



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

[Declared as Deemed-to-be-University u/s 3 of the UGC Act, 1956]

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BEEE 2020 INFORMATION BROCHURE

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GENERAL INFORMATION

Eligibility

Nationality

The applicant for BEEE 2020 should be a resident of India and (i) should have studied in schools located in India in the preceding 10 + 2 years for admission to Undergraduate program.

(ii) should have studied in educational institutions in India and completed their qualifying examination.

Eligibility Criteria in Qualifying Examination

Undergraduate programs

B.Tech. :

- ♦ A pass in 10+2 or its equivalent with Minimum 50% aggregate in Physics, Chemistry and Mathematics.
- ♦ For Bio Engineering Departments a pass in 10 +2 or its equivalent with Minimum 50% aggregate in Physics, Chemistry and Mathematics / Biology.

B.Arch.:

(a) A pass in 10+2 or its equivalent having a minimum total aggregate of 50% with English and Mathematics as subjects of study or 10+3 Diploma (Any Stream) recognized by Central / State Government with 50% aggregate marks.

(b) A pass in National Aptitude Test in Architecture (NATA) conducted by the Council of Architecture. However, the candidates have to apply in the prescribed application form for admission to B. Arch. program.

B.Tech. Lateral Entry:

A Pass in Diploma Recognized by Central or State Government with 50% aggregate / B.Sc. with Mathematics or its equivalent.

B.Sc. (Agriculture / Horticulture) :

A pass in 10+2 or its equivalent with Minimum 50% aggregate in Physics, Chemistry and Biology.

Postgraduate programs

M. Tech. :

Any B.E / B.Tech or its equivalent examination approved by UGC / AICTE in appropriate branch with at least 60% marks in the aggregate or equivalent CGPA are eligible for respective courses

M.Arch. :

B. Arch with at least 60% marks in the aggregate or equivalent CGPA are eligible.

MBA:

Any Under Graduate with first class or 60% marks or equivalents.

MCA:

Any Under Graduate with Business Mathematics or Statistics are eligible for first year MCA

B.Sc. in Computer Science, Information Technology / Electronics are eligible for Lateral Entry Program.

(Note : Candidates of the qualifying examination can also apply on provisional basis. but at the time of admission such candidates shall have to produce the original certificate of having passed / Mark sheet from the respective examination provided that he/she fulfills the eligibility criteria. failing to do so, the admission will be cancelled.)

Application Forms

Issue : The Application Forms will be issued from December 2019 onwards. There are two modes of registration.

i. Online with e-payment

use the URL www.bharathuniv.ac.in/admissions, register and pay online.

ii. Online with Demand Draft

- Application to be filled online by visiting www.bharathuniv.ac.in/admissions and the same can be downloaded and sent to us with the DD for Rs. 1000/- drawn in favour of **Bharath Institute of Higher Education and Research**, payable at Chennai. This has to reach us before the last date specified. Candidates should write their name and address on the reverse of DD. Your application will be processed only upon receipt of the DD.

iii. Direct

- Candidates can obtain the application form in person from **Bharath Institute of Higher Education and Research** Campus or Corporate Office on payment of Rs. 1000/-.



LIST OF DEPARTMENTS AND CODES

S.no.	Branch / Specialization	Code
B. Tech (duration 4 Years)		
1.	Aeronautical Engineering	01
2.	Aerospace Engineering	02
3.	Agriculture Biotechnology	03
4.	Automobile Engineering	04
5.	Biomedical Engineering	05
6.	Civil Engineering	06
7.	Computer Science & Engineering	07
8.	Computer Science & Engineering with Big Data	08
9.	Computer Science & Engineering with E Com.	09
10.	Computer Science & Engineering with Information Security	10
11.	Electrical & Electronics Engineering	11
12.	Electronics & Communication Engineering	12
13.	Genetic Engineering	13
14.	Industrial Biotechnology	14
15.	Information Technology	15
16.	Mechanical Engineering	16
17.	Mechatronics	17

S.no.	Branch / Specialization	Code
M. Tech (duration 2 Years)		
1.	Applied Electronics	21
2.	Automobile Engineering	22
3.	Biomedical Engineering	23
4.	CAD	24
5.	Computer Science & Engineering	25
6.	Construction Engineering and Management	26
7.	Digital Communication & Networks	27
8.	Electronics & Instrumentation Engineering	28
9.	Embedded System Engineering	29
10.	Environmental Engineering	30
11.	Geo-Technology	31
12.	Industrial Biotechnology	32
13.	Information Technology	33
14.	Machine Design	34
15.	Power Electronics & Drives	35
16.	Power Systems	36
17.	Structural Engineering	37
18.	Thermal Engineering	38
19.	VLSI Design	39

B. Arch (duration 5 Years)		
B. Sc. (duration 4 Years)		
1.	Agriculture	18

S.no.	Branch / Specialization	Code
M.B.A (duration 2 Years)		
M.C.A (duration 3 Years) Lateral Entry (duration 2 Years)		



