Karunya UNIVERSITY
(Karunya Institute of Technology & Sciences)
(Declared as Deemed - to - be - University under Sec. 3 of the UGC Act, 1956)
Karunya Nagar, Coimbatore 641 114, Tamil Nadu, India.

29-04-2017

Karunya Entrance Examination - 2017 (KEE 2017) & Counselling for Spot Admissions - B.Tech. admissions @ Karunya University

Karunya Entrance Examination - 2017 (KEE-2017) (online based test) and counselling for spot admissions will be conducted in the following centres on 12, 13, 14 and 15 May 2017 (10.00 AM to 5.30 PM). All the provisionally admitted candidates also can appear for the online test in any one of the following test centres on May 12, 13, 14 and 15, 2017 or they can appear for the test on the day of enrollment in the University campus. Even if they are not able to take this opportunity to give the online test in one of the centers, **their provisional admission still stands valid.**

Test Centres:

Madurai, Tirunelveli, Nagercoil, Tuticorin, Trichirappalli, Salem, Vellore, Chennai, Pondicherry, Ooty, Cochin, Kottayam, Trivandrum, Calicut, Thrissur, Hyderabad, Vijayawada, Guntur, Vizag, Anantapur, Rajahmundry, Cuddapah, Bangalore, Delhi, Ranchi, Mumbai and Coimbatore. The details of venue will be updated shortly in the website.

The question paper pattern for the entrance test is indicated below:

Mathematics / Biology*	-	20 multiple choice questions; 20 marks
Physics	-	10 multiple choice questions; 10 marks
Chemistry	-	10 multiple choice questions; 10 marks
General Aptitude	-	10 multiple choice questions; 10 marks

(Students who seek admission for Bio courses can opt for Biology questions provided they have studied Biology in their +2 / HSc)*

Duration: 1 hour; Max. Marks: 50

In case of any queries concerning the KEE-2017, you may feel free to contact us at 18004254300 and we will be pleased to answer all your queries. The syllabus for the Karunya Entrance Examination (KEE-2017) is mentioned below.

MATHEMATICS SYLLABUS - KEE 2017

Applications of Matrices and Determinants:

Adjoint, inverse – properties, computation of inverses, solution of system of linear equations bymatrix inversion method. Rank of a matrix – elementary transformation on a matrix, Cramer's rule, non-homogeneous equations, homogeneous linear system and rank method.

Complex Numbers:

Complex number system - conjugate, properties, ordered pair representation. Modulus – Properties, geometrical representation, polar form, principal value, conjugate, sum, difference, product, quotient, vector interpretation, solutions of polynomial equations, De Moivre's theorem and its applications. Roots of a complex number – n^{th} roots, cube roots, fourth roots.

Analytical Geometry of two dimensions:

Definition of a conic – general equation of a conic, classification with respect to the general equation of a conic, classification of conics with respect to eccentricity. Equations of conic sections (parabola, ellipse and hyperbola) in standard forms and general forms- Directrix, Focus and Latus rectum - parametric form of conics and chords. – Tangents and normals – cartesian form and parametric form- equation of chord of contact of tangents from a point (x_1, y_1) to all the above said curves. Asymptotes, Rectangular hyperbola – Standard equation of a rectangular hyperbola.

Vector Algebra:

Scalar Product – angle between two vectors, properties of scalar product and applications of dot products. Vector product right handed and left handed systems, properties of vector product and applications of cross product - Product of three vectors – Scalar triple product, properties of scalar triple product, vector triple Product.

Differential Calculus:

Derivative as a rate measurer - rate of change, velocity, acceleration, related rates, derivative as a measure of slope, tangent, normal and angle between curves, maxima and minima. Mean value theorem - Rolle's Theorem, Lagrange Mean Value Theorem, Taylor's and Maclaurin's series, L' Hospital's Rule, stationary points, increasing, decreasing, maxima, minima, concavity, convexity and points of inflexion.

Integral Calculus and its Applications:

Simple definite integrals – fundamental theorems of calculus, properties of definite integrals. Reduction formulae – reduction formulae for $\int \sin nx\, dx$ and $\int \cos nx\, dx$, Bernoulli's formula. Area of bounded regions, length of the curve.

Differential Equations:

Differential equations - formation of differential equations, order and degree, solving differential equations (1^{st} order), variables separable, homogeneous and linear equations. Second order linear differential equations - second order linear differential equations with constant co-efficients, finding the particular integral if $f(x) = e^{mx}$, sinmx, cosmx, x, x^2.

