

RUSTAMJI INSTITUTE OF TECHNOLOGY

BSF Academy, Tekanpur, Gwalior – 475 005 (M.P.)

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No.1232/RJIT/Admission-BE/2011/480

Dated 27th April 2011

To,

IG (Admn.) BSF HQ, New Delhi,
IG (Admn.) IG (Wel) CRPF, HQ, New Delhi,
IG (Admn.) IG (Wel) ITBP, HQ, New Delhi,
IG (Admn.) IG (Wel) CISF, HQ, New Delhi,
IG (Admn.) SSB, HQ, New Delhi,
Addl DG BSF (East) & West
HQ DG, Police M.P. Bhopal,
All BSF Frontiers HQ, All BSF Sectors HQ,
All BSF Training Institutions,

Sub.:- **ADMISSION TO B.E. COURSES.**

Sir,

Rustamji Institute of Technology, (RJIT) has been conducting 4 years Full time B.E. Course(s) in Information Technology, Electronics & Commn. Engg and Automobile Engg. under the affiliation of Rajiv Gandhi Proudhyogiki Vishwavidyalaya Bhopal, duly approved by All India Council for Technical Education (AICTE) New Delhi and Director of Technical Education (DTE) M.P. Bhopal since 1999.

2. 25 Seats in each discipline for BSF serving/retired/deceased on duty personnel's wards and 05 seats in each discipline for serving/deceased on duty CRPF, ITBP, CISF, SSB & M.P. Police, personnel's wards are available. Out of these 90 seats 01 seat is reserved for J & K resident. A candidate seeking admission against this seat will have to produce J & K domicile. **Fee structure is open for revision in future as per the directions of DTE Bhopal, AFRC Bhopal and BOG, RJIT, BSF Academy.** The details of present Annual Fee structure is as follows and is likely to be increased:-

S. No.	Nature of Fees	Wards of M P Quota & CRPF/ITBP/CISF/SSB/MP Police	Wards of BSF			
			Officers	SO's	OR's	Widow
(a)	College Fee	38,300/-	38,300/-	38,300/-	32,725/-	27,150/-
(b)	Other Fee					
1.	College Development	4,000/-	4,000/-	4,000/-	4,000/-	4,000/-
2.	Caution Money (Refundable)	1,500/-	1,500/-	1,500/-	1,500/-	1,500/-
3.	Counseling Fee*	500/-	500/-	500/-	500/-	500/-
4.	University Dev. Fee*	350/-	350/-	350/-	350/-	350/-
5.	Trg & Placement Fee	1,000/-	1,000/-	1,000/-	1,000/-	1,000/-
6.	SWF/Sports Fee*	200/-	200/-	200/-	200/-	200/-
	Total (in Rs.)	7,550/-	7,550/-	7,550/-	7,550/-	7,550/-
	Grand Total (a) + (b)	45,850/-	45,850/-	45,850/-	40,275/-	34,700/-

* Remitted to University (RGPV, Bhopal)

03. An Entrance Test will be conducted under the guidance and supervision of RGPV, AICTE and Director of Technical Education (M.P.) at RJIT, BSF Tekanpur only.
04. Additional branches of B.E. in Civil Engg & Mechanical Engg with capacity of 60 each is likely to be introduced from current academic session, 2011-12 subject to approval by AICTE, New Delhi.