STATE CODES

State	Code
Andhra Pradesh	01
Arunachal Pradesh	02
Assam	03
Bihar	04
Chattisgarh	05
Delhi	06
Goa	07
Gujarat	08
Haryana	09
Himachal Pradesh	10
Jammu and Kashmir	11
Jharkhand	12
Karnataka	13
Kerala	14
Madhya Pradesh	15
Maharashtra	16
Manipur	17
Meghalaya	18
Mizoram	19
Nagaland	20
Orissa	21
Punjab	22
Rajasthan	23
Sikkim	24
Tamil Nadu	25
Telangana	26
Tripura	27
Uttar Pradesh	28
Uttaranchal	29
West Bengal	30

State	Code
Andaman and Nicobar Island (UT)	31
Chandigarh(UT)	32
Dadra and Nagar Haveli (UT)	33
Daman and Diu (UT)	34
Lakshadweep (UT)	35
Puducherry (UT)	36

MOTHER TONGUE

Sl.	Mother Tongue	Code
1.	Assamese	01
2.	Bengali	02
3.	Gujarati	03
4.	Hindi	04
5.	Kannada	05
6.	Kashmiri	06
7.	Malayalam	07
8.	Manipuri	08
9.	Marathi	09
10.	Nepali	10
11.	Oriya	11
12.	Punjabi	12
13.	Rajasthani	13
14.	Sindhi	14
15.	Tamil	15
16.	Telugu	16
17.	Urdu	17
18.	Others	18



TEST CITY CENTRE

Test City Centre (for Written Exam)

If a candidate has opted for Written Exam, refer the following list and write the appropriate code in the space provided. Darken the corresponding numeral under each digit.

State	Centre	Code
Andaman & Nicobar	Port Blair	201
Andhra Pradesh	Anantapur	202
	Chittoor	203
	East Godavari	204
	Guntur	205
	Kadapa	206
	Kurnool	207
	Nellore	208
	Ongole	209
	Rajahmundry	210
	Srikakulam	211
	Tirupathi	212
	Vijayawada	213
	Vijayanagaram	214
Vishakhapatnam	215	
West Godavari	216	
Arunachal Pradesh	Itanagar	217
Assam	Guwahati	218
Bihar	Mazaffarpur	219
	Patna	220
Chattisgarh	Raipur	221
Jharkhand	Bokaro Steel City	222
	Dhanbad	223
	Jamshedpur	224
	Ranchi	225
Kerala	Ernakulam	226
	Kannur	227
	Kottayam	228
	Kozhikodu	229
	Thiruvananthapuram	230

State	Centre	Code
Maharastra	Mumbai	231
Manipur	Imphal	232
Meghalaya	Shilong	233
New Delhi		234
Orissa	Bhubaneswar	235
	Rourkela	236
Puducherry	Puducherry	237
Rajasthan	Kota	238
Tamil Nadu	Chennai	239
	Chidambaram	240
	Coimbatore	241
	Cuddalore	242
	Dindugal	243
	Kumbakonam	244
	Madurai	245
	Nagercoil	246
	Namakkal	247
	Neyveli	248
	Ramanathapuram	249
	Salem	250
	Theni	251
Tiruchirapalli	252	
Tiruvannamalai	253	
Telangana	Adilabad	254
	Hyderabad/Secunderabad	255
	Karim Nagar	256
	Khammam	257
	Nalgonda	258
	Nizamabad	259
	Ranga Reddy	260
Warangal	261	
Tripura	Agartala	262
Uttar Pradesh	Kanpur	263
	Lucknow	264
West Bengal	Durgapur	265
	Kolkatta	266
	Siliguri	267



TEST CITY CENTRE

Test City Centre (for Online Exam)

If a candidate has opted for online entrance examination, refer the following list to choose a test city and write the appropriate code in the space provided. Darken the corresponding numeral under each digit.

State	Centre	Code
Andaman & Nicobar	Port Blair	301
Andhra Pradesh	Tirupathi	302
	Vijayawada	303
	Vishakhapatnam	304
	Nellore	305
Assam	Guwahti	306
Bihar	Patna	307
Chattisgarh		308
Jharkhand	Jamshedpur	309
	Ranchi	310
Karnataka		311
Kerala	Ernakulam	312
Madhya Pradesh		313
Maharastra	Mumbai	314
New Delhi	New Delhi	315
Orissa	Bhuvaneshwar	316
Rajasthan		317
Tamil Nadu	Chennai	318
	Coimbatore	319
	Kanayakumari	320
	Madurai	321
	Tiruchirapalli	322
	Vellore	324
Telangana	Hyderabad	325
Uttar Pradesh	Lucknow	326
West Bengal	Kolkatta	327

