

AMRITA ENTRANCE EXAMINATION – ENGINEERING 2007

1. Introduction

“AMRITA Entrance Examination – Engineering 2007” is a common examination conducted by Amrita Vishwa Vidyapeetham on all-India basis for selecting candidates for admission to the first year of the 4 year B. Tech. programmes in the following three Engineering Schools of the University.

1. Amrita School of Engineering, Coimbatore (Tamilnadu)
2. Amrita School of Engineering, Amritapuri, Kollam (Kerala)
3. Amrita School of Engineering, Bangalore (Karnataka)

This handbook contains general information and rules relating to the Entrance examination for B. Tech. admission – 2007 and other relevant information. Candidates are required to go through the handbook thoroughly and acquaint themselves with all the relevant information relating to the entrance examination and subsequent admission.

The various B. Tech. programmes in the three campuses are listed in the University brochure.

The contents of the handbook are subject to modification as may be deemed necessary by the University.

2. Eligibility

- The age of the candidate should not exceed 21 years as on 01 July, 2007.
- A pass in 12th standard or second year Pre-University or equivalent examination from CBSE or any State Board or equivalent, scoring an aggregate of minimum 60% marks in Mathematics, Physics & Chemistry,
or
- Pass in Diploma examination (minimum 3 years duration after passing 10th standard), in Engineering, conducted by any State Board of Technical Education, scoring a minimum of 60% marks

Note: Those who are appearing for the above examinations in April/May 2007 and expect minimum marks as above, may also apply.

3. How to use Downloaded format for the Entrance Examination

- a. Get a DD for Rs.600 in favour of "Amrita Vishwa Vidyapeetham, Amrita School of Engineering" payable at Coimbatore .
- b. Download the Application form, Hall-ticket and Address slips in A4 size good quality paper.
- c. Fill up the Application form, Hall-ticket and Address slips correctly.
- d. Write the details of the DD No., Date, Bank, branch on the Application form.
- e. Affix photographs as mentioned in item No.5.
- f. Keep a xerox copy of filled in Application, Hall Ticket and DD for future reference.
- g. Send Application, Hall-ticket, DD and Address slips to the Admission Co-ordinator, Coimbatore campus with a covering letter(see item No.7).
- h. Upon receipt of the same, acknowledgment stating the application number will be sent to the applicant along with the University brochure.
- i. A single application is sufficient for Amrita Entrance Examination for admission to any of the B. Tech. Programmes in the above three campuses. If a candidate submits more than one application, any one of the applications as decided by the University at that time, will be considered.

4. How to fill up the application

- 4.1 **Name of the candidate** : Name as in SSLC to be written in CAPITAL letters in the space provided. Please leave a space between name and initials.
- 4.2 **Male / Female** : Write M or F.

4.3 Date of Birth : First two boxes are meant for the date, next two for the month and last two for the year.

d	d	m	m	y	y
0	1	0	1	8	7

Ex: 1st Jan, 1987 - to be written as

Age : Express the age in completed years.

4.4 Community : Please choose the appropriate one from the bracket and write at the space provided.

4.5 Father's Name : Please use CAPITALS. Leave space between name and initials.

Occupation : Mention designation; also name of the employer/business

4.6 Mother's Name : Please use CAPITALS. Leave space between name and initials.

Occupation : Mention designation; also name of the employer. If not employed, please mention Housewife or Home-maker as you prefer.

4.7 Address for Communication : Please fill up using CAPITAL Letters. Give full details including phone No., mobile and email if available. These details should be same as the one given in the address slips attached.

4.8 Particulars of Qualifying Examination

: Specify whether Higher Secondary, 2nd year Pre-University or Diploma etc.

4.9 Preferred Test Centre

: Please write name of the Test Centre and the respective Code in the space provided. Centre Codes are given in item **No.11** of this hand book. **Test centres once allotted will not be changed subsequently.**

4.10 Declaration : Please fill up all the details properly including date & place and put the signature.

5. Candidate's Photograph

Three identical passport size colour photographs are required in the application form. The candidate is required to **affix firmly** two recent passport size colour photographs, (taken within three months) in the hall ticket. Third photograph shall be affixed in the application. Photographs should not be stapled. The candidate shall sign on the three photographs.

If the photograph does not resemble the candidate present during the examination, he/she will not be allowed to write the examination. Also, if the photograph does not resemble the candidate present during counseling, the candidate will be denied admission. The candidates are advised to keep six additional copies of the same photograph for use during counselling.

6. Address Slip

The candidate shall neatly fill up in **CAPITAL** letters the six address slips provided along with the application for future correspondence.

7. Submission of the filled-in application

Duly filled-in application forms shall be **sent to the following address only:**

The Admission Co-ordinator, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Ettimadai Post, Coimbatore, Tamilnadu – 641 105. Phone: 0422 – 2656 422

8. Hall Ticket

Hall ticket will be issued by the University mentioning the candidate's registration No. and test Centre allotted. In case of non receipt of hall ticket 10 days before the date of Exam, the candidate shall call 0422 – 2652424, between 9 a.m and 5 p.m. on working days.