Probability Distributions:
Probability – Axioms – Addition law - Conditional probability – Multiplicative law - Baye's Theorem - Random variable - probability density function, distribution function, mathematical expectation, variance Theoretical distributions - discrete distributions, Binomial, Poisson distributions- Continuous distributions, Normal distribution.

Discrete Mathematics:
Mathematical logic – logical statements, connectives, truth tables, logical equivalence, tautology.

Groups:
Binary operations, semigroups, monoids, groups, order of a group, order of an element, properties of groups.

PHYSICS SYLLABUS - KEE 2017

Electrostatics:

Frictional electricity – Charges and their conservation – Coulomb's law – Forces between two point electric charges – Superposition principle

Electric field – Electric field due to a point charge – Electric field lines – Electric dipole – Electric field intensity due to a dipole (on its axial line and on the equatorial line) – Behaviour of dipole in a uniform electric field – Application of electric dipole in microwave oven

Electric potential – Potential difference – Electric Potential due to a point charge and due to a dipole – Equipotential surfaces – Electrical potential energy of a system of two point charges

Electric flux – Gauss's theorem – Field due to infinitely long straight wire – Field due to uniformly charged infinitely plane sheet – Field due to two parallel sheets – Field due to uniformly charged thin spherical shell (inside and outside)

Electrostatic induction – Capacitor and capacitance – Dielectric and electric polarization – Parallel plate capacitor with and without dielectric medium – Applications of a capacitor – Energy stored in a capacitor – Capacitors in series and in parallel – Action of points – Lightning arrester – Van de Graaff generator

Current Electricity:

Electric current – Flow of charges in a metallic conductor – Drift velocity and mobility – Their relation with electric current

Ohm's law – Electrical resistance – V-I chraracteristics – Electrical resistivity and conductivity – Classification of materials in terms of conductivity – Superconductivity – Elementary ideas – Carbon resistors – Colour code for carbon resistors – Combination of resistors – Series and parallel – Temperature dependence of resistance – Internal resistance of a cell – Potential difference and emf of a cell

Kirchoff's law – Illustration by simple circuits – Wheatstone's bridge and its applications for temperature coefficient of resistance measurement – Meterbridge – Special case of Wheatstone bridge – Potentiometer – Principle – Comparing the emf of two cells

Electric power – Chemical effect of current – Electro chemical cells – Primary (Voltaic, Lechlanche, and Daniel cells) – Secondary – Rechargeable cell – Lead acid accumulator

Effects of Electric Current:

Heating effect – Joule's law – Experimental verification – Thermoelectric effects – Seeback effect – Peltier effect – Thomson effect – Thermocouple, thermo emf, neutral and inversion temperature – Thermopile

Magnetic effect of electric current – Concept of magnetic field – Oersted's experiment – Biot-Savart law – Magnetic field due to an infinitely long current carrying straight wire and circular coil – Tangent galvanometer – Construction and working – Bar magnet as an equivalent solenoid – Magnetic field lines

Ampere's circuital law and its application to solenoid

Force on a moving charge in uniform magnetic field and electric field – Cyclotron – Force on current carrying conductor in a uniform magnetic field – Forces between two parallel current carrying conductors – Definition of ampere

Torque experienced by a current loop in a uniform magnetic field – Moving coil galvanometer – Conversion to ammeter and voltmeter – Current loop as a magnetic dipole and its magnetic dipole moment – Magnetic dipole moment of a revolving electron

Electromagnetic Induction and Alternating Current:

Electromagnetic induction – Faraday's law – Induced emf and current – Lenz's law

Self induction – Mutual induction – Self inductance of a long solenoid – Mutual inductance of two long solenoids

Methods of inducing emf – (1) By changing magnetic induction (2) By changing area enclosed by the coil and (3) By changing the orientation of the coil (quantitative treatment)

AC generator – Commercial generator (Single phase, three phase)

Eddy current – Applications – Transformer – Long distance transmission

Alternating current – Measurement of AC – AC circuit with resistance – AC circuit with inductor – AC circuit with capacitor – LCR series circuit – Resonance and Q-factor: power in AC circuits

Electromagnetic Waves and Wave Optics:

Electromagnetic waves and their characteristics – Electromagnetic spectrum, Radio, microwaves, Infra red, visible, ultra violet – X rays, gamma rays – Propagation of electromagnetic waves

Emission and Absorption spectrum – Line, Band and continuous spectra – Fluorescence and phosphorescence

Theories of light – Corpuscular – Wave – Electromagnetic and Quantum theories

Scattering of light – Rayleigh's scattering – Tyndal scattering – Raman Effect – Raman spectrum – Blue colour of the sky and reddish appearance of the sun at sunrise and sunset

Wave front and Huygens's principle – Reflection, Total internal reflection and refraction of plane wave at a plane surface using wave fronts.

