. NH3, and its derivatives), Grignard reagent; oxidation: reduction (Wolf Kishner and Clemmensen); the acidity of hydrogen. aldol condensation, Cannizzaro reaction.Haloform reaction, Chemical tests to distinguish between aldehydes and ketones. Carboxylic Acids: Acidic strength and factors affecting it Organic Compounds Containing Nitrogen: General methods of preparation. Properties, reactions and uses. Amines: Nomenclature, classification structure, basic character and identification of primary, secondary and tertiary amines and their basic character. Diazonium Salts: Importance in synthetic organic chemistry. Organic Compounds Containing Halogen: General methods of preparation, properties and reactions; Nature of C-X bond; Mechanisms of substitution reactions. Uses; Environmental effects of chloroform, iodoform, freons and DDT.

UNIT 13: POLYMERS AND BIOMOLECULES: Polymers: General introduction and classification of polymers, general methods of polymerization - addition, condensation and copolymerization. Natural and synthetic rubber and vulcanization, some important polymers with emphasis on their monomers and uses, e.g., polythene, nylon, polyester and Bakelite. Biomolecules: General introduction and importance of biomolecules. Carbohydrates: Classification; aldoses and ketoses: monosaccharide's (glucose and fructose) and Constituent monosaccharides of oligosaccharides (sucrose, lactose and maltose). Proteins: Elementary Idea of amino acids, peptide bond, polypeptides. Proteins: primary, secondary, tertiary and quaternary structure (qualitative idea only), denaturation of proteins, enzymes. Vitamins: Classification and functions. Nucleic Acids: Chemical constitution of DNA and RNA, Biological functions of nucleic acids.

UNIT 14: CHEMISTRY IN EVERYDAY LIFE: Chemicals in Medicines: Analgesics, tranquillizers, antiseptics, disinfectants, antimicrobials, anti-fertility drugs, antibiotics, antacids. Anti-histamines -their meaning and common examples. Chemicals in food: Preservatives, artificial sweetening agents - common examples. Cleansing Agents: Soaps and detergents, cleansing action

UNIT 15: THEORETICAL PRINCIPLES OF EXPERIMENTAL CHEMISTRY: Purification methods: Crystallization, sublimation, distillation, differential extraction and

chromatography – principles and their applications. Qualitative analysis: Detection of nitrogen, Sulphur, phosphorus and halogens. Quantitative analysis: (basic principles only) Estimation of carbon, hydrogen, nitrogen, halogens, Sulphur, phosphorus. Calculations of empirical formulae and molecular formulae: Numerical problems in organic quantitative analysis, Detection of extra elements (nitrogen, Sulphur and halogens) in organic compounds; Detection of the following functional groups; hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketones) carboxyl and amino groups in organic compounds. The chemistry involved in the preparation of the following: Inorganic compounds; Mohr's salt, potash alum. Organic compounds: Acetanilide, p-nitro acetanilide, aniline yellow, iodoform. The chemistry involved in the titrimetric exercises: acids, bases and the use of indicators, oxalic acid vs KMnO4, Mohr's salt vs KMnO4 Qualitative analysis of inorganic salts: Chemical principles involved in the qualitative salt analysis.

7. ELIGIBILITY FOR APPEARING TO MGMU - CET 2024

All the candidates appeared / passed the qualifying examination i.e., HSC / 12th Standard examination or its equivalent examination and having Indian Nationality are eligible for appearing for MGMU - CET 2024.

- **Maharashtra State Candidate:**
  (i) The Candidate should be an Indian National and having domicile of Maharashtra state and/or born in Maharashtra state.
  (ii) Appeared for HSC or its equivalent examination from Maharashtra state.

- **All India & NRI* Candidates:**
  (i) The Candidate should be an Indian National.
  (ii) Appeared for HSC or its equivalent examination.
  *NRI Seats are applicable as per AICTE Norms.

- **Examination Centre:** The MGMU - CET 2024 will be conducted online in the campus.

- **Important Instructions to the MGMU - CET 2024 appearing candidates**
1. The Online Question Paper will contain Multiple Choice Questions (MCQs) with four options (answers) for each question.
2. Each question will have Four alternatives (answers) out of which only one alternative/answer will be the correct.
3. Physics and Chemistry subjects will have 1 mark for each question and Mathematics subject will have 2 marks for each question.
4. Total duration for the MGMU - CET 2024 Examination is 180 Minutes in which the Candidate has to solve 150 questions.
5. There is no Negative Marking.
6. The questions will be displayed on the computer screen one at a time. Candidates are advised not to spend too much time on any particular question.
7. Questions will be available in English language only.

The duration of the test is 180 minutes. The candidate should appear in the following test in the below prescribed manner –

a. This paper is having 2 Groups of Physics-Chemistry and Mathematics with a total 180 Minutes Duration, first 90 minutes Physics and chemistry will be enabled and only after completion of first 90 minutes' time Physics-Chemistry group will be auto submitted and Mathematics group will be enabled with 90 minutes' duration.

Sr. No.	Type of Group	Total Duration (in Min)	01 to 90 Min	91 to 180- min
1	PCM Group	180	Physics & Chemistry	Mathematics

b. The mock link for the online examination of MGMU - CET 2024 will be available on the www.mgmu.ac.in.