9. Enquiries

For all enquiries related to Entrance Examination and admission, please call 0422 – 2652 424.

10. About the Entrance Examination

10.1 Entrance Examination pattern : Objective type questions with 4 answers of which only one is correct. Number of papers is TWO.

10.2 Examination Time Table

- a. All Exam centres except those in Kerala - April 22, 2007
b. All Exam centres in Kerala - May 6, 2007

Time : 09:30 AM - 12 Noon			
Subject	Duration	No. of Questions	Total marks
Paper I - Physics & Chemistry	2 ½ hrs.	100	300
Time : 02:00 PM - 04.30 PM			
Paper II - Mathematics	2 ½ hrs.	100	300

10.3 Question Paper

The Question Paper will be in the form of a sealed Question Booklet. Question Booklet will be distributed 10 minutes before the actual time prescribed for commencement of the examination, so that the candidates get time to read the instructions and fill up the required information. The Question Booklet will be in English only.

10.4 Facing page layout of the Question Booklet

Warning : Attempt to commit malpractice in any form in the examination will disqualify the Candidate.													
Version Code :													
Paper :			Subject :										
No. of pages :													
Questions : 100 Nos.		Marks : 300		Time : 2 ½ Hrs.									
Name of the candidate :			_____										
Signature of the Candidate :			_____										
Registration No. :			<table border="1"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>										

Each Question Booklet will have 4 versions as detailed below:

Paper I - Physics & Chemistry

(Version S-1, S-2, S-3 & S-4)

Paper II - Mathematics

(Version M-1, M-2, M-3 & M-4)

All the four versions of a Question Booklet will have the same 100 questions but arranged in different sequence.

The version Code of the Question Booklet, paper, subject and number of pages will be printed on the **facing sheet** of the Question Booklet.

Candidate must write his/her name and registration number in the space provided in the Question Booklet and should sign against “ **Signature of the Candidate**”.

10.5 Answer Sheet

The answer sheet will be distributed along with the Question Booklet.

The evaluation of the answer sheet will be done using the OPTICAL MARK READING (OMR) system. Hence the answer sheet is designed to suit this system. A specimen of the OMR answer sheet is given for ready reference.

Important Points

- 1) If a candidate tampers, mutilates or damages the OMR sheet, he/she will be disqualified and his/her candidature will be cancelled.
- 2) The candidate should **not** do any rough work or writing on the answer sheet. All rough work should be done in the question paper.
- 3) Extra care is needed while handling the OMR answer sheet in the following respects.

DO NOT : (i) pin or staple (ii) punch or tag (iii) make holes anywhere (iv) wet or soil (v) tear or mutilate (vi) wrinkle or fold the OMR answer sheet.

The answer sheet has two Parts – Candidate’s Data on the left side and Answers on the right. Before beginning to answer the questions, please furnish complete information regarding question paper **version code** and **candidate’s data**. Please fill in the boxes and the appropriate bubbles on the left side with **blue or black ball-point pen only**.

Question Booklet Version Code

The candidate should shade using Blue/Black Ball Point pen the appropriate bubble given beside the Version Code on the OMR answer sheet. This should be the same as the Version code printed on the Question Booklet. Then enter the following data.

- (1) **Registration No.** : Write the Registration No. within the blocks as given in the hall ticket and shade the ovals(bubbles). The Registration No. should be entered without any corrections or over-writing.
- (2) **Question Booklet No.** : Write the number in the blocks and shade the bubbles below.
- (3) **Name of the Candidate** : Write the name (as given in the hall ticket) in **CAPITALS** correctly & legibly
- (4) **Name of the Subject**: Write “Physics & Chemistry” / “Mathematics” as the case may be.
- (5) **Signature of the Candidate**: The candidate has to sign in the space indicated and it should match with the signature in the hall ticket.

Answer Part of the OMR SHEET (use HB pencil only)

DO NOT write your Register No. or name or make any stray marks on this part of the sheet. Do the marking for answers **only**, in the spaces provided (bubbles).

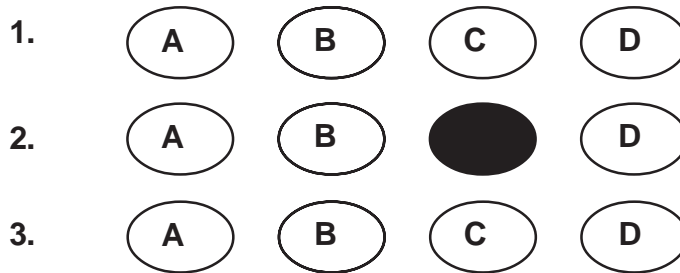
Method of Marking

Use **ONLY HB PENCIL** for filling (shading) the bubbles to indicate the correct answer.

Each question will have four alternative choices and hence four bubbles.



Select the correct or most appropriate answer, and shade the corresponding bubble with HB pencil. For example, if the answer to question 2 is C, bubble C has to be darkened as shown below:



Mark/shade **ONLY** one bubble against each question in the answer sheet. The bubble should be shaded completely. Candidates are advised not to make any special effort to mark the bubbles artistically.