Interference – Young's double slit experiment and expression for fringe width – Coherent source - Interference of light – Formation of colours in thin films – Analytical treatment – Newton's rings

Diffraction – Differences between interference and diffraction of light – Diffraction grating

Polarization of light waves – Polarization by reflection – Brewster's law – Double refraction – Nicol prism – Uses of plane polarised light and polaroids – Rotatory polarization – Polarimeter

Atomic Physics:

Atomic structure – Discovery of the electron – Specific charge (Thomson's method) and charge of the electron (Millikan's oil drop method) – alpha scattering – Rutherford's atom model

Bohr's model – Energy quantization – Energy and wave number expression – Hydrogen spectrum – energy level diagrams – Sodium and mercury spectra - Excitation and ionization potentials

Sommerfeld's atom model – X rays – Production, properties, detection, absorption, diffraction of X-rays – Laue's experiment – Bragg's law – Bragg s X-ray spectrometer – X-ray spectra – Continuous and characteristic X–ray spectrum – Mosley's law and atomic number

Masers and Lasers – Spontaneous and stimulated emission – Normal population and population inversion – Ruby laser – He-Ne laser – properties and applications of laser light – holography

Dual Nature of Radiation and Matter – Relativity:

Photoelectric effect – Light waves and photons – Einstein's photoelectric equation – Laws of photoelectric emission – Particle nature of energy – Photoelectric equation – Work function – Photo cells and their application

Matter waves – Wave mechanical concept of the atom – Wave nature of particles – de Broglie relation – de Broglie wave length of an electron – Electron microscope

Concept of space, mass, time – Frame of references – Special theory of relativity – Relativity of length, time and mass with velocity – ($E = mc^2$)

Nuclear physics

Nuclear properties – Nuclear Radii, masses, binding energy, density, charge – Isotopes, isobars and isotones – Nuclear mass defect – Binding energy – Stability of nuclei-Bain bridge mass spectrometer

Nature of nuclear forces – Neutron – Discovery – Properties – Artificial transmutation – Particle accelerator

Radioactivity – Alpha, beta and gamma radiations and their properties, α-decay, β-decay and γ-decay – Radioactive decay law – Half life – Mean life – Artificial radioactivity – Radio isotopes – Effects and uses Geiger-Muller counter

Radio carbon dating – Biological radiation hazards

Nuclear fission – Chain reaction – Atom bomb – Nuclear reactor – Nuclear fusion – Hydrogen bomb – Cosmic rays – Elementary particles

Semiconductor Devices and their Applications:

Semiconductor theory – Energy band in solids – Difference between metals, insulators and semiconductors based on band theory – Semiconductor doping – Intrinsic and Extrinsic semi conductors

Formation of P-N Junction – Barrier potential and depletion layer – P-N Junction diode – Forward and reverse bias characteristics – Diode as a rectifier – Zener diode – Zener diode as a voltage regulator – LED

Junction transistors – Characteristics – Transistor as a switch – Transistor as an amplifier – Transistor biasing – RC, LC coupled and direct coupling in amplifier – Feedback amplifier – Positive and negative feedback – Advantages of negative feedback amplifier – Oscillator – Condition for oscillations – LC circuit – Colpitt oscillator

Logic gates – NOT, OR, AND, EXOR using discrete components – NAND and NOR gates as universal gates – Integrated Circuits

Laws and theorems of Boolean's algebra – Operational amplifier – Parameters – Pin-out configuration – Basic applications – Inverting amplifier – Non-inverting amplifier – Summing and difference amplifiers

Measuring Instruments – Cathode Ray oscilloscope – Principle – Functional units – Uses – Multimeter – construction and uses

Communication Systems:

Modes of propagation, ground wave – Sky wave propagation

Amplitude modulation, merits and demerits – Applications – Frequency modulation – Advantages and applications – Phase modulation

Antennas and directivity

Radio transmission and reception – AM and FM – Super heterodyne receiver

T.V. transmission and reception – Scanning and synchronizing
Vidicon (camera tube) and picture tube – Block diagram of a monochrome TV transmitter and receiver circuits
Radar – Principle – Applications
Digital communication – Data transmission and reception – Principles of fax, modem, satellite communication – Wire, cable and Fibre-optical communication