05. (a) **Last date of receipt of filled application forms at the Office of the Principal, RJIT, BSF Tekanpur : 30 June 2011**
- (b) **Date of Entrance Test : 26 July 2011 at 0900 hrs.**
06. **Eligibility:**
For admission to B.E. First year a candidate should have passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of the Chemistry/ Biotechnology/ Biology of any recognized Board or University . Obtained at least 50% marks in the above subject taken together as per AICTE Norms.
NOTE:- Candidates who have appeared in concerned exam and whose result is still awaited (or) candidate whose examinations have been delayed can also apply, but they will have to submit the original documents at the time of counselling of their marks. Candidates are required to fill the application form attached with this letter.
07. Wards (Sons & daughters) of only those BSF/CPOs personnel are eligible, who are getting their pay/pension out of Govt Exchequer.
08. The Entrance Test fee is Rs. **300/-(non refundable)** except for the wards of BSF widows for whom the Entrance Test fee is Rs. **100/- (non refundable)** only. The amount can be sent in the form of :-
(a) A Demand draft drawn in favour of Principal RJIT payable at State Bank of India (Code No. 8284) BSF Academy, Tekanpur Gwalior (M.P.)
(b) In case DD is not payable at State Bank of India (Code No. 8284) then same will not be entertained and your application form will be treated as rejected for which you will solely be responsible.
09. Photocopy of the following certificates are to be attached with the application form :-
(a) Date of Birth certificate. (b) 10+2 Pass Mark sheet/ appeared certificate.
(c) Father's service certificate issued by competent authority of concerned department. Retired person also produce Relationship certificate by the concerned department mentioning Real Son/Daughter in respect of his ward.
(d) Two self addressed envelopes with stamp of Rs. 5.00 on each.
(e) Filled admit card for Entrance Test. Photographs of applicant/candidate on admit card is required to be attested by Unit/HQ Comdt or his authorized signatory to avoid fraud.
(f) Two number coloured Pass Port Size (front sided) photographs.
(g) Necessary Bank Draft (Application without requisite Bank Draft shall not be entertained)
10. Candidates who are found eligible for admission to B.E. Courses will be required to pay full fees on the day of admission i.e. **27 July 2011**. The amount deposited in cash/ Demand draft drawn in favour of Principal RJIT payable at State Bank of India (Code No. 8284) BSF Academy, Tekanpur Gwalior (M.P.).
11. Limited Hostel facility for Boys and Girls is available. Hostel allotment will be as per the Hostel Policy. Boys/Girls candidates who get the Hostel accommodation will be required to pay the Hostel charges separately.
12. Bus facility from Gwalior to Tekanpur and back is available. Charges applicable.
13. All Units/HQrs are requested to circulate the contents of this letter down up to BOP/Sub Unit level by 15 May 2011.
14. This application Form and syllabus for B.E. Courses is also available at RJIT website **www.rjit.org**.
15. In case of non receipt of Admit Card till 20 July 2011, duplicate Admit Card will be issued on 25 July 2011 on producing the proof of DD/Mailing alongwith three passport size photographs.
16. For all types of query, applicant/guardian are advised to contact Adm Officer, RJIT at Phone No. 07524-274319 & Mob No. 09425308824.

(KUNAL MAZUMDAR)
PRINCIPAL
RJIT,BSF Tekanpur

Encl.: - 1. Application Form
2. Admit Card

SYLLABUS FOR PEPT - 2011

1. PHYSICS

2.

Unit and Dimensions, Dimensional Analysis, S.I, Units, Motion in two dimensions cases of uniform velocity and uniform acceleration, general relation among position and velocity, uniform circular motion and inertia. Newton's laws of motion, Conservation of momentum and energy. Static and kinetic friction. work energy and power elastic collisions, potential energy, gravitational potential energy and its angular conservations to its kinetic energy. Potential energy of a spring. Rigid body rotation and conservation of its momentum, moment of inertia, theorems of parallel and perpendicular axis.(moment of inertia of uniform ring, disc, thin rod and cylinder only).

Acceleration due to gravity and its variation, universal law of gravitation, geostationary satellites, escape velocity.

Hooke's law, young's modulus, shear and bulk modulus, surface energy and surface tension, kinetic theory of gases, gas laws, kinetic energy and temperature.

Specific heats and constant volume and constant pressure mechanical equivalent of heat, isothermal and adiabatic processes.

Heat conduction in one dimension, convection and radiation, Stefan's law and Newton's law of cooling.

Periodic motion, simple harmonic motion, Oscillations due to spring. wave motion, principle of superposition, progressive and stationery waves, beats and Doppler effect.

Wave nature of light, interference ,young's double slit experiment, velocity of light and Doppler effect in light.

Reflection, refraction, total internal reflection, curved mirrors, lenses, mirror and lens formulae. Dispersion in prism, absorption and emission spectra. The human eye, defects of vision, magnification and resolving power of telescope and microscope.

"e" and "e/m" for and electron, Einstein's photoelectric equation, photocells.

Bohr model of the atom, Hydrogen spectrum, composition of nucleus, atomic masses and isotopes, radioactivity, laws of radio active decay, decay constant, half life and mean life, mass energy relation, fissions, Xray, properties and uses.

Elementary ideas of conductor, semi conductor and insulator, intrinsic and extrinsic semiconductors, p-n junction as a rectifier.

Bar magnet, lines of force, torque on a bar magnet due to magnetic field, earth's magnetic field , tangent galvanometer, vibration maganetometer.

Coulomb's law of electrostatic, dielectric constant, electric field and potential due to a point charge, dipole, dipole field, Guass's law in a simple geometrics.