In case the candidate, after a second thought, wishes to change the choice already shaded, please erase the marking completely with a good eraser and thereafter mark/shade the alternative bubble afresh. While attempting to erase, care should be taken to see that there is no smudge or damage to the sheet, as it will affect OMR performance.

Opening the Question Booklet

The Booklet shall be opened only when the Invigilator announces to do so. Do not open/break the seal before the announcement.

After Opening the Booklet

Immediately after opening the Question Booklet, the candidate should check whether the Question Booklet supplied is of the correct subject, it contains all the 100 questions in serial order and the exact number of pages mentioned on the facing sheet. In case of unprinted, torn or missing pages in the Booklet, the matter should be immediately brought to the attention of the invigilator. In such a case, the invigilator shall take immediate action to issue the candidate a fresh Question Booklet of the same version code. The Question Booklet initially issued will be taken back only after the replacement is made.

Any malpractice or attempt to commit any kind of malpractice in the examination, will result in the summary disqualification of the candidate. Impersonation/forgery in any form will be dealt with as per law.

11. EXAMINATION CENTERS (PROPOSED)	(code number given in bracket)
ANDHRA PRADESH	: Hyderabad (401), Visakhapatnam (402), Vijayawada (403)
DELHI	: New Delhi (411)
GUJARAT	: Ahmedabad (421)
JHARKHAND	: Ranchi (431)

KARNATAKA	: Bangalore (301), Belgaum (302), Bijapur (303), Davengere (304), Dharwad (305), Karwar (306), Mangalore (307), Mysore (308), Raichur (309), Shimoga (310), Udupi (311)
KERALA	: Amritapuri (201), Ernakulam (202), Kannur (203), Kasargod (204), Kollam (205), Kottayam (206), Kozhikode (207), Pathanamthitta (208), Thrissur (209), Thiruvananthapuram (210)
MADHYA PRADESH	: Bhopal (441)
MAHARASHTRA	: Mumbai (451)
RAJASTHAN	: Kota (461)
TAMILNADU & PONDICHERRY	: Chennai (101), Coimbatore (102), Cuddalore (103), Erode (104), Hosur (105), Karur (106), Madurai (107), Nagercoil (108), Namakkal (109), Ooty (110), Salem (111), Thoothukudi (112), Tirunelveli (113), Trichy (114), Vellore (115), Karaikkal (116), Pondicherry (117)
UTTAR PRADESH	: Lucknow (471)
WEST BENGAL	: Kolkata (481)

12. Evaluation

Three marks will be awarded for every correct answer. For every incorrect answer, one mark will be deducted from the total score. If no response is indicated in the answer sheet against a question, no marks, positive or negative, will be awarded. If more than one answer is indicated against a question, it will be treated as "incorrect answer" and negative mark will be awarded.

The answer sheets are machine graded and scrutinised with precision. Revaluation and rechecking will not be allowed.

13. Publication of Ranks

Rank of the individual candidates will be published in the University website within one month from the date of examination. (ref: www.amrita.edu)

14. Admission

Counselling for admission will start by June 2007.

15. Acknowledgement

Candidates who wish to have acknowledgement may send self-addressed post card, writing the details as below on the front and backside of the post card.

(Front side)

Amrita Entrance Examination - Engineering 2007

Acknowledgement

Application No. :

(to be written by
the Office)

(back side)

To :
(The applicant to write his address in CAPITALS)

(Office Seal)

Note: The candidate shall keep xerox copy of the filled in application for future reference.

16. Identification of Candidates

In the examination hall, candidates have to sign on the office copy of the Hall Ticket and on the attendance sheet.

Also they have to affix their left hand thumb impression on the attendance sheet.

16.1 The candidates are advised to keep a xerox copy of the filled in application and Demand Draft for future reference. In case the Hall Ticket has not been received in time due to postal delay etc., the candidate has to present these xerox copies to establish his/her candidature.

MATHEMATICS - SYLLABUS

1. 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

2. 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. Solution of simultaneous linear equations using determinants .

3. Quadratic Equations

Quadratic equations in real and complex number system and their solutions. Relation between roots and coefficients, Nature of roots, formation of quadratic equations with given roots;

4. 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.

5. 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. Special series $\sum n$, $\sum n^2$, $\sum n^3$. Arithmetic-Geometric Series, Exponential and Logarithmic Series.

6. Differential Calculus

Polynomials, rational, trigonometric, logarithmic and exponential 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 upto two. Applications of derivatives: rate of change of quantities, monotonic- increasing and decreasing functions, Maxima and Minima of functions one variable, tangents and normals, Rolle's and Lagrange's Mean Value Theorems.

7. Integral Calculus

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

8. Differential Equations

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

9. Two Dimensional Geometry

Recall of Cartesian system of rectangular co-ordinates in a plane, distance formula, area of triangle, condition for the collinearity of three points and section formula, centroid and in-centre of a triangle, locus and its equation, translation of axes, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axes

10. The straight line and pair of straight lines

Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, distance of a point from a line. Equations of internal and external bisectors of angles between two lines, equation of family 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 intersections and angles between two lines.

