INDIAN SCHOOL OF MINES UNIVERSITY

(Established under section 3 of the UGC Act, 1956, vide notification no. F 11-4/67-U3, dated 18th September 1967, GOI)

DHANBAD – 826 004

Phones: 0326-2210024 to 2210027**, Ext:** 5625**; FAX:** 0326-2210028

Email: ism_ee@ismdhanbad.ac.in

INFORMATION BULLETIN

M. Sc. / M. Sc. Tech. ENTRANCE EXAMINATION – 2008

Part I

GENERAL INFORMATION

1.1 HISTORY

Indian School of Mines (I.S.M.) University was established in 1926 as a Premier Institute in the country for teaching Mining and Geology. In 1967, the School was granted the Deemed University Status under University Grants Commission Act, 1956, and subsequently placed under MHRD, Government of India, in 1996. This premier institute of mineral sciences and technology in the country celebrated its Platinum Jubilee in December 2001. MHRD has decided to choose ISM Universityfor setting up a regional center at Singrauli, District Sidhi, Madhya Pradesh.

1.2 LOCATION

I.S.M. University is located at Dhanbad (the heart of major Indian coalfields) in the state of Jharkhand. The University campus covers an area of 88 hectares (208 acres), composed of graceful blend of old and new style buildings for its faculties and laboratories, hostels and staff quarters in the peaceful surrounding right within the district town of Dhanbad.

1.3 ORGANISATIONAL SET-UP

I.S.M. University, an autonomous organisation, has a General Council that provides representation to various industrial and government interests, both houses of Parliament as well as its own academic community. The main governing body of the University is its Executive Board. The Academic Council headed by the Director looks after academic matters.

1.4 DEPARTMENTS

For imp arting specialized education, research and training, the University has following Departments:

1. Applied Chemistry
2. Applied Geology
3. Applied Geophysics
4. Applied Mathematics
5. Applied Physics
6. Computer Science & Engineering
7. Electrical Engineering
8. Electronics & Instrumentation
9. Environmental Science & Engineering
10. Fuel & Mineral Engineering
11. Humanities & Social Sciences
12. Management Studies
13. Mechanical Engineering & Mining Machinery Engg
14. Mining Engineering
15. Petroleum Engineering

1.5 CENTRAL FACILITIES

The central facilities of the University include Central Library, Computer Centre, Workshop, Physical Education Centre, Reprographic & Photographic Centers, Yoga club, NCC, NSS and Health Centre.

1.6   ACADEMIC PROGRAMMES

The University offers the following courses:

A.   B. Tech. (4-years) Degree in:

1. Computer Science & Engineering   6. Mineral Engineering
2. Electrical Engineering   7. Mining Engineering
3. Electronics Engineering   8. Mining Machinery Engineering
4. Environmental Engineering   9. Petroleum Engineering
5. Mechanical Engineering

Admission in these courses is made through IIT Joint Entrance Examination.

B.   M. Sc. (2-years) Degree in (i) Applied Physics, (ii) Chemistry; (iii) Mathematics and Computing and **M. Sc. Tech. (3-years)** degree in (i) Applied Geology and (ii) Applied Geophysics. Admission in these courses is made through All India Entrance Examination, conducted by I.S.M. University. The advertisement is made in the month of December/January.

C.   5-Year Integrated Course in (i) M. Sc. Tech Applied Geology, (ii) M. Sc. Tech Applied Geophysics, (iii) M. Sc. Chemistry, (iv) M. Sc. Mathematics and Computing and (v) M. Sc. Applied Physics.

D.   **5-Year Dual Degree Course** in (i) Mineral Engineering with M. Tech in Material Technology, (ii) Mineral Engineering with M. Tech in Mineral Resource Management, (iii) Mining Engineering with MBA, (iv) Petroleum Engineering with M. Tech in Petroleum Management.

E.   Beside these degree programmes the University also offers **M.B.A. (2-years) programme**. Admission to this programme is through CAT score followed by Group Discussion and Interview.