CHEMISTRY SYLLABUS - KEE 2017

Atomic Structure:
Bohr's atomic model – limitations – Sommerfeld's theory of atomic structure; Electronic configuration and Quantum numbers; Shapes of s, p, d, f orbitals – Pauli's exclusion principle - Hund's Rule of maximum multiplicity – Aufbau principle of filling up of electrons in orbitals. Hydrogen spectrum – Lyman, Balmer, Paschen, Brakett and Pfund series; deBroglie's theory; Heisenberg's uncertainty principle – wave nature of electron – Schrodinger wave equation and its significance – Eigen values and Eigen functions. Hybridization of atomic orbitals to form molecular orbitals.

p, d and f – Block Elements:
p block elements – Phosphorous compounds; PCl_3, PCl_5 – Oxides. Hydrogen halides, Inter-halogen compounds. Xenon fluorides. General Characteristics of d–block elements – Electronic Configuration – Oxidation states of first row transition elements and their colours; Lanthanides – Introduction, Electronic configuration, general characteristics, oxidation state – lanthanide contraction.

Coordination Chemistry and Solid State Chemistry
Terminology in coordination chemistry – IUPAC nomenclature of mononuclear coordination compounds – Isomerism, Geometrical isomerism in 4-coordinate, 6-coordinate complexes. Werner's theory of co-ordination, Valence Bond theory. Uses of coordination compounds. Bioinorganic compounds (Haemoglobin and chlorophyll). Lattice – unit cell, systems, types of crystals, packing in solids; Ionic crystals – Imperfections in solids – point defects. X-Ray diffraction

Thermodynamics, Chemical Equilibrium and Chemical Kinetics
First and second law of thermodynamics – spontaneous and non spontaneous processes, entropy, Gibb's free energy – Free energy change and chemical equilibrium – significance of entropy. Law of mass action – Le Chatlier's principle, applications of chemical equilibrium. Rate expression, order and molecularity of reactions, zero order, first order and pseudo first order reaction – half life period. Determination of rate constant and order of reaction. Temperature dependence of rate constant – Arrhenius equation, activation energy

Electrochemistry
Theory of electrical conductance; metallic and electrolytic conductance. Faraday's laws – theory of strong electrolytes – Specific resistance, specific conductance, equivalent and molar conductance – Variation of conductance with dilution – Kohlraush's law – Ionic product of water, pH and pOH – buffer solutions – use of pH values. Cells – Electrodes and electrode potentials – construction of cell and EMF values, Fuel cells, Corrosion and its prevention.

Isomerism in Organic Compounds
Definition, Classification – structural isomerism, stereo isomerism – geometrical and optical isomerism. Optical activity – chirality – compounds containing chiral centres – R,S notation, D,L notation.

Alcohols and Ethers

Nomenclature of alcohols – Classification of alcohols - distinction between primary, seconadary, and tertiary alcohols – General methods of preparation of primary alcohols, properties. Aromatic alcohols – preparation and properties of phenols and benzyl alcohol. Ethers – properties of aliphatic ethers – Uses. Aromatic ethers – Preparation of Anisole – Uses.

Carbonyl Compounds

Nomenclature of carbonyl compounds – Comparison of aldehydes and ketones. General methods of preparation of aldehydes – Properties – Uses. Aromatic aldehydes – Preparation of benzaldehyde – Properties and Uses. Aromatic ketones – preparation of acetophenone – Properties – Uses, preparation of benzophenone – Properties. Name reactions; Clemmenson reduction, Wolff – Kishner reduction, Cannizaro reaction, Claisen Schmidt reaction, Benzoin Condensation, aldol Condensation. Preparation and applications of Grignard reagents.

Carboxylic Acids and their derivatives

Nomenclature – Preparation of aliphatic monobarboxylic acids – formic acid – Properties – Uses. Aromatic acids; Benzoic and Salicylic acid – Properties – Uses. Derivatives of carboxylic acids; acetyl chloride (CH_3COCl) – Preparation – Properties – Uses. Preparation of acetamide, Properties – acetic anhydride – preparation, Properties. Preparation of esters – methyl acetate – Properties.

Organic Nitrogen Compounds

Aliphatic nitro compounds – Preparation of aliphatic nitroalkanes – Properties – Uses. Aromatic nitro compounds – Preparation – Properties – Uses. Distinction between aliphatic and aromatic nitro compounds. Amines; aliphatic amines – General methods of preparation – Properties – Distinction between primary, secondary, and tertiary amines. Aromatic amines – Synthesis of benzylamine – Properties, Aniline – Preparation – Properties – Uses. Distinction between aliphatic and aromatic amine. Aliphatic nitriles – Preparation – properties – Uses. Diazonium salts – Preparation of benzene diazonium chloride

Biomolecules

Carbohydrates – distinction between sugars and non sugars, structural formulae of glucose, fructose and sucrose, with their linkages, invert sugar – definition, examples of oligo and polysaccharides,

Amino acids – classification with examples, Peptides – properties of peptide bond.