11. Circles and Family of Circles

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, equation of a circle when the end points of a diameter are given, points of intersection of a line and circle with the centre at the origin and condition for a line to be tangent, equation of a family of circles through the intersection of two circles, condition for two intersecting circles to be orthogonal.

12. Conic Sections

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

13. Three Dimensional Geometry

Coordinates of a point in space, distance between two points; Section formula, direction ratios and direction cosines, angles between two intersecting lines. Skew lines, the shortest distance between and its equation. Equation of a line and plane in different forms; intersection of a line and a plane, coplanar lines, equation of a sphere, its centre and radius. Diameter form of the equation of a sphere.

14. Vector Algebra

Vector and scalars, addition of two 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.

15. 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.

16. Probability

Probability of an event, addition and multiplication theorems of probability and their applications; Conditional probability; Bayes' theorem, Probability distribution of a random variate; Binomial and Poisson distributions and their properties.

17. Trigonometry

Trigonometrical identities and equations. Inverse trigonometric functions and their properties. Properties of triangles, including centroid, incentre, circumcentre and orthocentre, solution of triangles. Heights and distances.

PHYSICS - SYLLABUS

1.Units and Dimensions

Units for measurement, system of units, SI, fundamental and derived units, dimensions and their applications

2.Motion in One Dimension

Motion in straight line, uniform and non-uniform motion, their graphical representation, uniformly accelerated motion and its applications

3.Motion in Two Dimension

Scalars and Vectors, vector addition, unit vector, zero vector and its properties; resolution of vectors, scalar and vector products, uniform circular motion and its applications, projectile motion

4.Newtons Laws of Motion

Force and inertia-Newton's Laws of motion; conservation of linear momentum and its applications, friction-laws of friction

5.Work, Energy and Power

Concept of work, energy and power; energy-kinetic and potential; conservation of energy and its applications; elastic collisions in one and two dimensions; different forms of energy

6.Rotational Motion and Moment of Inertia

Center of mass of a two particle system; center of mass of a rigid body, general motion of a rigid body, nature of rotational motion, torque, angular momentum, its conservation and applications; moment of inertia, parallel and perpendicular axes theorem, expression of moment of inertia for a thin rod,ring, disc and sphere

7.Gravitation

Acceleration due to gravity, one and two dimensional motion under gravity; universal law of gravitation, variation in the acceleration due to gravity of the earth; planetary motion, Kepler's laws, artificial satellite-geostationary satellite, gravitational potential energy near the surface of earth, gravitational potential and escape velocity

8.Solids and Fluids

Interatomic and inter molecular forces-states of matter

Solids: Elastic properties, Hooke's law, Young's modulus, bulk modulus, modulus of rigidity.

Liquids: Cohesion and adhesion; surface energy and surface tension; flow of fluids, Bernoulli's theorem and its applications; viscosity, Stoke's Law, terminal velocity

9.Oscillations

Periodic motion, simple harmonic motion and its equation, energy in S H M; oscillations of a spring and simple pendulum

10.Waves

Wave motion, speed of a wave, longitudinal wave and transverse waves, superposition of waves. progressive and standing waves, free and forced; oscillations, resonance, vibration of strings and air columns, beats, Doppler effect

11.Heat and Thermodynamics

Thermal expansion of solids, liquid and gases and their specific heats; relationship between C_p and C_v for gases, first law of thermodynamics, thermodynamic processes; second law of thermodynamics, Carnot cycle, efficiency of heat engines)

12.Heat Transfer

Modes of transference of heat; thermal conductivity; black body radiations, Kirchoff's law, Wein's Law, Stefan's law of radiation and Newton's law of cooling

13.Electrostatics

Electric charges-its unit and conservation, Coloumb's law, dielectric constant, electric field, lines of force, field due to dipole and its behavior in a uniform electric field, electric flux, Gauss's theorem and its applications; electric potential, potential due to a point charge; conductors and insulators, distribution of charge on conductors; capacitance, parallel plate capacitor, combination of capacitors, energy of capacitor

14.Current Electricity

Electric current and its unit, sources of energy, cells-primary and secondary, grouping of cells, resistance of different materials, temperature dependence, specific resistivity, Ohm's law,Kirchoff's Law, series and parallel circuits; Wheatstone's Bridge with their applications and potentiometer with their applications

15.Thermal and Chemical Effects of Currents

Heating effects of current, electric power, simple concept of thermoelectricity-Seebeck effect and thermocouple; chemical effect of current-Faraday's laws of electrolysis.