F.   A large number of **M. Tech** and **M. Phil. programmes** are also offered in accordance with UGC/AICTE guidelines. Admission in these programmes is through GATE/NET score followed by interview. A limited number of Sponsored and Non-GATE candidates are also admitted through a written test and interview at I.S.M. University.

1.7   RESEARCH PROGRAMMES

The University awards Ph. D. degree in all the Engineering, Applied Science and Management disciplines existing in I.S.M. University.

1.8   MEDIUM OF INSTRUCTION

The medium of instruction in all courses is ENGLISH.

1.9   SEMESTER SYSTEM

The University follows semester and grading systems in all disciplines. An academic year is composed of two semesters. The course work for each semester is completed by the end of the semester itself. Student's performance is continuously evaluated from the beginning of the semester, based on quizzes, home assignments, tutorials, mid-semester examination, field-training, group discussions and seminars, as applicable. The sessionals carry 40% weightage in respective subjects.

1.10   ATTENDANCE REQUIREMENT

To appear in each semester examination, a student must have **at least 75% attendance in each subject**.

1.11   REQUIREMENT FOR COMPLETING M.Sc./M.Sc. Tech. ACADEMIC PROGRAMMES

For completing an academic programme, a student is allowed a maximum of 8-semesters for M. Sc. Tech and 6-semesters for M. Sc. Programmes.

1.12   FEE STRUCTURE (<u>TENTATIVE</u>), FINANCIAL AID AND SCHOLARSHIPS

A fee of Rs. 21,650/- for General/OBC/DP/PS/JK /PH(**Orthopaedically handicapped**) candidates (Rs. 16,350/- for SC/ST candidates) for the first semester is to be deposited at the time of admission to the M. Sc. / M. Sc. Tech. courses. This amount includes refundable caution money of Rs. 5,000/-/-. In subsequent semesters, a fee of Rs. 8,000/- for General/OBC/DP/PS/PH/JK candidates and Rs. 2,700/- for SC/ST

candidates is to be deposited at the time of registration for the semester. An additional annual fee of approximately Rs. 2,000/- has to be paid at the beginning of each subsequent year. Students are required to pay Rs. 1,750/- approximately towards the cost of I.S.M. University blazer at the time of admission.

A good number of Scholarships are available for deserving students. All eligible SC/ST students are awarded scholarship and are exempted from tuition fee. Students with good academic record are eligible for UGC scholarship of Rs. 1,000/- per month in the **third** year of M. Sc. Tech. programmes.

1.13 RESIDENCE AND BOARDING ARRANGEMENTS

The University provides residential accommodation within the campus to all students including separate hostels for girl students. Students run their own messes with expenses around Rs.1200/- per month.

PART II
ADMISSION PROCEDURE

2.1 IMPORTANT DATES REGARDING ENTRANCE EXAMINATION - 2008

Date and Time of Entrance Examination: **11th May, 2008, 09.00 a.m. to 12.00 noon.**
Issue of Application forms by post: **14th January to 2nd March, 2008**.
Issue of Application forms from
I.S.M. University Cash Counter: **14th January to 14th March, 2008**
Last date for receiving completed application forms: **14th March, 2008.**

2.2 C ENTRES OF EXAMINAION

Bhubaneswar, Chennai, Delhi, Dhanbad, Guwahati, Howrah, Hyderabad, Mumbai and Varanasi.

2.3 APPLICATION FORMS FOR EXAMINATION

Application form and Information Bulletin can be obtained on cash payment of application fee of Rs 1,000/- (Rs.500/- for SC/ST/PH candidates only) from the office of the ASSISTANT REGISTRAR (ACADEMIC) during **14th January, 2008 to 14th March, 2008.** The application material can also be obtained from the office of the ASSISTANT REGISTRAR (ACADEMIC) by post by sending an A/c payee Bank draft for Rs.1,050/- (Rs.550/- for SC/ST/PH candidates only), drawn in favour of the Registrar, Indian School of Mines University, Dhanbad payable at S.B.I, I.S.M. Campus Branch, Dhanbad (Branch code No. 1641) along with a self addressed unstamped envelope of A4 size. The application form will also be available at I.S.M. University website (**http://www.ismdhanbad.ac.in**) which can be downloaded and sent with the requisite Demand Draft.