NAME OF THE EXAMINATION BOARD AND CODES

S.No.	NAME OF THE EXAMINATION BOARD	CODE
1.	Andhra Pradesh Board of Intermediate Education	101
2.	Arunachal State Board of Secondary Schools	102
3.	Assam Higher Secondary Education Council	103
4.	Bihar School Examination Board	104
5.	Central Board of Secondary Education	105
6.	Chattisgarh Board of Secondary Education	106
7.	Council for the Indian School Certificate Examinations	107
8.	Goa Board of Secondary and Higher Secondary Education	108
9.	Gujarat Secondary and Higher Secondary Education	109
10.	Himachal Pradesh Board of School Education	110
11.	Haryana Board of School Education	111
12.	J & K State Board of School Education	112
13.	Jharkhand Academic Council	113
14.	Karnataka Board of Pre-University Education	114
15.	Kerala Board of Higher Secondary Education	115
16.	Madhya Pradesh Board of Secondary Education	116
17.	Maharashtra State Board of Secondary and Higher Secondary Education	117
18.	Manipur Council of Higher Secondary Education	118
19.	Meghalaya Board of School Education	119
20.	Mizoram Board of School Education	120
21.	Nagaland Board of School Education	121
22.	Odisha council of Higher Secondary Education	122
23.	Punjab School Education Board.	123
24.	Rajasthan Board of Secondary Education	124
25.	Tamil Nadu Board of Higher Secondary Education	125
26.	Telangana State Board of Intermediate Education	126
27.	Tripura Board of Secondary Education	127
28.	Uttra Pradesh Board of High School & Intermediate Education	128
29.	Uttarkhand Board of School Education	129
30.	West Bengal Council of Higher Secondary Education	130
31.	Others	131

BEEE - 2020 - Pattern of Question paper For B.Tech Under Graduate Programs

S. No	Details
1.	Part 1: English 10 questions with a total weightage of 10 marks
2.	Part 2: Physics 30 questions with a total weightage of 30 marks
3.	Part 3: Chemistry 30 questions with a total weightage of 30 marks
4.	Part 4: Mathematics 30 questions with a total weightage of 30 marks
5.	Part 4: Biology 30 questions with a total weightage of 30 marks (Only for Biology Students)
6.	No Negative mark for wrong answer
7.	Total weightage 100 marks

SYLLABUS AND MODEL QUESTIONS FOR ENTRANCE EXAMINATION

PART 1 - ENGLISH (10 Questions)

As per the Intermediate Second Year Syllabus

PART 2 - PHYSICS (30 Questions)

UNIT 1: Units and Measurement

Units for measurement, system of units-S.I., fundamental and derived units, measurements-errors in measurement-significant figures, dimensions-dimensional analysis-applications.

UNIT 2: Mechanics

Motion in one dimension-uniform and non-uniform motion-uniformly accelerated motion-scalar and vector quantities-Newton's laws of motion-force and inertia-impulse and momentum-law of conservation of linear momentum-applications-motions in two dimension-projectile motion-uniform circular motion-friction-laws of friction-applications- centripetal force-centre of mass-torque-angular momentum and its conservation -moment of inertia-theorems of moment of inertia-work-energy-potential energy and kinetic energy-power-collision-elastic and inelastic collisions.

UNIT 3: Gravitation, Mechanics of Solids and Fluids

The universal law of gravitation, acceleration due to gravity-variation of 'g' with altitude, latitude and depth-gravitation potential-escape velocity and orbital velocity-geostationary satellites-Kepler's laws of planetary motion. Solids-elastic behaviour, stress-strain-Hooke's law-Modulli of elasticity-relation between them-surface tension-capillarity-applications-viscosity-Poiseuille's formula-Stokes law-applications-streamline and turbulent flow-Reynolds number-Bernoulli's theorem-applications.

UNIT 4: Oscillations and Wave Motion

Periodic motion-simple harmonic motion-equations of motion-oscillations of spring-simple pendulum-free, forced and damped oscillations-resonance-applications-wave motions-longitudinal and transverse waves-velocity of wave motion in different media-Newton's formula-Laplace's correction-super position of waves-progressive and standing waves-sonometer-air columns-Doppler effect and its applications.

UNIT 5: Heat and Thermodynamics

Kinetic theory of gases-postulates-pressure of a gas-specific heat capacity-relation between C_p and C_v -first law of thermodynamics thermodynamical processes-isothermal adiabatic-reversible and irreversible process-second law of thermodynamics-Carnot's engine-Heat transfer-conduction-convection-radiation-thermal conductivity of solids-black body radiations-Kirchoff's law-Wien's displacement law-Stefan's law-Newton's law of cooling.

UNIT 6: Ray and Wave Optics and Magnetism

Wavefront – Huygens principle – wave nature of light – interference – young's double slit experiment – diffraction and polarization – reflection and refraction of light – total internal reflection – velocity of light determination – deviation and dispersion of light by a prism – lens.