Electrostatic potential, capacitance, parallel plate and spherical capacities in series and parallel, energy of a capacitor.

Electric current, Ohm's law, Kirchhoffs laws, resistances in series and parallel temperature dependence of resistance, Wheat stone bridge, potentiometer.

Measurement of voltage as currents.

Electric power, heating effects of currents, chemical effects and law of electrolysis thermoelectricity Blot Savart law, magnetic fields due to a straight wire circular loop and solenoid.

Force on a moving charge in a magnetic field(Lorentz force), magnetic moment of a current loop, effect of a uniform magnetic field of a current loop, forces between two currents, moving coil, galvonometer, ammeter and voltmeter.

Electromagnetic induction induced e.m.f., Faradays law, Lenz's law, self and mutual inductance alternating currents, impedance and reactance, growth and decay of current in L-R circuit, elementary idea if dynamo and transformer.

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3. CHEMISTRY :

GENERAL AND PHYSICAL CHEMISTRY

Structure of atom: constitutions of nucleus: Bohr's atom model: quantum numbers Aufbau principle, electronic configuration of elements (upto Kr): De-Broglie relation, shapes of orbitals.

Chemical bond: electrovalent, covalent and coordinate bonds, hybridisation(sp): hydrogen bond: shapes of molecules(VSEPR theory): bond polarity, resonance, elements of VBT a MOT.

Solutions: models of expressing concentrations of solutions: types of solutions, Raoult's law of colligative properties, non- ideal solution, abnormal molecular weights.

Solid state: crystal lattices, unit cells, structure of ionic compounds: close packed structure ionic radii, imperfections(point defects): properties of solids.

Nuclear chemistry: radio active radiations: half-life, radioactive decay, group displacement law structure and properties of nucleus: nucleus reaction, disintegration series artificial transmutation: isotopes and their uses: radiocarbon dating.

Chemical equilibrium: chemical equilibrium, law of mass action: K_p and K_c : Le Chatelier principle and its applications.

Ionic equilibrium in solutions, solubility product, common ion effect, theories of acids and base hydrolysis of salts: PH: buffers.

Thermochemistry and thermodynamics: energy changing due to chemical reaction: intrinsic energy enthalpy, first law of thermodynamics: Hess's law heats of reactions: second law of thermodynamics: energy free energy: spontaneity of a chemical reaction: free energy change and chemical equilibrium: free energy as energy available for useful work.

Chemical kinetic: rate of a reaction, factors affecting the rates, rate constant rate expression, order of reaction, first order rate constant expression and characteristics, Arrhenous equation.

Electrochemistry: oxidation, oxidation number and ion- electron methods. Electrolytic conduction, Faraday's law: voltaic cell, electrode potentials, electromotive force, Gibb's energy and cell potentials. Nernst equation, commercial cells, fuel cell, electrochemical theory of corrosion. Surface chemistry, colloids and catalysis: Adsorption, colloids (types preparation and properties), Emulsions, Micelles, catalysis types and characteristics.

INORGANIC CHEMISTRY:

Principle and metallurgical operations: furnaces, ore concentration, extraction, purification metallurgies of Na, Al, Fe, Cu, Ag, Zn and Pb and their properties.

Chemical periodicity s.p.d and f-block elements, periodic table: periodicity: atomic and ionic radii valency, ionization energy, electron affinity electro negativity, metallic character.

Comparative study of elements: comparative study of following families of elements 1. Alkali metals 2. Alkaline earth metals 3. Nitrogen family 4. Oxygen family 5. Halogens 6. Noble gases.

Transition metals: electronic configuration of 3d metal ions, oxidation states, other general characteristics properties, potassium permanganate, potassium dichromate.

Co-ordination compounds: simple nomenclature, bonding and stability, classification and bonding in organometallics.

Chemical analysis: chemistry involved is simple inorganic qualitative analysis: calculations based on acid base titrimetry.

ORGANIC CHEMISTRY:

Calculations of empirical and molecular formula of organic compounds, nomenclature of organic compounds, common functional groups isomerism structure and shapes of alkanes, alkenes and benzene.

Preparation properties and uses of alkenes, alkynes, benzene petroleum, cracking octane number, gasoline additives.

Nomenclature, physical chemical properties, correlation of physical properties with structure properties and uses of haloalkanes, halobenzenes, alcohols and phenols: general ideas of some polyhalogen compounds viz dichloroethanes dichloroethers, chloroform, carbon tetrachloride D.D.T benzene hexachloride.