2.4 LAST DATE OF APPLICATION

Application form complete in all respects should be sent in the prescribed envelope provided with the application form to **The Assistant Registrar (Academic), Indian School of Mines University, Dhanbad – 826 004** , so as to reach on or before the closing date i.e**. March 14th, 2008**.

2.5   ELIGIBILITY, SUBJECTS OF EXAMINATION AND AGE LIMIT

Eligibility and subjects of Examination are given in the following table:

Name of the programme	Discipline of Admission	Minimum qualification for Examination	Subject of Entrance Examination
a. M. Sc. Tech. (3-years)	Applied Geology	B.Sc. Degree (3-year) with Geology as Honours/ Major/ Equivalent subject and any two subsidiary subjects from Mathematics, Physics, Chemistry, Statistics and Computer Science.	One paper in **Geology**
b. M. Sc. Tech. (3-years)	Applied Geophysics	B.Sc. Degree (3-year) with Physics as Honours/Major/Equivalent subject, Mathematics as a subsidiary subject and another subsidiary subject from Chemistry, Geology, Geography, Electronics, Statistics and Computer Science.	One paper in **Physics**
c. M. Sc. (2-years)	Mathematics & Computing	B.Sc. Degree (3-year) with Mathematics as Honours/ Major /Equivalent subject and two subsidiary subjects from Physics, Chemistry, Geology, Statistics, Electronics and Computer Science.	One paper in **Mathematics**
d. M. Sc. (2-years)	Applied Physics	B.Sc. Degree (3-year) with Physics as Honours/ Major subject /Equivalent subjects, Mathematics as a subsidiary subject and another subsidiary subject from Chemistry, Geology, Statistics, Electronics, Computer Science, Economics and Geography.	One paper in **Physics**
e. M. Sc. (2-years)	Chemistry	B.Sc. Degree (3-year) with Chemistry as Honours/ Major /Equivalent subject, Mathematics as a subsidiary subject, and another subsidiary from Physics, Statistics, Electronics and Computer Science.	One paper in **Chemistry**

Note: In all the above courses 4-yr B. Sc. B. Ed. Degree candidates are also eligible provided they meet the minimum qualification for examination.

The paper will contain both short and descriptive type questions from the relevant subject of Entrance Examination. **The medium of examination is English.**

Candidates appearing in qualifying examination by June 2008 are also eligible to apply. If selected, their admission will be provisional and will stand cancelled unless results are submitted by 30th September 2008.

Candidates born on or after **October 1, 1984** are eligible for admission. Age limit for SC/ST/PH candidates is relaxable by 5 years.

2.6   RESERVATION OF SEATS

(i)   15% seats are reserved for SC candidates, 7.5% for ST candidates and 3% for PH (Orthopaedically handicapped) candidates.
(ii)   One seat for (i) J&K (JK) migrants, (ii) ward of defence personnel (DP), (iii) Parsi (PS) candidates is reserved in each of the M.Sc./M.Sc. Tech programmes.
(iii)   Reservation for OBC candidates, if any, would be notified on the website of I.S.M. University as and when government orders for the same are issued.

2.7   MEDICAL STANDARD OF FITNESS

Candidates must be medically fit as per I.S.M. University rules given in PART V and submit a medical fitness certificate in the format attached with Information Bulletin **at the time of admission** Besides, he/she will also undergo medical examination arranged by I.S.M. University.

2.8   PUBLICATION OF RESULT

Results will be published by the middle of June 2008. Only successful candidates will be informed by Registered or Speed Post. One may check the result on I.S.M. University website (**http://www.ismdhanbad.ac.in**) also.

PART III

INSTRUCTIONS FOR COMPLETING APPLICATION FORM

3.1   Photograph: Paste three of your recent and identical passport size **colour** photographs at the appropriate place on the Application Form and Admit Cards. All the three photographs should be attested by the Head of the Institution for the candidates appearing/appeared in the qualifying examination. In case the applicant has already passed the Qualifying examination, he/she should get it **SELF-ATTESTED.**

3.2   Name: Write your full name as given in the records of Secondary Education Board/University. One box should be left blank between two parts of the name.