UNIT 7: Electricity and Magnetism

Magnetism: Earth's magnetic field and magnetic elements – magnetic field due to a magnetic dipole – torque on a magnetic dipole – magnetic properties of a material – dia, para and ferro magnetic materials – application. Biot savart law – force on a moving charge in an uniform magnetic field. Electrostatic – coulomb's inverse square

law – dielectric constant – electric field – electric lines of force – electric dipole – electric potential – potential difference – electric flux – gauss theorem – electrostatic induction – capacitor connected in parallel and series – drift. Velocity of electrons – ohm's law – electrical resistivity and conductivity – super conductivity – kirchoff's law – wheat stone bridge – principle potentiometer – electric power – faraday's law – lenz law at electromagnetic induction – self and mutual inductances – flemming's right hand rule – methods of inducing emf – eddy current, transformer.

UNIT 8: Atomic Physics and Relativity

Relativity – Einstein's mass energy relation – variation of mass with velocity. Atomic structure-properties of cathode rays and positive rays - specific charge of an electron-atom model – Thomson atom model-Rutherford atom model-Bohr atom model-merits and demerits-quantum numbers-X-rays-production-properties - Bragg's law - X-ray spectrometer-Photoelectric effect-laser-spontaneous and stimulated emission-laser action-characteristics of laser light-ruby laser-applications of laser.

UNIT 9: Dual Nature of Matter and Nuclear Physics

Nuclear properties: radius, mass, binding energy, density, isotopes, mass defect – Bainbridge mass spectrometer – nuclear forces. Newton discovery, matter waves – wave nature of particles – de Broglie wavelength – electron microscope – radioactivity α , β and γ decay – half life and mean life – artificial radio activity – radio isotopes – radio carbon dating – radiation hazards – nuclear fission – nuclear reactor – nuclear fusion – hydrogen bomb – cosmic rays – elementary particles.

UNIT 10: Electronics and Communication

Communication: Space communication – propagation of electromagnetic waves in atmosphere – sky and space wave propagation.

Electronics: Semiconductor – doping – types – PN junction diode – biasing – amplifier – gain – feedback in amplifier's – logic gates – NOT, OR, AND, NOR, NAND – Universal gates – De Morgan's theorems.

PART 3 - CHEMISTRY (30 Questions)

UNIT 1: Some Basic Concepts in Chemistry

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.

UNIT 2: States of Matter

Classification of matter into solid, liquid and gaseous states. Solid State: Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Bragg's Law and its applications; unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, imperfection in solids; electrical, magnetic and dielectric properties. Liquid State: Properties of liquids – vapour pressure, viscosity and surface tension and effect of temperature on them (qualitative treatment only). Gaseous State: Measurable properties of gases; Gas laws-Boyle's law, Charles'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 gases (only postulates); concept of average, root mean square and most probable velocities; real gases, deviation from ideal behaviour, compressibility factor, Van der Waals equation, liquefaction of gases, critical constants.

UNIT 3: Chemical Families - Periodic Properties

Modern periodic law and present form of the periodic table, s & p block elements, periodic trends in properties of elements, atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states and chemical reactivity. Transition elements-d-block elements, inner transition elements-f-block elements. Ionization energy, lanthanides and actinides-general characteristics. Coordination Chemistry: Coordination compounds, nomenclature: terminology - Werner's coordination theory. Applications of coordination compounds.

UNIT 4: Atomic Structure

Discovery of sub-atomic particles (electron, proton and neutron); Thomson and Rutherford atomic models and their limitations; nature of electromagnetic radiation, photoelectric effect; spectrum of hydrogen atom, Bohr model of hydrogen atom-its postulates, derivation of the relations for energy of the electron and radii of the different orbits, limitations of Bohr's model; dual nature of matter, De-Broglie's relationship, (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.

UNIT 5: Chemical Bonding and Molecular Structure

Covalent bonding: Concept of electronegativity, Fajan's rule, dipole moment; Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules. Valence bond theory - Its important features,

concept of hybridization involving s, p and d orbitals; resonance. types of molecular orbitals (bonding, anti-bonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, concept of bond order, bond length and bond energy. Elementary idea of metallic bonding. Hydrogen bonding and its applications. Extractive metallurgy of sodium, lithium, properties of alkali metals, basic nature of oxides and hydroxides, compounds of alkaline earth metals, compounds of boron. Oxides, carbides, halides and sulphides of carbon group.

UNIT 6: Solutions

Different methods for expressing concentration of solution-Molality, molarity, mole fraction, percentage (by volume and mass both), vapour pressure of solutions and Raoult's law-ideal and non-ideal solutions, vapour pressure-composition plots for ideal and non-ideal solutions; colligative properties of dilute solutions-relative lowering of vapour pressure, depression of freezing point, 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.

UNIT 7: Chemical Equilibrium

Meaning of equilibrium, concept of dynamic equilibrium. Equilibria involving physical processes: Solid-liquid, liquid-gas and solid-gas equilibria, Henry's law, Equilibria involving chemical processes: Law of chemical equilibrium, equilibrium constants (K_p and K_c) and their significance, 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 multistage ionization) and ionization constants, ionization of water, pH scale, common ion effect, hydrolysis of salts and pH of their solutions, solubility of sparingly soluble salts and solubility products, buffer solutions.