Nomenclature, methods of preparation, chemical properties correlations of physical properties with structures and uses of ethers aldehydes, ketones, carboxylic acids and their derivatives, brief account of the chemistry of cyanides isocyanides, amines and nitro compounds.

Polymers: classification: preparation and uses of common natural and synthetic polymers.

Bio-molecules: classification, structure and biological importance of carbohydrates amino acids, peptides, proteins and enzymes, nucleic acids and lipids.

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3. MATHEMATICS

ALGEBRA:

Algebra of Complex numbers, Graphical representation of complex numbers modules, and argument of complex numbers, conjugated of a complex number, triangle inequality, cube roots of unity, arithmetic, geometric and harmonic progression. Arithmetic, geometric and harmonic means between two numbers. Sum of squares and cubes of first natural numbers. Theory, geometric equation, relations between roots and coefficients. Quadratic expressions, quadratic equations in one variable, permutations and combinations..

Bionomial (any index) theorem exponential and logarithmic series, determinants up to third order and their order and their elementary properties matrices types of matrices, adjoint and inverse of matrix, elementary, applications is solving simultaneous equation upto three variables.

TRIGONOMETRY:

Trigonometry functions and their graphs, addition and subtraction formulae; formulae involving multiple and submultiple angles, general solutions of trigonometrical equations, relation between sides and angles of a traingle. Solution of traingles, inverse : trigonometrical functions, height and distance(simple problems).

CO-ORDINATE GEOMETRY OF TWO DIMENSIONS:

Rectangular cartesian coordinates, straight line, pair to straight lines, distance of a point from a line, angle between two lines.

Circle, tangents and normals, system of circles.

Conic section, parabola, ellipse and hyperbola in standard forms with elementary properties, tangents and normals.

CO-ORDINATE GEOMETRY OF THREE DIMENSIONS:

Rectangular co ordinate system, direction cosines and direction ratios, equation of plane in standard forms. Perpendicular distance from a point, equation of a line angles between two lines.

VECTOR ALGEBRA:

Definition of vector, addition of vector, components in three dimensional space, scalar and vector products. triple products, simple applications in geometry and mechanics.

DIFFERENTIAL CALCULUS:

Function, polynomial, rational trigonometric, logarithmic and exponential, inverse functions. Limit continuity and differentiability of functions, differentiation of rational, trigonometric and exponential functions.

Application of derivative in elementary problem in mechanics, increasing and decreasing functions. Maxima and Minima of function of one variable, Roll's theorem and mean value theorem.

INTEGRAL CALCULUS:

Integration as the inverse process of differentiation, integration by parts. By substitution and by partial fraction definite integral. Areas under simple curves.

DIFFERENTIAL EQUATIONS:

Formulation of differential equation, ordered degree solution of differential equations by separation of variable method. Homogeneous form linear differential equation of first order.

STATISTICS:

Probability addition and multiplication laws, conditional probability, Binomial distribution, simple problems in correlation and regression.

NUMERICAL METHODS:

Solution of equation by the methods of bisection, false position and Newton Raphson. Numerical integration by trapezoidal and Simpson's rule.

LINEAR PROGRAMMING:

Definition and formation of linear programming problems, solution by graphical method.

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4. BIOLOGY (Comprising of Botany and Zoology)

BOTANY :

Structure organisation of cell, cell theory . Light and electron microscopic view of cells. structure and functions of cell organelles : nucleus mitochondria , Chloroplast, Endoplasmic reticulum, Golgi complex lysosome, micro bodies, microfilaments ribosomes. Centrioles and plasmids, Eukaryotic chromosome (morphology) cell and plasma membrane. Difference between cell and animal division, cell cycle significance of mitosis and meiosis.

Mendel's law of inheritance, monohybrid and dihybrid cross; linkage and crossing over of genetic material DNA replication, genetic code transcription and gene regulation.

Difference between prokaryote and eukaryotes: structure reproduction and economic importance of viruses Mycoplasma, Bacteriophage, cyanobacteria (Nostoc) and bacteria.

Five kingdom classification binomial nomenclature: external morphology and life cycle of Spirogyra mucor, Funaria Selaginella and Pinus .

Elementary knowledge of microsporogenesis, megasporogenesis. Fertilization endosperm and embryo development in angiosperms. Tissue and tissue systems, meristematic and permanent tissue, mineral nutrition essential elements and their functions: uptake of minerals transport of water and solutes.