3.3   Address
   a)   Address for correspondence: Write the complete postal address including Pin code to which communications are to be sent.
   b)   Permanent address: Write your permanent home address in Item 12 (a).
   c)   Telephone Number: Write your Mobile Number and/or telephone number, if any, with STD code to contact.
   d)   Email address: Write your email ID for contact, if any, in Item 12 (d).

3.4   Name of father/mother: Write name of your (a) father, and (b) mother.

3.5   Enter date, month and year of your birth
 Write as per the English Calendar and as recorded in the Secondary Education Board/University certificate.

3.6   Sex : Put tick mark in the appropriate blank box.

3.7   Nationality: Write your nationality.

3.8   Category: Mention the category in the appropriate blank box. The caste certificate for SC/ST applicants from the **concerned District Officer,** medical certificate for PH (Orthopaedically handicapped) applicants from **Civil Surgeon,** certificate of being a ward of Defence Personnel (DP) from the respective record office/Army Headquarters (Adjutant General's Branch) and certificate from concerned District officer for being a Parsi (PS) / JK migrants candidate must be attached with the application wherever necessary.

3.9   Certificate from Head of the Institution: The applicant should write the name of subject of Honours/Major/Equivalent of 3-yr B.Sc./ 4-yr B.Sc. B. Ed.. The applicant should obtain the signature of the Head of the Institution where he/she is presently studying in B.Sc./ B. Sc. B. Ed. The name of Head of the Institution with designation and name of college and place should be clearly written and the seal of the Institution should be affixed.

3.10   Educational Qualification: Write the details of examinations passed/appeared/ appearing.

3.11   Course applied for

(a) Subject of Entrance Examination : The applicant should write **only one** subject of Examination from Physics, Chemistry, Mathematics, Geology.
(b) Course applied for:

   - Applicants with Physics Honours/Major/Equivalent degree should give their first and/or second choice(s) for either (a) 2-yr M.Sc. (Applied Physics) or (b) 3yr M. Sc. Tech (Applied Geophysics) course.
   - Applicants with Mathematics Honours/Major/Equivalent degree need not give second choice. They will be considered for the 2-yr M. Sc. (Mathematics & Computing) course only.

- Applicants with Geology Honours/Major/Equivalent degree need not give second choice. They will be considered for 3-yr M.Sc. Tech (Applied Geology) course only.
- Applicants with Chemistry Honours/Major/Equivalent degree need not give second choice. They will be considered for the 2-yr M.Sc. (Chemistry) course only.

3.12   Choice of Examination Centres

From the list of examination centres given in Item 2.2 of Part II, select and write the names of **TWO** convenient centers, **all different**, in order of preference. In case sufficient number of candidates are not available at any centre, I.S.M. University may allot any other centre. REQUEST FOR **CHANGE OF EXAMINATION CENTRE** WILL **NOT BE ENTERTAINED**. ALLOTMENT OF CENTRE IS AT THE **SOLE DISCRETION** OF I.S.M. University.

3.13   Declaration by the applicant should be signed with date. Signature should <u>NOT</u> be in CAPITAL LETTERS.

3.14   Full mailing address should be written in block capital letters on the envelope and postcard for sending Admit Card and acknowledgement for receipt of application.

3.15   Rejection: Applications received after the closing date and/or incomplete in any respect will be rejected.

PART IV

SYLLABUS FOR M. Sc. and M. Sc. Tech. Entrance Examination, 2008

1. GEOLOGY   for M. Sc. Tech. (Applied Geology)

(a) GENERAL GEOLOGY: Age, origin and interior of the earth; formation of continents, and oceans; geological time-scale; physiographic features of India. Processes of weathering, erosion, transportation and deposition. Geological work of running water (river), lake, glaciers, sea, wind, groundwater and organic life. Mountains, plateaus and plains. Volcanoes and earthquakes. Elementary ideas on plate tectonics.