UNIT 8: Electrochemistry

Electrolytic and metallic conduction, conductance in electrolytic solutions, specific and 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; dry cell and lead accumulator; fuel cells; corrosion and its prevention.

UNIT 9: Surface Chemistry, Chemical Kinetics and Catalysis

Adsorption-Physisorption and chemisorption and their characteristics, factors affecting adsorption of gases on solids-Freundlich and Langmuir adsorption isotherms, adsorption from solutions. Catalysis. Tyndall effect, Brownian movement, electrophoresis, dialysis, coagulation and flocculation; emulsions and their characteristics. Factors affecting rates of reactions - factors affecting rate of collisions encountered between the reactant molecules, effect of temperature on the reaction rate, concept of activation energy, catalyst. Rate law expression. Order of a reaction (with suitable examples). Units of rates and specific rate constants. Nuclear Chemistry: radioactivity: isotopes and isobars: Properties of α , β and γ rays; Kinetics of radioactive decay (decay series excluded), carbon dating.

UNIT 10: Some Basic Principles of Organic Chemistry

Tetravalency of carbon; shapes of simple molecules-hybridization (s and p); classification of organic compounds based on functional groups: $-C=C-$, $-C-C-$ 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.

UNIT 11: Hydrocarbons

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions. Alkenes-Geometrical isomerism; mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoff's and peroxide effect); ozonolysis, oxidation, and polymerization. Mechanism of electrophilic substitution: halogenation, nitration, Friedel-Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene.

UNIT 12: Organic Compounds Containing Oxygen

General methods of preparation, properties, reactions and uses. Alcohols: Distinction of primary, secondary and tertiary alcohols; mechanism of dehydration. Reactions of hydroxyl derivatives. Phenols: Acidic nature, electrophilic substitution reactions: halogenation, nitration and sulphonation, Reimer-Tiemann reaction. Addition to

>C=O group, relative reactivities of aldehydes and ketones. Ethers: Structure. Aldehyde and Ketones: Nature of carbonyl group; Nucleophilic addition reactions (addition of HCN, NH_3 and its derivatives), Grignard reagent; oxidation; reduction (Wolff Kishner and Clemmensen); acidity of-hydrogen, aldol condensation, Cannizzaro reaction, Haloform reaction; Chemical tests to distinguish between aldehydes and Ketones. Carboxylic acids: Reactions, Acidic strength and factors affecting it; reactions of acid derivatives.

UNIT 13: 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.

UNIT 14: Polymers

General introduction and classification of polymers, general methods of polymerization—addition and condensation, copolymerization; natural and synthetic rubber and vulcanization; monomers and uses - polythene, nylon, polyester and bakelite.

UNIT 15: Chemistry in Everyday Life

Chemicals in medicines—Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids. Cleansing agents—Soaps and detergents, cleansing action.

PART 4 - MATHEMATICS (30 Questions)

UNIT 1: Sets, Relations and Functions

Sets and their representations, union, intersection and complements of sets and their algebraic properties.

UNIT 2: Complex Numbers

Complex numbers in the form $a+ib$ and their representation in a plane. Argand diagram. Algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex number. Cube roots of unity, triangle inequality.

UNIT 3: Matrices and Determinants

Determinants and matrices of order two and three, properties of determinants, evaluation of determinants. Addition and multiplication of matrices, adjoint and inverse of matrix.

UNIT 4: Applications of Matrices and Determinants

Computing the rank of a matrix—test of consistency and solution of simultaneous linear equations using determinants and matrices.

UNIT 5: Quadratic Equations

Quadratic equations in real and complex number system and their solutions. Relation between roots and co-efficients, nature of roots, formation of quadratic equations with given roots; symmetric functions of roots, equations reducible to quadratic equations.

UNIT 6: Permutations and Combinations

Fundamental principle of counting; permutation as an arrangement and combination as selection, meaning of $P(n,r)$ and $C(n,r)$. Simple applications.

UNIT 7: Mathematical Induction and its Applications

Stating and interpreting the principle of mathematical induction. Using it to prove formula and facts.

UNIT 8: Trigonometry

Trigonometrical identities and equations. Inverse trigonometric functions and their properties. Properties of triangles, including, incentre, circumcentre and orthocenter, solution of triangles.

UNIT 9: Sequences and Series

Arithmetic, geometric and harmonic progressions. Insertion of arithmetic, geometric and harmonic means between two given numbers. Relation between A.M., G.M. and H.M. arithmetic, geometric series, exponential and logarithmic series.

UNIT 10: Differential Calculus

Polynomials, rational, trigonometric, logarithmic and exponential functions. Inverse functions. Graphs of simple functions. Limits, continuity, 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.