16.Magnetic Effects of Current

Oestard's experiment-Biot Savert's law, magnetic field due to straight wire, circular loop and solenoid, force on a moving charge in a uniform magnetic field(Lorentz force),forces and torques on current in a magnetic field, force between current carrying wires, moving coil galvanometer and conversion to ammeter and voltmeter

17.Magnetostatics

Bar magnet, magnetic field, lines of force, torque on a bar magnet in a magnetic field, earth's magnetic field, para, dia and ferro magnetism, magnetic induction, magnetic susceptibility

18.Electromagnetic Inuction and Alternating Current

Induced e.m.f., Faraday's law, Lenz's law, Self and mutual inductance, alternating currents, impedance and reactance, power in ac; circuits with L C and R series combination, resonant circuits, transformer and AC generator

19.Ray Optics

Reflection and reflection of light at plane and curved surfaces, totals internal reflection, optical fiber; deviation and dispersion of light by a prism; lens formula, magnification and resolving power; microscope and telescope

20.Wave Optics

Wave nature of light-interference-Young's double experiment; diffraction-diffraction due to a single slit; elementary idea of polarization

21.Electromagnetic Waves

Electromagnetic waves and their characteristics; electromagnetic wave spectrum from gamma to radio waves- propagation of EM waves in atmosphere

22. Electron and Photons

Charge on an electron, photoelectric effect and Einstein's explanation of photoelectric effect

23. Atoms, Molecules and Nuclei

Alpha particles scattering experiment, atomic masses, size of the nucleus; radioactivity; alpha, beta and gamma particles/rays and their properties .radioactive decay law, half life and mean life of radio active nuclei, binding energy, mass energy relationship, nuclear fission and nuclear fusion

24. Solids and Semiconductors

Energy bands in solids, conductors, insulators and semiconductors, pn junction, diodes, diode as a rectifier, transistor action, transistor as an amplifier.

CHEMISTRY - SYLLABUS

1. Some Basic Concepts

Measurement in chemistry; Laws of chemical combination, Atomic mass, Mole concept, Molar mass, Determination of molecular formula, Chemical equation, Stoichiometry of chemical reactions.

2. States of Matter

Gaseous state, Boyle's Law, Charle's Law and absolute scale of temperature, Avogadro's hypothesis, ideal gas equation. Dalton's Law of partial pressures.

Kinetic molecular theory of gases. Deviation from ideal behavior. Critical phenomena. Liquefaction of gases.

Liquid state (properties of liquids: vapor pressure, , surface tension, viscosity)

Solid state (classification of solids, X-ray studies of crystal; lattices and unit cell, Packing constituent particles in crystals). Imperfection in solids.

3. Atomic Structure & Chemical Bonding

Constituents of the atom Rutherford's model of the atom. Electronic structure of atoms; nature of light and electromagnetic waves; atomic spectra; Bohr's model of hydrogen.

Dual nature of matter and radiation, de Broglie relation. The uncertainty principle, Quantum mechanical model of the atom. Orbitals and quantum numbers, shapes of orbitals, Aufbau's principle, Pauli's exclusion principle, Hund's rules, Electronic configuration of atoms.

Chemical Bonding : Chemical bonds and Lewis structure, shapes of molecules (SEPR theory), Quantum theory of the covalent bond, Hydrogen and some other simple molecules, carbon compounds, hybridization, Boron and Beryllium compounds, Coordinate covalent bond, ionic bond as an extreme case of polar covalent bond, ionic character of molecules and polar molecules. Bonding in solid state: ionic, molecular and covalent solids; metals. Hydrogen bond and resonance.

Molecular Orbital Theory; bond order and magnetic properties of H₂, O₂, N₂, F₂ on the basis of MOT.

Hybridization involving s, p, and d orbitals (including shapes of simple organic molecules).

4.Solutions

Types of solutions. Units of concentration, Vapour-pressure of solutions and Raoult's law.

Colligative properties. Determination of molecular mass. Non-ideal solutions and abnormal molecular masses. Volumetric analysis.

5.Chemical Energetics and Thermodynamics

Energy changes during a chemical reaction. Internal energy and Enthalpy changes. Origin of Enthalpy changes in reaction, Hess's law of constant heat summation, numerical problems based on these concepts. Enthalpies of reaction (Enthalpies of neutralization, combustion, fusion and vaporization) Sources of energy (conservation of energy sources and identification of alternative sources, Pollution associated with consumption of fuels. The sun as the primary source)

First law of thermodynamics: Relation between internal energy and enthalpy. Application of first law of thermodynamics. Second law of thermodynamics: Entropy, Gibb's energy, Spontaneity of a chemical reaction; Gibb's energy change and chemical equilibrium. Gibb's energy available for useful work.

6.Kinetics & Equilibrium

Chemical Kinetics

Rate of reaction, and order of reaction. Factors affecting rate of reaction, effect of temperature on the reaction rate, concept of activation energy, Catalyst. Elementary reactions as steps to more complex reactions.

Rate law expression. Order of a reaction. Units of rates and specific rate constant. Order of reaction and effect of concentration. Temperature dependence of rate constant.

Chemical Equilibrium

Equilibrium involving physical changes (solid - liquid, liquid - gas equilibrium involving dissolution of solids in liquids, gases in liquids).

Equilibrium involving chemical system (the law of chemical equilibrium, the magnitude of the equilibrium constant, numerical problems).

Effect of changing conditions of systems at equilibrium (change of concentration, change of temperature, effect of catalyst; Le Chatelier's principle)

Equilibria involving ions-ionization of electrolytes, weak and strong electrolytes, acid-base equilibrium, various concepts of acids and base. Ionization of water, pH scale, Buffers; solubility product, numerical problems based on these concepts.