(b) MINERALOGY: Classification of minerals, and physical and chemical properties of important minerals. Double refraction, pleochroism, birefringence, interference figures, sign determination of uniaxial and biaxial minerals, optic axial angle. Diagnostic optical properties of important rock-forming minerals.

(c) CRYSTALLOGRAPHY: Classification of crystal classes and crystal system, twinning, isomorphism, pseudomorphism and polymorphism.

(d) PETROLOGY: Crystallisation, differentiation and assimilation of magma. Bowen's Reaction Series. Processes of sedimentation and sedimentary structures. Types of metamorphism, metamorphic grades and facies. Classification, mode of occurrence, texture, structure and mineral composition of common igneous, sedimentary and metamorphic rocks.

(e) STRUCTURAL GEOLOGY: Common structural features of rock masses. Stratification, joint, cleavage, schistosity and lineation; dip, strike, and thickness of beds. Effect of topography on outcrop of beds. Folds, faults and unconformities: their classification, description and recognition in field and on the geological maps.

(f) ECONOMIC GEOLOGY: Forms, mode of occurrences and classification of mineral deposits. Important processes of formation of economic mineral deposits. Some common and important metallic and non-metallic mineral deposits of India with particular reference to their geology, geographical occurrences and utilisation. Geology of fuels.

(g) STRATIGRAPHY: Standard stratigraphical scale and its subdivisions. Principles of stratigraphy. Major geological formations of India with special reference to Archaean, Proterozoic, Palaeozoic, Mesozoic and Tertiary stratigraphy.

(h) PALAEONTOLOGY: Fossils – definition, nature and mode of preservation. General description of most common fossil groups of invertebrates and plants. Stratigraphic distribution and evolutionary trends of common invertebrate phyla.

2. PHYSICS   for M. Sc. (Applied Physics) and M. Sc. Tech. (Applied Geophysics)

(a) GENERAL PHYSICS: Elastic constants and their inter-relations, torque on cylinder, flexure of beam, ripples and gravity waves, viscosity.

(b) ACOUSTICS: Free, damped and forced vibrations. Fourier's theorem and its applications, analysing simple wave forms, concept of vibration of membrane, vibration of strings, acoustics of auditoriums & building.

(c) CLASSICAL MECHANICS: Hamilton's Principle, Lagrange's and Hamilton's equations of motion. Motion in central field. Inertia ellipsoid and principal moments of inertia, moment of rigid body, Euler's equation for a rotating body, gyroscopic motion.

(d) SPECIAL THEORY OF RELATIVITY: Postulates, Lorentz transformation and consequences, velocity dependence of mass. Mass-Energy equivalence.

(e) STATISTICAL PHYSICS: Boltzman, Fermi and Bose distribution laws. Planck's radiation law. Stefan's law.

(f) THERMAL PHYSICS: Three laws of Thermodynamics. Principle of increase of entropy, Maxwell's and T-dS relations, Clausius-Clapeyron's equation. Joule-Thomson effect, concept of enthalpy.

(g) OPTICS: Plane and concave gratings, resolving powers. Plane, circular and elliptical polarisations. Zeeman effect, Stark effect; rotation and vibration spectra of molecules.

(h) ELECTRICITY/MAGNETISM: Gauss's law, system of charges, electric polarisation and displacement, electrical images, space quantisation, Stern-Gerlach experiment. Langevin's theories of dia- and para-magnetism. Weiss' theory of ferromagnetism, hysteresis, transients, L.C.R. circuit, alternating current, use of J-operator in solving electrical circuit problems, parallel and series-resonant circuits, transformers. Seebeck, Peltier, and Thomson effects, Poisson's and Laplace's equations. Maxwell's field equations.

(i) MODERN PHYSICS: Nuclear disintegration, packing fraction, mass defect, binding energy, nuclear energy, periodic structure in solids. Crystal binding, free-electron in metals. Elementary band theory. Photoelectric, Compton and Raman effects. Active semiconductor devices - diodes & transistors, rectifier, simple voltage amplifier, principle of oscillator. α and β spectra; theories of α and β decay.