UNIT 11: Applications of Differential Calculus

Rate of change of quantities, monotonic – increasing and decreasing functions, maxima and minima of functions of one variable, tangents and normals, Rolle's and Lagrange's mean value theorems.

UNIT 12: Integral Calculus

Fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration using trigonometric identities. Integral as limit of a sum. Properties of definite integrals. Evaluation of definite integrals; Determining areas of the regions bounded by simple curves.

UNIT 13: Differential Equations

Ordinary differential equations, their order and degree. Formation of differential equations. Solution of differential equations by the method of separation of variables. Solution of homogeneous and linear differential equations and those of the type $d^2y/dx^2 = f(x)$.

UNIT 14: Straight Lines in Two Dimensions

Equation of family of lines passing through the point of intersection of two lines, homogeneous equation of second degree in x and y, angle between pair of lines through the origin, combined equation of the bisectors of the angles between a pair of lines, condition for the general second degree equation to represent a pair of lines, point of intersection and angle between two lines.

UNIT 15: Circles in Two Dimensions

Standard form of equation of a circle, general form of the equation of a circle, its radius and centre, equation of a circle in the parametric form, length of the tangent, equation of the tangent, equation of a family of circles through the intersection of two circles, condition for two intersecting circles to be orthogonal.

UNIT 16: Conic Sections in Two Dimensions

Sections of cones, equations of conic sections (parabola, ellipse and hyperbola) in standard form, condition for $y = mx+c$ to be a tangent and point(s) of tangency.

UNIT 17: Vector Algebra

Vectors and scalars, addition of vectors, components of a vector in two dimensions and three dimensional space, scalar and vector products, scalar and vector triple product. Application of vectors to plane geometry.

UNIT 18: Measures of Central Tendency and Dispersion

Calculation of mean, median and mode of grouped and ungrouped data. Calculation of standard deviation, variance and mean deviation for grouped and ungrouped data.

UNIT 19: Probability

Probability of an event, addition and multiplication theorems of probability and their applications; Conditional probability; Baye's theorem, probability distribution of a random variate; binomial and poisson distributions and their properties.

PART 4: BIOLOGY (30 Questions)

BOTANY

Unit 1: Taxonomy of Angiosperm

Types of classifications - Artificial, Natural, Phylogenetic - Biosystematics - Binomial Nomenclature - Herbaria and their uses- Bentham and Hooker's classification of plants - Families Malvaceae, Solanaceae - Euphorbiaceae, Musaceae and Economic Importance.

Unit 2: Plant Anatomy

Tissues and Tissue System - anatomy of monocot and dicot roots - anatomy of Monocot and dicot stem and anatomy of dicot leaf.

Unit 3: Cell Biology and Genetics

Chromosomes - Structure and types - genes recombination of chromosomes mutation - chromosomal aberration - DNA as genetic material- Structure of DNA - replication of DNA - Structure of RNA and its type.

Unit 4: Biotechnology

Recombinant DNA Technology - Transgenic plants with beneficial traits - plant tissue culture and its application - Protoplasmic fusion

Unit 5: Plant Physiology

Photosynthesis - Significance - site of photosynthesis - photochemical and biosynthetic phases - electron transport system - cyclic and non cyclic photophosphorylation - C3 and C4 pathway - photorespiration - factor affecting photosynthesis - fermentation - plant growth - growth regulators - phytohormones - auxin - gibberellins - cytokinins - ethylene.

Unit 6: Biology in Human Welfare

Food production - breeding experiments - improved varieties and role of biofertilizer - crop diseases and their control - biopesticides - genetically modified food - sustained agriculture and medicinal plants including microbes.

ZOOLOGY

Unit I: Human Physiology

Nutrition - introduction - carbohydrates - proteins - lipids - vitamins minerals - water - Balanced diet - calorie value - (ICBM standard) obesity - Hyperglycemia - hypoglycemia - malnutrition. Digestion - enzymes and enzyme action - Bones and Joints (Major types) - Arthritis - Rickets and Osteomalacia - Gout.

Muscles - muscle action - muscle tone - Rigor Mortis - aerobic exercises (body building) myasthenia gravis.

Respiration - Process of pulmonary respiration - inspiration Expiration - Exchange of gases at alveolar level - Circulation - Functioning of heart origin and conduction of heart beat - Artificial pacemaker - coronary blood vessels and its significance - myocardial infarction - Angina pectoria - Atherosclerosis - heart attack -Resuscitation in heart attack (First aid) Blood

components-functions-plasma-corpusecles-blood clotting-anticoagulants-Thrombosis-embolism-blood related diseases like polycythemia-Leukemia-Lymph fluid.

Physiological Co ordination System:

Brain-functioning of different regions-memory-sleep-stroke- Alzheimer's disease-meningitis-Thyroid-parathyroid hormones-insulin and glucagon-Hormones of adrenal cortex and medulla-Reproductive hormones-problems related to secretion, non secretion of hormones.