7.Redox Reactions and Electrochemistry

Oxidation and reduction as electron transfer concept. Redox reaction in aqueous solutions-electrochemical cells, e.m.f. of a galvanic cell; Dependence of e.m.f on concentration and temperature. (NERNST equation and numerical problems based on it). Electrolysis, Oxidation number. (Rules for assigning oxidation number, redox reactions in terms of oxidation number). Balancing oxidation-reduction equations.

Electrolytic conduction, molar conductivity, Kohlrausch's law and its application. Voltaic cell, Electrode potential and electro motive force. Gibb's energy change and cell potential; Electrode potential and products of electrolysis. Fuel cells, corrosion and its prevention.

8.Surface Chemistry

Surfaces: Adsorption - physical and chemical adsorption, adsorption isotherms, Colloids preparation and general properties; Emulsions; Catalysis: Homogeneous and heterogeneous, structure of catalyst, Enzymes. Zeolite.

9.Chemical Families-Periodic Properties

Modern periodic law, Types of elements - Representative Elements (s and p block, transition Elements: d-block elements). Periodic trends in properties-ionization enthalpy (Ionization energy), Electron gain enthalpy (Electron Affinity), Atomic radii, valence and periodicity in properties of compounds.

Periodic properties- trends in groups and periods (a) nature of oxides (b) melting points of halides and (c) solubility of carbonates and sulphates;

The chemistry of s and p block elements, electronic configurations, general characteristic properties and oxidation states of following: Group 1: Alkali metals, Group 2: Alkaline earths, Group 13: Boron family, Group 14: Carbon family, Group 15: Nitrogen family, Group 16: Oxygen family, Group 17: Halogen family, Group 18: Noble gases & hydrogen.

10.Chemistry of Non-Metals

Hydrogen: (unique position in the periodic table, occurrence, isotopes, properties, reactions and uses), ortho, para hydrogen; Hydrides-molecular, saline and interstitial.

Occurrence, preparation, properties, reactions and uses of Oxygen, Nitrogen and Boron;

Water and Hydrogen peroxide, structure of water molecule and its aggregates, physical and chemical properties of water, hard water and soft water; water softening, hydrogen peroxide: preparation, properties, structure and uses.

Preparation, properties and uses of compounds: ammonia, oxides of nitrogen, Nitric acid: simple oxides, ozone, Borax and Boric acid; usage of Boron and its compounds.

Carbon: inorganic compounds of carbon; oxides, carbides, elemental carbon.

Noble gases: discovery, occurrence, and isolation, physical properties. Chemistry of noble gases and their uses.

11.Chemistry of Metals

Occurrence, extraction, properties and uses of Sodium, Magnesium, Copper, silver and Zinc.

Transition Metals Including Lanthanides : Electronic configuration: General characteristic properties, oxidation states of transition metals.

12.Co-Ordination Chemistry

Coordination compounds, Nomenclature, isomerism in coordination compounds; bonding in coordination compounds; Werner's coordination theory. Application of coordinate compounds.

13.Nuclear Chemistry

Nature of radiation from radio active substances, nuclear reaction; radio active disintegration series; artificial transmutation of elements; isotopes and their application; radiocarbon-dating.

14.Purification and Characterization of Organic Compounds

Purification: Crystallization, sublimation, distillation, differential extraction, chromatography.

Qualitative analysis: Detection of nitrogen, sulphur, phosphorus and halogens.

Quantitative analysis: estimation of carbon, hydrogen, nitrogen, halogens, basic principles only

15. Some Basic Principles in Organic Chemistry

Classification of organic compounds.

Tetravalency of Carbon. Homologous series. Functional groups; $-C=C-$, $-C\equiv C-$, and groups containing halogen, oxygen, nitrogen and sulphur. General introduction to naming organic compounds: common names and IUPAC nomenclature of aliphatic, aromatic and cyclic compounds. Illustration with example of compounds having not more than three same or different functional groups/atoms. Isomerism: structural and stereoisomerism (geometrical and optical). Covalent bond fission and heterolytic; free radicals, carbocations and carbanions; electrophiles and nucleophiles.

Electron displacement in a covalent bond: inductive effect, Electromeric effect and resonance.

Common types of organic reactions: substitution, addition, elimination and rearrangement reactions.

16. Hydro Carbons

Classification; Sources of hydrocarbons.

General methods of preparation, physical properties and reactions of Alkanes (from unsaturated hydrocarbons, alkyl halides, aldehydes, ketones, and carboxylic acids), Alkenes and Alkynes; Substitution, oxidation and miscellaneous reactions of alkanes. Conformations of alkanes (ethane, propane, butane,) and cyclohexane, Sawhorse and Newman's projections). Markownikoff's rule. Acidic character of alkynes. Polymerization of alkenes.

Aromatic hydrocarbon: Benzene and its homologous, isomerism, chemical reaction of benzene. Structure of benzene, resonance. Directive influence of substituents.

Petroleum: Hydrocarbons from petroleum, cracking and reforming, quality of gasoline; octane number, gasoline additives.