3. MATHEMATICS for M. Sc. (Mathematics & Computing)

(a) DIFFERENTIAL CALCULUS: Successive differentiation. Leibnitz's theorem, Taylor's and Mclaurin's series of one and two variables, partial and total derivatives, maxima & minima of function of one, two & three variables, curvature and asymptotes.

(b) INTEGRAL CALCULUS: Definite integral, differentiation under integral sign. Improper Integrals, Beta, Gamma and error functions, double and triple integrals and their applications. Reimann-integration: necessary and sufficient conditions, Reimann Stieltjes integral as a generalization of Reimann integration, necessary and sufficient conditions for R-S integrability.

(c) VECTOR CALCULUS: Differentiation of scalar and vector point functions, Expansion formulae involving gradient, divergence and its applications, curl, line, surface and volume integration of vector function, Green's, Gauss and Stoke's theorems and their applications. Orthogonal curvilinear coordinates.

(d) ALGEBRA: Convergence of series, Cauchy's general principle of convergence, convergence of series of non-negative terms, comparison, Cauchy's root, condensation, D' Alembert's, Raabe's, De-Morgan and Bertrand, and logarithmic tests of convergence. Alternating series, conditional and absolute convergence, Power series. Solution of cubic and biquadratic equations.

(e) ABSTRACT ALGEBRA: Group: properties, abelian group, cyclic group, permutation group, order of an element of group, subgroups of a group and their properties. Normal subgroup, quotient group. Elementary ideas of a ring, integer domain and field and their properties.

(f) BOOLEAN ALGEBRA: Properties and relation in Boolean algebra, Application of Boolean algebra in electrical networks, solvability of Boolean equations and logical puzzles.

(g) MATRIX ALGEBRA: Rank and Inverse of a matrix, normal form of matrix, consistency conditions, solution of system of linear equations, linear and orthogonal transformations, eigen values and eigen vectors, Caley-Hamilton theorem, reduction to diagonal form and reduction of quadratic form to canonical form. Orthogonal, unitary and Hermitian matrices and their eigen values. Vector space and properties.

(h) COMPLEX VARIABLES: Analytic functions, Cauchy-Reimann equations, harmonic functions, complex integration, Cauchy's theorem, Cauchy's integral formula. Expansion of analytic functions in power series-Taylor's and Laurent's series, residues, evaluation of integral using residue theorem.

(i) DIFFERENTIAL EQUATIONS: Formation of differential equations, solution of first order and higher order differential equations with constant and variable coefficients. Simultaneous

linear differential equations. Partial differential equations of first order. Application of differential equations.

(j) DYNAMICS: Motion in two dimensions: Velocity and acceleration parallel to coordinate axes, radial and transverse velocities and acceleration, tangential and normal velocities and acceleration, D' Alembert's principle.

(k) LAPLACE TRANSFORMS: Laplace transform of some elementary functions, properties, Laplace transforms of derivatives, Laplace transform of integrals, t-multiplication and t-division theorems, inverse Laplace transform, convolution theorem, applications.

(l) NUMERICAL METHODS: Finite difference, Interpolation in regular or irregular intervals, numerical differentiation and integration, numerical solution of first order ordinary differential equation, solution of non-linear equations, solution of simultaneous linear equations by Gaussian methods and method of factorization.

(xiii) STATISTICS: Probability of events, mutually exclusive and independent events, Baye's theorem, probability mass and density functions, binomial, Poisson and normal distributions.

4. CHEMISTRY   for M. Sc. (Chemistry)

Physical Chemistry

Atomic structure: Fundamental particles, Bohr's theory of hydrogen atom; wave particle duality; uncertainty principle; Schrödinger's wave equation; quantum numbers, shapes of orbitals, Hund's rule and Pauli's exclusion principle.

Theory of gases: Kinetic theory of gases, Maxwall Boltzmann distribution law, Equipartition of energy.

Chemical thermodynamics: Reversible and irreversible processes; First law and its application to ideal and nonideal gases; Thermo chemistry; Second law; Entropy and free energy, criteria for spontaneity.