Receptor Organs:

Eye-Focussing mechanism and photo chemistry of retina-short sightedness-Nyctalopia-Eye infection-conjunctivitis-Glaucoma-Ear-Hearing mechanism-Hearing impairments and aids - Noise pollution and its importance-skin-melanin functions - Effect of solar radiation / UV Excretion:

Ureotelism-urea-Biosynthesis(ornithine cycle)

Nephron-ultrafiltration-tubular reabsorption and tubular secretion-Renal failure-Dialysis kidney stone formation kidney transplantation-Diabetes.

Reproductive System:

Brief account of spermatogenesis and oogenesis-menstrual cycle-in vitro fertilization-Birth control

Unit 2: Microbiology

Introduction-History of medical microbiology-The influence of Pasteur, Koch and Lister-Virology-structure Genetics culture and diseases-AIDS and its control-Bacteriology-structure, Genetics and diseases-protozoan microbiology-Diseases oriented-pathogenecity of micro organism-anti microbial resistance chemotherapy. Single cell protein. Microbial culture technique and its applications - Strain Isolation and Improvement - Isolation of microbial products.

Unit 3: Immunology

Innate immunity (Non specic) - anatomical Barriers-Physiological barriers-phagocytic barriers Lymphoidal organs-Thymus- Bursa of fabricius- Peripheral Lymphoid organs-Lymph nodes- Transplantation immunology-Autoimmune disorders.

Unit 4: Modern Genetics and Animal Biotechnology

Introduction-scope-Human Genetics Karyotyping Chromosome gene mapping-Recombinant DNA technology and segmenting-genetic diseases-Human genome project-cloning-Transgenic organisms- Genetically modified organism(GMO)-Gene therapy- Animal cell culture and its applications-Stem cell technology-Bioethics of genetic engineering in animals.

Unit 5: Environmental Science

Human population and explosion-issue-Global Warming Crisis-Green house effect-Ozone layer depletion-waste management-Biodiversity conservation (Biosphere reserve)

Unit 6: Applied Biology

Livestock and management-Breeds-Farming method-poultry diseases-Economic value Pisciculture-shafarming-Edibleshes of Tamil Nadu.

Unit 7: Theories of Evolution

Lamarckism-Darwinism-Modern concept of natural selection-species of concept-origin of species and isolating mechanism.

MODEL QUESTIONS

PART 1 : ENGLISH

- _____ bravery is a great virtue
a. No article b. the
c. an d. a
- How can you afford to live _____ that meagre a salary.
a. with b. in
c. on d. to
- Either James or his brothers _____ written the mail
a. have b. has
c. is d. are
- He plays cricket _____?
a. didn't he b. don't he
c. isn't he d. doesn't he
- There was _____ food in the fridge. It was nearly empty.
a. a little b. a few
c. little d. few

PART 2 : PHYSICS

- Red light has a wavelength of 7000 \AA . In μm it is
a. $0.7 \mu\text{m}$ b. $7 \mu\text{m}$
c. $70 \mu\text{m}$ d. $0.07 \mu\text{m}$
- The distance travelled by a body, falling freely from rest in one, two and three seconds are in the ratio
a. $1 : 2 : 3$ b. $1 : 3 : 5$
c. $1 : 4 : 9$ d. $9 : 4 : 1$
- The rate of change of angular momentum is equal to
a. Force
b. Angular acceleration
c. Torque
d. Moment of Inertia
- If the distance between two masses is doubled, the gravitational attraction between them
a. is reduced to half
b. is reduced to a quarter
c. is doubled
d. becomes four times

- If the length of the wire and mass suspended are doubled in a Young's modulus experiment, then, Young's modulus of the wire
a. remains unchanged
b. becomes double
c. becomes four times
d. becomes sixteen times

PART 3 : CHEMISTRY

- which of the following has higher electro negativity
a. fluorine
b. chlorine
c. bromine
d. iodine
- Noble gases have the electron affinity of value
a. low b. high
c. zero d. very high
- The electron affinity and atomic size are proportional
a. directly
b. inversely
c. not but independent
d. none of these
- The hybridization in SF_6 is
a. sp^3 b. sp^3d
c. sp^3d^2 d. sp^3d^2
- Para magnetism is common in
a. p-block b. s-block
c. d-block d. f-block

PART 4 : MATHEMATICS

- Matrix A is of order 2×3 and B is of order 3×2 then order of matrix BA is
a. 3×3 b. 2×3
c. 2×2 d. 3×2
- In a third order determinant the cofactor of a_{23} is equal to the minor of a_{23} then the value of the minor is
a. 1 b. Δ