17. Organic Compounds Containing Halogens (Haloalkanes And Haloalkenes)

Methods of preparation physical properties and reactions.

18. Organic Compounds Containing Oxygen

General methods of preparation, correlation of physical properties with their structures, chemical properties and uses of alcohols, polyhydric alcohols, ethers, aldehydes, ketones, carboxylic acids and their derivatives, Phenol, benzaldehyde and benzoic acid: their important methods of preparation and reactions. Acidity of carboxylic acids and phenol; effect of substituents on the acidity of carboxylic acids.

19. Organic Compounds Containing Nitrogen (Cyanides, Nitrocompounds And Amines)

Cyanides, nitro compounds and their methods of preparation; correlation of their physical properties with structure, chemical reaction and uses; basicity of amines

20. Synthetic and Natural Polymers

Classification of polymers, natural and synthetic polymers (with stress on their general methods of preparation) and important uses of following: Teflon, PVC, Polystyrene, Nylon-66, Terylene and Bakelite.

21. Biomolecule and Biological Processes

The cell and energy cycle; carbohydrates: Monosaccharides, disaccharides, polysaccharides; Amino acids and peptides: structure and classification; Proteins -structure of proteins.

Nucleic Acids: DNA and RNA; Lipids: structure, membranes and their functions.

22. Chemistry in Action

Dyes, chemicals in medicines (antipyretic, analgesic, antibiotics), rocket propellants.

23. Environmental Chemistry

Environmental pollutants; Soil, water and air pollution; major atmospheric pollutants; acid rain; ozone and its reaction causing ozone layer depletion, effect of the depletion of ozone layer; industrial pollution.

AMRITA VISHWA VIDYAPEETHAM
U N I V E R S I T Y
 Amrita Entrance Examination - Engineering
A N S W E R S H E E T

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(Answer Sheet No.)

USE ONLY BLUE/BLACK BALL POINT PEN FOR WRITING & SHADING ALL DETAILS BELOW.

USE ONLY HB PENCIL FOR ANSWERS.

The **Version Code** given in the Question Booklet should be marked correctly in the appropriate bubble given below

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IMPORTANT

- Handle this sheet carefully.
- Any error in filling this sheet may affect your selection.

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3. Name of the Candidate

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5. Certification

Certified that the above entries including Question Booklet version code are checked by me and found to be correct.

Signature of the Candidate

Signature of the Invigilator

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IMPORTANT INSTRUCTIONS

1. Read carefully the instructions on the question paper and answer sheet before answering the questions.
2. Candidates shall possess the Hall Ticket issued by the University without which they will not be permitted to write the examination.
3. Candidates shall occupy their respective seats having their registration number.
4. Any malpractice or attempt to commit malpractice in the examination will lead to disqualification of the candidate
5. Candidates will not be allowed to carry any textual material, printed or written bits of papers, Mathematical and Physical Tables, electronic gadgets like calculator, cell phone etc. into the examination hall.
6. The answer sheet has two Parts – Candidate's Data on the left side and **Answers** on the right. Fill in all the entries on the left side (candidate's Data Part) in blue or black ball-point pen before beginning to answer Questions. **Only HB Pencil** should be used to mark/shade the bubbles for the answer on the right side.
7. DO NOT : (i) Pin or staple (ii) punch or tag (iii) Make holes anywhere (iv) Wet or Soil
(v) Tear or mutilate (vi) wrinkle or fold the OMR answer sheet.
8. Use the answer sheet carefully; no spare answer sheet will be given.
9. Immediately after opening the Question Booklet, the candidate should check whether the question booklet supplied is of the correct subject and that it contains all the 100 questions in serial order and exact number of pages mentioned on the facing sheet. In case of unprinted, torn or missing pages in the booklet the matter should be immediately brought to the attention of the invigilator.
10. For each Question, mark only one bubble in the Answer sheet. The bubble should be filled completely and must be darkened by HB pencil. There is negative marking in respect of wrong answers.
11. In case the candidate wishes to change the choice already shaded, please erase the marking completely with a good eraser and thereafter mark/shade the alternative bubble afresh.
12. Candidates will not be permitted to leave the hall before the end of the examination.
13. The candidates are required to **hand over the answer sheet and question booklet to the Invigilator** before leaving the hall.



AMRITA
VISHWA VIDYAPEETHAM
UNIVERSITY
Established u/s 3 of UGC Act 1956

श्रद्धावान् लभते ज्ञानम्

Application for AMRITA ENTRANCE EXAMINATION - ENGINEERING 2007

Application No.:

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Registration No.:

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(To be filled by the Office)

1. Name of the Candidate
(in CAPITALS as in SSLC) _____

2. Male/Female : _____

3. Date of Birth :

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Age: _____

4. Community : (SC, ST, BC, MBC, OBC, OC) _____

5. Father's Name
(in CAPITALS) _____

Occupation : _____
(Specify Organisation's Name)

6. Mother's Name
(in CAPITALS) _____

Occupation : _____
(Specify Organisation's Name)