Chemical and Phase Equilibria: Law of mass action; Kp, Kc; Effect of temperature on K; Ionic equlibria in solutions; pH and buffer solutions, hydrolysis; solubility product. Phase equlibria – phase rule and its application to one component and two-component systems, Colligative properties.

Electrochemistry: Conductance and its application; transport number, Galvanic cells, EMF and Free energy; Concentration cell with and without transport.

Chemical Kinetics: Reactions of different order, Arrhenius equations, and Collision theory, Theory of absolute reaction rate; Chain reactions-Normal and branched chain reactions

Organic Chemistry

Basic concepts in organic chemistry and stereochemistry: Isomer ism and nomenclature, electronic (resonance and inductive) effects. Optical isomerism in compounds containing one and two asymmetric centers, designation of absolute configuration, conformations of cyclohexanes.

Aromaticity & Huckel's rule: Mono & bicyclic aromatic hydrocarbons.

Organic reactions mechanism and synthetic applications: Methods of preparation and reactions of alkanes, alkenes, alkynes, arenes and their simple functional derivatives, Mechanism and synthetic applications of electrophilic aromatic substitution. Stereochemistry and mechanism of aliphatic nucleophilic substitution and elimination reactions. Mechanism of aldol condensation, Claisen condensation, esterification and ester hydrolysis, Cannizzaro reaction, benzoin condensation, Perkin reaction, Claisen rearrangement, Beckmann rearrangement and Wagner-Meerwein rearrangement. Synthesis of simple molecules using standard reactions of organic chemistry. Grignard reagents.

Natural Products chemistry: Introduction to the various classes of compounds-alkaloids, terpenes, carbohydrates, amino acids and nucleic acids.

Qualitative Organic analysis: Functional group interconversions, identification of functional groups by chemical tests.

Inorganic Chemistry

Periodic table: Periodic classification of elements and periodicity in properties; general methods of isolation and purification of elements.

Chemical Bonding and Shapes of compounds: Types of bonding; VSEPR theory and shapes of molecules; hybridization; dipole moment; ionic solids; structure of NaCl, CsCl, diamond and graphite; lattice energy.

Main group Elements (s- and p- blocks): Group relationship and gradation in properties; structure of electron deficient compounds of main group elements and their applications.

Transition metals (d-block): Characteristics of 3d elements; oxides, hydroxides and salts of first row metals; coordination complexes; VB and crystal field theories for structure, colour and magnetic properties of metal complexes.

Analytical Chemistry
Principles of qualitative and quantitative analysis; acid–base, oxidation-reduction and precipitation reactions, use of indicators, radioactivity; nuclear reactions; applications of isotopes.

PART V

MEDICAL FITNESS STANDARD

I. For General/OBC/DP/PS/SC/ST/JK Candidates:

   Candidates must satisfy the following minimum medical standard of fitness at the time of admission, if selected.

1. Height: 1.5 m and weight: 41 kg.
2. Chest measurement: 69 cm. and Expansion: 5 cm.
3. Heart and Lungs: No abnormality. Open heart surgery cases will be rejected.
4. Hernia, Hydrocele, Piles, etc: Temporary disqualification to be rectified before joining.
5. Vision: corrected to 6/6 in both eyes. However, glass power should be within (-3.5). Eyes free from disease.
   Colour Blind candidates are Not Eligible for admission in I.S.M. University, Dhanbad.
6. Limbs: Should not have any defect, viz. Poliomyelitis, paralysis, paresis, amputation.
7. Stammering: Mild degree only allowed.
8. Hearing: Should be normal. Hearing aid cases will be rejected.
9. Kidneys: Operated cases (transplant) will be rejected.
10. Congenital defects like Cryptorchidism should join after operative treatment.
11. Candidate should not suffer from Tuberculosis, Pleurisy, Asthma, Rheumatic fever, Heart disease, E.N.T. disorder, Gastric/Ulcer/Kidney/Diabetes, Polio-myelitis or Neurological diseases, Epilepsy, psychiatric disease, and major operation leading to disability.

II. For PH (Orthopaedically handicapped) candidates:
   Medical Standard of fitness and Medical Examination Report from **Civil Surgeon** for PH (Orthopaedically handicapped) candidates will be as per the Government of India norms.