- c. $-\Delta$ d. 0
- If $ax / ((x + 2) (2x - 3)) = 2 / (x + 2) + 3 / (2x - 3)$ then a =
 a. 4 b. 5
 c. 7 d. 8
 - The number of 4 digit numbers, that can be formed by the digits 3, 4, 5, 6, 7, 8, 0 and no digit is being repeated, is
 a. 720 b. 840
 c. 280 d. 560
 - If n is a positive integer then the number of terms in the expansion of $(x + a)^n$ is
 a. n b. n - 1
 c. n + 1 d. n + 2
- PART 4 : BIOLOGY**
(Biology Students only)
- Electron transport system is present in
 a. ribosomes b. mitochondria
 - c. golgi bodies d. lysosomes
 - DNA replication takes place in
 a. conservative model
 b. semiconservative model
 c. liberal model
 d. None of the above
 - Recombination percentage in a diploid cannot exceed
 a. 100 b. 50
 c. 25 d. 75
 - One of the following does not have ability to divide
 a. Nerve cells b. Liver cells
 c. Muscle cells d. Bone-Marrow cells
 - Which of the following cell organelles takes part in photorespiration
 a. Peroxisomes
 b. Glyoxisomes
 c. Lysosomes
 d. Sphaerosomes

SCHOLARSHIPS

BEEE 2020 - SCHOLARSHIP (TUITION FEE WAIVER)

- 100% of Tuition fees granted as scholarship for Top 25 Rank Holders in BEEE 2020
- 100% of Tuition fees granted as scholarship for State Toppers of all Boards.
- 50% of Tuition fees granted as scholarship for 26 - 250 Rank Holders in BEEE 2020.
- 25% Tuition fees granted as scholarship for Ranks 251 to 500 in entrance conducted by BEEE 2020.
- 100% of Tuition fees granted as scholarship for students Participated / Won in National Sports & events.
- 50% of Tuition fees granted as scholarship for students Participated / Won in State level Sports & events.
- 25% of Tuition fees granted as scholarship for students Participated / Won in District level Sports & events.
 (Note: Students eligible for sports scholarship will have to be certified by Dept. of Physical Education from the University. The students sports participation shall be monitored during the academic year)
- Students Applied for IIT/JEE and STATE ENTRANCE EXAMS will be granted for Scholarship on Rank Basis.
- The above listed scholarship are not applicable for admissions into Architecture, Science & Humanities and PG Course.

REFUND POLICY

If a student chooses to withdraw from the programme of study in which he/she is enabled, The University shall follow the following five-tier system for the refund of fees* remitted by the student.

Sl.	Percentage of Refund of Fees*	Point of time when notice of withdrawal of admission is received by the University
1.	100%	15 days or more before the formally-notified last dat of admission
2.	90%	Less than 15 days before the formally-notified last date of admission
3.	80%	15 days or less after the formally-notified last date of admission.
4.	50%	30 days or less, but more than 15 days, after formally-notified last date of admission
5.	00%	More than 30 days after formally notified last date of admission

IMPORTANT DATES TO REMEMBER

1.	Last date for receipt of filled-in application	10th April 2020 (Friday)
2.	Entrance Examination (Written Exam) (Hall Ticket can be Downloaded from 13th to 18th April 2020)	19th April 2020 (Sunday)
3.	Entrance Examination (Online Exam) (Hall Ticket can be Downloaded from 13th to 18th April 2020)	20th to 24th April 2020 (Monday to Friday)
4.	Publication of rank list & counselling schedule (Counselling Schedule can be Downloaded from the website)	06th May 2020 (Wednesday)
5.	Counselling for admission to B.Tech	3rd to 7th June 2020 (Wednesday to Sunday)
6.	Counselling for admission to M.Tech / M. Arch	27th June 2020 (Saturday)
7.	Counselling for admission to MBA and MCA	28th June 2020 (Sunday)
8.	Last date for receipt of NATA score and HSC marks for B.Arch admission	29th July 2020 (Monday)
9.	Publication of rank list & counselling schedule for B.Arch	2nd August 2020 (Sunday)
11.	Counselling for admission to B.Sc. (Agriculture)	22nd July 2020 (Wednesday)
10.	Counselling for admission to B.Arch	5th August 2020 (Wednesday)

The application form included with this guide is valid for the academic year 2020 - 2021 only.
Hostel & Mess fee payment shall be made on an annual basis at the beginning of every academic year.
Subject to conditions

ORIGINAL DOCUMENT TO BE PRODUCED AT THE TIME OF COUNSELLING (ALONG WITH 3 SET OF XEROX COPIES)

BEEE 2020 Hall Ticket / BEEE 2020 Score Card / Call Letter
Demand Draft for Rs.20,000/- drawn in favour of “Bharath Institute of Higher Education and Research”, payable at Chennai.
Mark statement of qualifying examination (XII Standard and its equivalent)
Mark statement of X Standard.
Degree Certificate (for PG candidates)
Transfer Certificate,
Migration Certificate (For Non Tamil Nadu Students)
Community Certificate (For all categories except General).
Xerox copy of Aadhar Card / Ration Card.
Six copies of recent Passport Size (3.5 x 4.5 cm) color photos of the candidate with white background.
Two copies of Passport Size (3.5 x 4.5 cm) Photographs of Parent / Guardian.