BIOLOGY SYLLABUS - KEE 2017

Botany:

Biodiversity and Taxonomy

Systematics : Two Kingdom and Five Kingdom systems - Types of classifications - artificial - natural – phylogenetic - binomial nomenclature - herbarium and its uses - Bentham and Hooker's classification of plants.

Plant morphology, anatomy and Physiology

Morphology: Structure and types of Root, Stem, Leaf, Flowers, Fruits and Seeds – Anatomy: Tissue and tissue systems – Physiology: Properties of Protoplasm - Mechanism of Stomatal Opening and Closing (Potassium ion theory) - Nitrogen Metabolism and Biological Nitrogen Fixation - Photosynthesis – significance – site of photosynthesis - cyclic and non-cyclic photophosphorylation – C3 and C4 pathways – photorespiration - mechanism of glycolysis – Krebs cycle – pentose phosphate pathway

Cell Biology

Cell Theory - Prokaryotic and Eukaryotic Cell (Plant Cell) - Light Microscope and Electron Microscope (TEM & SEM) - Cell organelles: Cell Wall, Cell membrane (Fluid mosaic model), Nucleus, Mitochondria, Plastids, Ribosomes, Chromosomes - structure and types, Cell Divisions : Amitosis, Mitosis & Meiosis.

Genetics

Concept of Heredity and Variation - Mendel's Laws of Inheritance - genes and genomes – linkage and crossing over - gene mapping - recombination of chromosomes - mutation - chromosomal aberrations - DNA as genetic material – structure of DNA - replication of DNA - structure of RNA and its types.

Biotechnology and Biology in Human welfare

Biotechnology: Recombinant DNA technology - transgenic plants and microbes - plant tissue culture and its application - Biology in Human welfare: Food production – breeding experiments – improved varieties and role of biofertilizers. Crop diseases and their control – biopesticides – genetically modified food – biowar – biopiracy – biopatent.

Zoology:

Human Anatomy and Physiology

History - The integumentary - Skeletal - Muscular – Digestive: Nutrition - Enzymes and enzyme action – Respiratory: Process of pulmonary respiration - Circulatory Lymphatic –

Nervous: Functions of Brain, Spinal cord, CSF – Sense organs - Endocrine - Excretory - Reproductive.

Cell Biology and Genetics

Animal cell: Plasma membrane - Nucleus - Mitochondria - Ribosomes - Endoplasmic reticulum - Lysosomes – Golgi bodies - Centrosomes – Chromosomes – Modern genetics: Human Genetics, karyotyping, Chromosome gene mapping, Recombinant DNA technology and segmenting - Genetic diseases-Human Genome project-Cloning-Transgenic organisms Genetically Modified Organisms (GMO)-Gene therapy.

Microbiology and Immunology

Introduction-History of Medical Microbiology – Virology: Structure, Genetics, Culture and diseases-AIDS and its control – Bacteriology: Structure, Genetics and diseases - Protozoan microbiology - Pathogenicity of microorganism-Anti microbial resistance - Chemotherapy.

Innate(Non-specific) Immunity - Anatomical Barriers - Physiological Barriers - Phagocytic Barriers. Lymphoidal organs -Thymus-Bursa of Fabricius - Peripheral Lymphoid Organs - Lymph nodes – Spleen. Antibodies – Immunoglobulins. Transplantation immunology-Classification of graft Immune system disorder.

Applied biology

Livestock and Management – Dairy - Breeds of cattle - Milch breed - Draught breed - Dual purpose - Common diseases and control - Exotic and cross breeds - Techniques adopted in cattle breeding. Poultry- Farming techniques – Breeds. Farming methods - Poultry diseases-Economic value. Pisciculture - Fish farming-Edible fishes of Tamilnadu. Medical Lab Techniques: Stethoscope - Sphygmomanometer - Haemocytometer – Urine sugar analysis. ECG-'PQRST' wave, CT Scan- Endoscopic (Laparoscopic) techniques, Artificial pacemaker, Auto analyser.

Environmental Science:

Human population and explosion -Issue - Global warming Crisis Green House Effect-Ozone layer depletion - Waste management - Biodiversity conservation (Biosphere reserves) Government and Non Governmental organisations involved - Energy crisis and Environmental impact-Poverty and environment-Fresh water crisis and management.