MEDICAL EXAMINATION REPORT
(For General/OBC/DP/PS/SC/ST/JK Candidates)
(To be issued by a Registered Medical Practitioner and **submitted at the time of admission by selected candidates**.
Please refer to Part V: **MEDICAL FITNESS STANDARD for General/OBC/DP/PS/SC/ST/JK Candidates.)**
The selected candidates will be examined further by a Medical Board arranged by I.S.M. University **at the time of admission**)

MEDICAL FITNESS STANDARD PERSONAL HISTORY

(Items 1 to 7 are to be filled by the Candidate)

1. Name : _____

2. Roll No : _____ _____

3. Parent/Guardian's Name : _____

4. Age : Year : _____ Months. _____   5.   Sex : Male/ Female

6. Identification Mark on the Body : (This can be mole, scar or birth mark) _____

7. Major illness/Operation : (Specify nature of illness/Operation) _____

MEDICAL CERTIFICATE

(Items 8 to 19 are to be filled by Medical Officer conducting the medical examination. Please refer to

Part V for t he **Medical standard of fitness**)

8. Height _____ cm. 9. Weight _____kg. 10. Chest (a) Inspiration _____cm (b) Expiration _____cm

11. Respiratory System _____12.Hearing _____13. Nervous System _____

14. Past History   (a) Mental Disease _____(b) Epileptic fit _____

15. Vision with or without glass (a) Right Eye _____ (b) Left Eye _____(c) Colour Blindness[*] _____

16. Abdomen (a) Liver _____   (b) Spleen _____

17. Heart   (a) Sounds _____   (b) Murmur _____

18. (a) Hernia _____   (b) Hydrocele _____

19.Any other defects detected _____

    Certified that Mr./Ms. _____

    Son / Daughter of _____

    (a) fulfils the prescribed standard of physical fitness and is FIT for admission to M. Sc. / M. Sc. Tech
         . programme

    (b) does not fulfill the prescribed standard of physical fitness

    (c) is unfit/temporarily unfit for admission due to following defects _____

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Signature of the Candidate with date   Signature of the Medical Officer with date

                                               Full Name _____

                                               Registration No. -----------------------------

Official Seal of the Medical Officer

    [*Candidates with **Colour blindness** are **NOT ELIGIBLE** for admission in I.S.M. University, Dhanbad]

CHECK LIST

VERIFY AND CHECK THOROUGHLY THE FOLLOWING BEFORE SENDING THE APPLICATION FORM

(i)   Have you enclosed the Demand Draft of Rs 1,000/- for all candidates (Rs 500/- for SC/ST/PH candidates only) in favour of the Registrar, I.S.M. University, Dhanbad payable at S.B.I, I.S.M. Campus Branch, Dhanbad (branch code No. 1641).

(ii)   Have you checked your eligibility of the course applied for?

(iii)   Have you mentioned correctly the name of the course applied for?

(iv)   Have you pasted self-attested three recent identical passport size **colour** photographs at the appropriate places?

(v)   Have you got the certificate from the Head of the Institution completed in your application form with the name of the Honours/Major/Equivalent and subsidiary subject(s) in 3-year B. Sc. / 4-yr B. Sc. B. Ed. course (**applicable for the candidates appearing in the Qualifying Examination or with the results awaited** - <u>See Item 15 of the Internet Application Form</u>)?

(vi)   Have you carefully checked all the columns of the Application form and ensured that no item is left blank?

(vii) Have you written **category to claim for SC/ST/PH/DP/PS/OBC/JK category** correctly, if applicable?

(viii) Have you put your signature (**NOT IN CAPITAL LTTERS**) at all appropriate places in the Internet downloaded application form?

(ix)   Have you attached the following with the Internet Downloaded Application Form:

             (a) **self-attested** copies of all **Marks-sheets and Certificates,**

             (b) <u>**two self-addressed unstamped envelopes**</u> of size 28.0 cm x 12.5 cm,

             (c) **documentary evidence** of your **category claim for SC/ST/PH/DP/PS/OBC/JK Candidate,** if applicable?