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## NOTIFICATIONS

No. A. 12011/2/80-APT(A) the 6.8.1981. In pursuance of rule 29 and sub-rule 2 of Rule 7 of the Mizoram Civil Service Rules, 1977 and with prior approval of the Central Government, the Administrator of Mizoram hereby makes the following regulations, namely :—

1. Short title : These regulations may be called the Mizoram Civil Service ( Competitive Examination ) Regulations, 1981.
2. Definition : In these regulations, unless the context otherwise requires:—
  - (a) "Vacancies" means the Vacancies in the service which as determined by the Administrator under sub-rule (1) (a) of Rule 5 are to be filled by direct recruitment on the result of an examination.
  - (b) "Board" means the Board appointed by the Central Government under Rule 6 of the Mizoram Civil Service Rules.
  - (c) "Examination" means a competitive Examination for recruitment to the Service held under Rule 7 of the Mizoram Civil Service Rules.
  - (d) "List" means the list of candidates prepared by the Board.
  - (e) "Schedule" means a Schedule appended to these regulations.
  - (f) "Scheduled Castes" and "Scheduled Tribes" shall have the same meaning as already assigned them by clauses (24) and (25) respectively of Article 366 of the Constitution of India.
  - (g) "Service" means the Mizoram Civil Service.
3. A candidate seeking admission to the examination must apply to the Secretary (Appointment), Govt. of Mizoram on the prescribed form of application. A specimen form of application is appended as Schedule-II.

4. A candidate seeking admission to the examination must pay to the Government of Mizoram Rs. 5/- (Rupees five) only as application fee and Rs. 30/- (Rupees thirty) only as admission fee in the event of his admission to the Examination (in the case of candidates, belonging to Scheduled Castes or Scheduled Tribes, the amount will be Rs. 2.50 and Rs. 15/- respectively).
5. (1) For admission to the examination a candidate must be a citizen of India (as defined in Article 5 to 7 of the Constitution of India).
- (2) A candidate in whose case a certificate of eligibility is necessary may be admitted to the examination but the offer of appointment may be given only after the necessary eligibility certificate has been issued to him by the Government of India.
6. (1) A candidate must have attained the age of 21 years and must not have attained the age of 26 years on the 1st day of August of the year in which the Examination is held.
- (2) The upper age limit prescribed above will be further relaxable.
- (i) Upto a maximum of five years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe;
- (ii) upto a maximum of three years in the case of Defence Service personnel, disabled in operations during hostilities with any foreign country or in a disturbed area and released as a consequence thereof;
- (iii) upto a maximum of eight years in the case of Defence Service personnel, disabled in operations during hostilities with any foreign country or in a disturbed area, and released as a consequence thereof who belong to the Schedule Caste or the Schedule Tribe;
- (iv) upto a maximum of three years in the case of Border Security Force personnel disabled in operations during Indo-Pak hostilities of 1971, and released as a consequence thereof;
- (v) upto a maximum of eight years in the case of Border Security Force personnel, disabled in operations during Indo Pak hostilities of 1971, and released as a consequence thereof who belong to the Schedule Caste or Schedule Tribe.
- (3) Save as provided above the age limits prescribed can in no case be relaxed.
7. A candidate must hold a degree of any of the Universities incorporated by an Act of the Central or State Legislature in India or other educational Institution established by an Act of Parliament or declared to be deemed as a University under Section 3 of the University Grants Commission Act, 1956 or possesses an equivalent qualification.

Note: Candidates, who have appeared at an examination the passing of which would render them educationally qualified for the Board's examination but have not been informed of the result as also the candidates who intend to appear at such a qualifying examination will not be eligible for admission to the examination.

8. A candidate who is or has been declared by the Government of Mizoram to be guilty of -

- (i) obtaining support for his candidature by any means, or
- (ii) impersonating, or
- (iii) procuring impersonation by any person, or
- (iv) submitting fabricated document or documents which have been tampered with, or.
- (v) making statements which are incorrect or false, or suppressing material information, or
- (vi) resorting to any other irregular or improper means in connection with his candidature for the examination, or
- (vii) using unfair means during the examination, or
- (viii) writing irrelevant matter, including obscene language or pornographic matter, in the script (s) or
- (ix) misbehaving in any other manner in the examination hall ; or
- (x) harassing or doing bodily harm to the staff employed by the Govt. of Mizoram for the conduct of their examination, or
- (xi) attempting to commit or as the case may be abetting the Government of Mizoram of all or any of the acts specified in clauses may, in addition to rendering himself liable to criminal prosecution, be liable.
  - (a) to be disqualified by the Government of Mizoram for the examination for which he is a candidate, or
  - (b) to be debarred either permanently or for a specified period -
    - (i) by the Government of Mizoram from any examination or selection held by them ;
    - (ii) by the Administrator from any employment under him; and
  - (c) if he is already in service under Government to disciplinary action under the appropriate rules.