7. Address for Communication :
(in CAPITALS) _____

_____ P.O. _____ Taluk _____

Dist. : _____ State : _____ PIN Code : _____

Phone No. : _____ Mobile: _____ E-mail : _____
(STD Code)

Affix a recent
passport size
colour photo
duly self attested

8. Particulars of Qualifying Examination (HSC or Equivalent / Diploma) :

Name of the Examination : _____ No. of attempts : _____

Board / University : _____ Year of appearance : _____

State in which studied for Qualifying Exam: _____

9. Preferred Test Centre :
(Write Centre Code)

First Choice

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10. D.D No. & Date _____

Bank & Branch _____

DECLARATION

I,son/daughter of
hereby declare that the particulars given by me in this application are true and correct. I shall produce the original certificates at the time of admission or on demand. If, in future, any information furnished is found to have been false or incorrect or any information has been suppressed to secure admission, I shall be liable to be removed from the course without any claim or consideration. I further state that I have carefully read the Information Handbook, before filling the application.

Place :

(Signature of the Applicant)

Date :

Name :



AMRITA VISHWA VIDYAPEETHAM

UNIVERSITY

Established u/s 3 of UGC Act 1956

श्रद्धावान् लभते ज्ञानम्

Application No.

Hall Ticket for Amrita Entrance Examination - Engineering 2007

Centre Allotted (To be filled by office)

Registration No.(to be filled by the office)

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Name of the Applicant (to be filled by the applicant)

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Father's Name (to be filled by the applicant)

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Applicant's Postal Address (to be filled by the applicant)

House / Street																			
P.O.																			
District																			
State											Ph. No.								

PIN

Affix a recent passport size colour photo duly self attested

Signature of the Candidate
(to be signed at the time of applying)

Signature of the Candidate
(to be signed in the exam hall)

Verified

Signature of the Invigilator

Cut Here



AMRITA VISHWA VIDYAPEETHAM

UNIVERSITY

Established u/s 3 of UGC Act 1956

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District																			
State											Ph. No.								

PIN

Affix a recent passport size colour photo duly self attested

Signature of the Candidate
(to be signed at the time of applying)

Chairman - Admissions

Important Instructions

Date of ENTRANCE EXAMINATION

- a. All Exam centres except those in Kerala - April 22, 2007
- b. All Exam centres in Kerala - May 6, 2007

Time of Examination : 9.30 am to 12.00 noon & 2 pm to 4.30 pm

The candidate shall be present at the examination hall 20 minutes before the commencement of the examination. Candidate shall not be allowed to appear for the exam without producing the Hall Ticket.

Candidate will not be admitted to the exam hall 15 minutes after the commencement of the test.

Candidates will not be permitted to leave the hall before the end of the examination.

Candidate should hand over the answer sheet and the question booklet to the invigilator before leaving the hall.

Candidates must bring blue or black ball point pen, HB pencils (2 Nos.), sharpener and eraser.

Candidates will not be allowed to carry any textual material, printed or written bits of papers, Mathematical and Physical Tables, electronic gadgets like calculator, cell phone etc. into the examination hall.

Application No:

ADDRESS SLIP

Communication address of the applicant to be filled in and returned with the **completed application form**

USE BALL POINT PEN ONLY. WRITE IN CAPITAL LETTERS

Name

Address

PIN

Phone No.: _____

Name

Address

PIN

Phone No.: _____

Name

Address

PIN

Phone No.: _____

Name

Address

PIN

Phone No.: _____

Name

Address

PIN

Phone No.: _____

Name

Address

PIN

Phone No.: _____

Amrita Entrance Examination - Engineering Time Schedule

<i>Description of Paper</i>	<i>Paper I Physics & Chemistry</i>	<i>Paper II Mathematics</i>
Entry into the Exam Hall	09.10 am	01.40 pm
Distribution of Answer Sheet & Question Booklet	09.20 am	01.50 pm
Filling-up the entries in the Question Booklet & Answer Sheet	09.20-09.28 am	01.50-01.58 pm
Opening the Question Booklet by breaking the seal	09.28 am	01.58 pm
Examining the Question Booklet	09.28-09.30 am	01.58-2.00 pm
Commencement of Test	09.30 am	02.00 pm
Late Entry to the Hall Permitted Till	09.45 am	02.15 pm
End of the Examination	12.00 Noon	04.30 pm

Dates to Remember

Issue of APPLICATION FORM commences	-	February 1, 2007
Last date for receiving COMPLETED APPLICATION	-	April 5, 2007
Date of ENTRANCE EXAMINATION		
a. All Exam centres except those in Kerala	-	April 22, 2007
b. All Exam centres in Kerala	-	May 6, 2007
COUNSELLING for admission	-	June, 2007

Important Note

A candidate shall appear in only one Examination, i.e., either on 22nd April 2007 or on 6th May 2007. Those candidates found appearing in both the examinations will have their candidature summarily rejected without any intimation whatsoever.

Irrespective of the centre that a candidate chooses to write the entrance examination, he / she can opt for admission to any of the three Schools of Engineering at Amritapuri, Bangalore and Coimbatore.