Transpiration photosynthesis and respiration: importance, mechanism and factors affecting these processes: photorespiration.

Enzymes and growth hormones with reference to their classification, chemical nature, mode of action importance. Elementary idea of photoperiodism and phytochrome.

Ecosystem - structure and function, major ecosystems i.e lake and forest; food chain., food web and energy flow, ecological crises role of man in polluting environment - air water and soil.

Role of plants in human welfare: a general knowledge of plant products of economic value drugs, fibers, cereals.

Wheat and rice, pulses(gram), oil seeds(ground nut), sugarcane, coal and petroleum,

Food preservation methods and importance.

Principle of plant breeding and its role in improvement of crops, biotechnology, scope and importance in agriculture and industries manufacture of cheese. yoghurt alcohol antibiotics.

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ZOOLOGY :

MULTICELLULARITY- STRUCTURE AND FUNCTION OF ANIMAL LIFE:

- Structure and function of animal tissues epithelial, connective muscular, skeletal and nerve.
- Histology of mammalian organs - stomach, intestine, liver, kidney, lung, testes and ovary.
- Structure and physiology of different organ systems of human body. Skin, digestive system, respiratory system, circulatory system.
- Skeleton, joints, muscles on the basis of movement receptors.
- Endocrine system with special reference to various endocrine glands of man and hormonal coordination.
- Vitamins and minerals (source and disorders due to deficiencies).

DEVELOPMENTAL BIOLOGY AND GENETICS:

- Female reproductive cycle in mammals. Gametogenesis along with structure of sperm and ovum. Types of eggs, fertilization, types of cleavage and blastula, development of mammals upto three germinal layers. Foetal membrane structure and functions.
- Growth, repair, ageing, amniocentesis.
- Chromosomes, types of chromosome, human karyotype and chromosomal abnormalities and syndromes, hormonal, chromosomal and genic balance theory of sex determination, sex linkage and sex linked inheritance in man, blood group and their significance, blood bank.
- Tissue culture, genetic engineering(brief idea), mutation gene mutation.
- Human population natality mortality, sex ratio population, explosion, dynamics of human life with respect to food supply, housing health and standard of living impact of population problems and their control.

TAXONOMY EVOLUTION ECONOMIC ZOOLOGY:

- Classification- binomial and trinomial nomenclature, basic features of classification, classification of different animal phyla upto classes with characters and suitable examples.
- Origin of life, theories of organic evolution- Darwin, Lamarck, synthetic evidence of organic evolution, human evolution.
- Economic zoology/sericulture, apiculture, lac culture, poultry, fishery and pearl industry.

- Protozoan disease in relation to man, insect carrying diseases in relation to man.
- Cancer types of cancer and cancer cell communicable diseases (Hepatitis, AIDS) . STD, immune response, vaccines and antisera allergies.
- Smoking, alcoholism and drug addition, symptoms and control.
- Wild conservation.
- Pesticides - users, advantages and hazards.

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5. BIOTECHNOLOGY

Protein and Gene Manipulation

Protein Structure and Engineering :

Introduction to the world of proteins, 3-D shape of proteins, Structure function relationship in proteins, Purification of proteins, Characterization of proteins, protein based products, designing proteins, proteomics.

Recombinant DNA technology :

Introduction, tools of r DNA technology, making recombinant DNA, DNA library, introduction of recombinant DNA into host cell, identification of recombinants, polymerase chain reaction(PCR) , DNA probes, hybridization techniques, DNA sequencing, site- directed mutagenesis.

Genomics and Bio informatics :

Introduction, genome sequencing projects, gene prediction and country, genome similarity SNP's and comparative genomics, functional genomics, History of Bio-informatics, sequences and nomenclature, information sources. Analysis using Bio-informatics.

Microbial culture and applications :

Introduction, microbial culture techniques, measurement and kinetics of microbial growth, scale up of microbial process, isolation of microbial products, strain isolation and improvement, application of microbial culture technology, bioethics in microbial technology.

Plant cell culture and applications :

Introduction, cell and tissue culture techniques, application of cell and tissue culture, gene transfer methods in plants, transgenic plant with beneficial, traits, diagnostics in agriculture and molecular breeding, bioethics in plant genetic engineering.

Animal cell culture and applications :

Introduction , animal cell culture techniques, characterisation of cell lines, scale up of animal culture, process , applications of animal cell culture, stem cell technology, bioethics of genetic engineering in animals.