9. The competitive examination shall comprise :—

(A) Written examination in -

- (i) three compulsory subjects-Essay, General English and General Knowledge, each with the maximum of marks as shown in Part I of Schedule I; and
- (ii) Two optional subjects set out in Part II of Schedule 1.

(B) Interview for personality test of such candidates as may be called by the Board, carrying maximum of 300 marks.

10. Candidates who obtain such minimum qualifying marks in the written examination as may be fixed by the Board in their discretion shall be summoned by them for an interview for a personality test.

Provided that candidates belonging to the Schedule Caste or S may be summoned for an interview for a personality test by the Board by applying relaxed standards if the Board is of the opinion that sufficient number of candidates from these communities are not likely to be summoned for interview for a personality test on the basis of the general standard in order to fill

11. After the examination, the candidates will be arranged by the Board in the order of merit as disclosed by the aggregate marks finally awarded to each candidate and in that order so many candidates as are found by the Board to be qualified by the examination shall be recommended for appointment upto the number of unreserved vacancies decided to be filled on the results of the examination.

Provided that candidates belonging to the Scheduled Caste or the Scheduled Tribe Scheduled Castes and Scheduled Tribes cannot be filled on the basis of the general standard, be recommended by the Board by a relaxed standard to make up the deficiency in the reserved quota, subject to the fitness of these candidates for appointment to the service irrespective of their ranks in the order of merit at the examination.

12. If any question arises as to the interpretation of these regulations the same shall be decided by the Administrator.

A.H Scott.

Chief Secretary to the Govt. of Mizoram,  
Aizawl.

#### SCHEDULE-I

#### GOVERNMENT OF MIZORAM

Syllabus in the different subjects for the-Recruitment Examination for Grade II of M.C.S.

#### 1. COMPULSORY SUBJECTS-3 (Three)

- |  |              |
|--|--------------|
| (1) An Essay to be written on one of several specified subjects                          | - 100 Marks. |
| (2) General English to test comprehension and expression<br>Precis, and unseen passages. | - 100 "      |
| (3) General Knowledge  | - 100 "      |

Including knowledge of current events and of such matters of every day observation and experience in their scientific aspects as may be expected of an educated person who has not made a special study of any scientific subject. The paper will include questions of freedom movement of India and teaching of Mahatma Gandhi, Indian History including History of Mizoram and Assam and Geography of a nature which candidates should be able to answer without study.

## II. OPTIONAL SUBJECTS-2 (Two)

Each subject will have two papers carrying 100 marks each. The Standard and syllabus of each subject are approximately those of the North Eastern Hill University (NEHU) Degree Course Examination. A candidate is to select only two of the following subjects.

### 1. MATHEMATICS paper - I

Algebra, Trigonometry and Analytical Co-ordinate Geometry of two and three dimensions.

#### ALGEBRA :

Elementary theory of sets ; group and their simple properties. Subgroups and normal sub groups Definition and examples of Rings and fields. Idea of homomorphism in Groups and Rings.

Determinants and their elementary properties. Addition and multiplication of determinants. Cramers' rule for solution of system of linear equations.

Different types of Matrices. Addition and scalar multiplication of matrices. Multiplication of matrices. The inverse of matrix. Rank of a matrix. Solution of a system of linear equations using matrix theory.

Relation between roots and coefficients of polynomial equations of Nth degree with special reference to cubic and biquadratic equations (General solution not necessary).

Sequences, Convergent and sequences, monotonic sequences and their convergence. Convergence and divergence of infinite series. Absolute and conditional convergence. Comparison test, D' Alembert's ratio test and Raabe's test.

#### TRIGONOMETRY :

Definition of the trigonometric functions and their natural relations. Range and graphs of the trigonometric functions. Addition and subtraction formulae and deductions of trigonometric identities.