8. ONLINE APPLICATION FORM

Application Form for MGMU - CET 2024 will be filled through Online Mode only. The information brochure for MGMU - CET 2024 and the user manual for filling out the online application form are available on website www.mgmu.ac.in, www.udict.mgmu.ac.in. Candidate is advised to download and print the user manual for filling up the online application form.

For submission of online application form the candidates should login at www.mgmu.ac.in, www.udict.mgmu.ac.in website. The detailed procedure for online submission of application form is given in the user manual. Please quote your application no. in all future correspondence with In-charge MGMU - CET 2024 Cell Office.

The Online Application Submission is four step processes:
a. Registration - Creation of Username and Password
b. My Application - Filling up Application Form for MGMU - CET 2024
c. Upload of Photograph and Signature - Candidate must upload their recent Photograph and Signature in Online system
d. Payment of Fees - Candidates can make payment of Fees using Online Payment mode only.

• Candidates MUST review their Form details before payment of Fees; the details will not be available for edit once payment is made. Fees once paid will not be refundable under any circumstances.

• To Upload Photograph and Signature: Please note that all the applicants are required to upload their recent scanned / digital color photograph and signature. The file size of the Photograph should be between 15 KB to 50 KB and Signature should be between 5KB to 20 KB per file. The online application system will not allow uploading files smaller or larger than the specified size. All Candidates have to upload their Photograph and Signature in ".jpg" format only and file name of Photograph and signature should preferably be photo.jpg and sign.jpg respectively.

• **MGMU - CET 2024 Application Fee Payment:** Application form processing fees as stated below is to be paid through online mode for which the service charges as per rules shall be applicable in addition to the application form processing fees. This fee is non-refundable and non-transferable under any circumstances. For all Category Candidates the application fees for admission and MGMU - CET 2024 is Rs. 1500/-.

• **Registration Process Completion:** On successful payment of the application fee, a confirmation of the same will be displayed online. Candidates shall print the receipt for future references. After successful payment, Candidate shall take the print out of its online application form for MGMU - CET 2024.

Keep a copy of MGMU - CET 2024 Application No., Log-In ID & Password.

• **Download Admit Card:**
For downloading an Admit Card, candidates should visit the website www.mgmu.ac.in, www.udict.mgmu.ac.in. The candidate can download his / her admit card for MGMU - CET 2024 from his / her login ID. Issue of Admit Card is merely an enabling document for appearing at the MGMU - CET 2024 and does not imply that the candidate satisfies all the requirements of eligibility conditions

of admission.

Important Note:

a) Incomplete application forms will be rejected. The candidate shall submit one and only one application form.

b) The candidate will be permitted to submit his / her application only once. If the candidate wishes to submit his / her application once again, then he / she should cancel his / her previous application before filling in the new application. The process of cancellation of the filled application is available in the user manual for filling out the online application form.

c) In any case, the candidate has cancelled his / her application; the fees paid for the same will not be refunded under any circumstances.

d) The email id and mobile number entered in the application form for validation will be treated as primary contact details and all communications will be sent to the same.

e) In case of mail is not received in INBOX, candidate should check the Spam / Junk Folder of his / her E-mail.

f) Candidates are advised to check their emails on a regular basis.

9. ONLINE MGMU - CET 2024

1. MGMU - CET 2024 is a Multiple-Choice Questions (MCQs) test. Each question has 4 responses. Candidate should choose an appropriate response.

2. The MGMU - CET 2024 examination will close as per time given in the Admit Card, under any circumstances NO EXTRA TIME will be given to any candidate.

3. Candidates found using any unfair means will forfeit their chance of being considered for admission and will be debarred from Examination and Admission Process of MGMU - CET 2024.

4. If a candidate has an objection against any question in the question paper of this examination, the same may be submitted through Candidate's Login as per the schedule in the Information brochure. Representation received by any other mode shall not be considered.

10. DECLARATION OF RESULT

The InCharge of MGMU - CET 2024 will conduct the examination and declare the result. The result will be declared on website www.mgmu.ac.in, www.udict.mgmu.ac.in as per the schedule.

● Provisional Answer key of each version of question paper & Candidate's response will be made available on website www.mgmu.ac.in, www.udict.mgmu.ac.in as per schedule. The Candidate's response will be available to each candidate after entering Password and Registration ID.

● The Competent Authority shall invite application for admission and after verification of documents and eligibility, publish the Merit Lists as per the Rules.

● The downloadable mark sheet will be made available on website www.mgmu.ac.in, www.udict.mgmu.ac.in as per schedule.

● While declaring the result, if a Candidate remains Absent in any one of subject in PCM the Total Marks for PCM will be declared as 'ABS' (Absent) as the Case may be.

11. LEGAL JURISDICTION

All disputes pertaining to the conduct of examination and selection shall fall within the jurisdiction of Courts, at Aurangabad only. The InCharge of MGMU - CET 2024 Cell shall be the legal person authorized for legal matters.

12. CONDUCT AND DISCIPLINE

- Failure of the candidate in entering full and correct information in the online application form and /or suppression of any information would lead to disqualification of the candidate for MGMU - CET 2024 or even at a later date. Such a candidate will be debarred from the examination / entire selection process.
- Adopting an unfair means or engaging in malpractice in the examination shall render a candidate liable for punishment and disqualify the candidate for MGMU - CET 2024 examination.
- Any issue not dealt here-in above will be dealt with, when arising, fully and finally by the competent authority. Any amendments made by Registrar, MGM University Aurangabad from time to time will be implemented.