De Moivre's theorem for a rational index. Expansions of  $\sin x$  and  $\cos x$  in ascending powers of  $x$ . Exponential values of circular functions, complex arguments. Gregory's series.

Summation of finite and infinite trigonometric series. Hyperbolic functions.

#### CO-ORDINATE GEOMETRY OF TWO AND THREE DIMENSIONS :

Two and three dimensional rectangular cartesian co-ordinates. Distance between two points ; section formula, area of a triangle. Standard equation of a straight line, angle between two straight lines. Condition for perpendicularity and parallelism.

Standard equation of a circle, parabola, ellipse and hyperbola. Tangents and normals to them. General equation of a conic. Pair of straight lines.

Shortest distance between two straight lines. Standard equation of a plane and a sphere. Tangent plane to a sphere.

Ellipsoid, Hyperboloid and tangent planes to them.

## PAPER - II

**Calculus, Differential Equations and Mechanics.**

### CALCULUS :

Idea of function—Real valued function, Inverse functions Bounds, limits and continuity of functions. The derivative and its signs.

Successive differentiation. Rolle's theorem. Lagrange's form of the mean value theorem. Taylor's and maclaurin's theorems with Lagrange's form of remainder.

Functions of two or more variables, partial derivatives. Maxima and minima. Envelopes, asymptotes, Evolutes and involutes.

Rules of integration : Standard forms. Definite ietegrate, and their properties. Elementary idea of improper integrals.

Application of calculus: Tangents and normals, curvature of plane curves. Rectification of plane curves, curve tracing, quadrature. Surfaces and volumes of solids of revolution.

### DIFFERENTIAL EQUATIONS :

Formation of differential equations: equations of first order and first degree. Clairauts form.

Linear equations of the second and higher order with constant coefficients, Complementary function and particular integral in simple cases.

### MECHANICS :

Concurrent forcer, moment of a force about a point, Varignon's theorem. Moment about an axis. Parallel forces, couples, resultant of a couple and force.

Coplanar forces: General conditions for equilibrium of coplanar forces.

Centre of gravity: of a system of particles, of a rigid body a thin rod, of homogeneous lamina in the form of a triangle, a parallelogram, a circle, a quadrant of a circle and of an ellipse, of a uniform rod bent in the form of a triangle or an arc of a circle etc.

Friction: Laws of statical and limiting friction. Equilibrium of a particle on a rough plane, angle of friction. Applications to simple problems.

Simple machines: system of pulleys mechanical advantages, velocity ratio.

Analytical expression for velocity and acceleration. Rectilinear motion. Motion of a particle in two dimension. Simple harmonic motion. Projectiles. Tangential and normal accelerations. Motion along a smooth vertical circle.

Impulse, work energy and power. Principle of energy: Impulsive forces. Conservation of energy and linear momentum. Impact of elastic bodies. (direct impact only).

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## CHEMISTRY

Paper I :	Inorganic	—	70	Total marks 100
	Physical	—	30	
Paper II :	organic	—	70	100 marks.
	physical	—	30	

## PAPER — I

## GROUP — A

## Inorganic Chemistry

Simple concept of modern atomic theory, atomic structures Isotopes their separation and uses. Elementary ideas of electrovalency, covalency and co-ordinate valency, elementary concept of molecular orbital theory and valence bond theory. Pi bond and sigma bond. Periodic classification of elements.

Study of the following elements and their chief compounds with special reference to the following general Considerations.

- Co-relation of properties on the basis of period classifications of elements.
- Simple structure of oxides and oxyacids and electronic structure of simple compounds.
- Large scale preparation of elements and their Chief compounds without technical details.

For non-metals—study of hydrides, oxides, oxyacids and halides.

- Study of rare gases and their position in the periodic table. Discovery, isolation and uses of rare gases.  
Study of water, hydrogen peroxide & ozone. Their preparation properties & uses. Elementary ideas of deuterium, tritium, its oxides—its preparation & uses.
- Study of water, hydrogen peroxide & ozone. Their preparation properties & uses. Elementary ideas of deuterium, tritium, its oxides— its preparation & uses.
- Study of Nitrogen-Ammonia, Nitric acid, hydrazine. hydrazoic and hydroxylamine, nitrous acid hyponitrous acid.
- Phosphorus-occurrence, preparation, properties and uses. Different allotropic modification, phosphoric acid and phosphate important hydrides, oxides and halides.
- Sulphur hydrides, oxides and oxyacids (polithionic acid omitted) Manufacture of sulphuric acid, properties uses
- Halogens - Hydroacids, oxides, oxyacids of chlorine.
- Arsenic - Arsenates and Arsenites.
- Carbon - Its allotropic modification, coal gas, producer gas, water gas, carbides of silicon & calcium.

9. Silicon - Silici, Sodium Silicate, Silicic acid and glass.
10. Boron - Boric acid and borax.

#### Study of the following metals.

(Study of some of their principal compounds like hydrides, halides, oxides, hydroxides, carbonates, nitrates, sulphides and sulphates including their laboratory preparation properties uses)

Lithium, Sodium, potassium, copper, silver, gold, magnesium, calcium, strontium, barium, zinc, cadmium, mercury, aluminium, Tin, lead, antimony, Bismuth, chromium, manganese, iron, cobalt & Nickel.

The following metals are to be studied in details, ores, extraction, alloys and their principal compounds, sodium, copper, silver, gold, zinc, aluminium, tin, cadmium, chromium, manganese, iron, nickel.

Radioactivity - Discovery, properties of radioactive rays half life and average life period. Radioactive disintegration artificial transmutation. Elementary ideas of Fission, Fusion, Radioisotopes - their application, nuclear reactor.

Elementary ideas of the following topics - Dissociation and decomposition, allotropy, isomerism, oxidation-reduction oxidizing agent and reducing agent. Iron electrode method, complex salt and double salt, Werner's theory (excluding space configuration and isomerism).

### GROUP B

#### PHYSICAL CHEMISTRY

1. Osmosis and osmotic pressure, lowering of vapour pressure, elevation of boiling point, depression of freezing point - their experimental determination, Raoult's law, abnormal behaviour of solution (non-thermodynamic relations between colligative properties),
2. Analogy of the behaviour of ideal gases and dilute solutions determination of molecular weights of substances from the studies of dilute solutions and their limitations.
3. Chemical equilibria -- Reversible and irreversible reactions, law of mass action and its verification (Kinetic and experimental), equilibrium in homogeneous system of liquids and gases. Le Chatelier's principle and its Applications.
4. Colloidal states of matter, crystalloids, colloids, classification of colloidal, lyophobic colloids, preparation of colloidal solutions. Properties of colloidal solution - peptisation, dialysis, electrophoresis, Brownian movement coagulation of colloids, optical properties, emulsions, and their uses.
5. Kinetic theory of gases - its fundamental postulates deduction of gas laws, average velocity, R.M.S. velocity. Ideal gas equation and derivation of gas laws, deviation from ideal behaviour, continuity of state, principle of liquefaction of gases, van der Waal's equation of state, the principle of corresponding state, the law of partial pressure.



6. Specific heat of gases and specific heat relation (from Kinetic theory), First law  
 tion: of Cp & Cv. Joule-Thomson effect. Elementary treatment of second law of thermodynamics.
7. Vapour densities, abnormal vapour density, limiting density, different methods of determination of molecular weights.

**PAPER-II**  
**ORGANIC CHEMISTRY**  
**GROUP-A**

1. Introduction to organic chemistry-growth, scope and applications of organic chemistry. Qualitative and quantitative analysis of carbon, hydrogen, halogens and sulphur in organic compound. Determination of molecular formula. Structure and classification of organic compounds. Nomenclature, homologous series and isomerism;
2. Occurrence, preparation, general properties of saturated hydrocarbons (including structural formula), saturated paraffins upto butane, unsaturated hydrocarbons including butadiene and isoprene, acetylene, significance of double and triple bond. Baeyer's strain theory petroleum industry.
3. Halogen derivatives of paraffins-methyl and ethyl halides. their preparation. properties and uses. Dihalogen  
 chloroform, carbon tetrachloride-preparation properties, uses.
4. Aliphatic alcohol-preparation, properties and constitution of primary secondary and tertiary alcohol, monohydric alcohol (first four members) fermentation and elementary knowledge of enzymes, manufacture of methyl and ethyl alcohol. Glycols, ethylene glycol, ethylene oxide glycerol and its important derivatives.
5. Preparation, properties and constitution of esters, diethyl ether.
6. Preparation, properties and constitution of aldehydes and ketones, formaldehyde, acetone.
7. Preparation, properties and constitution of fatty acid Formic acetic, vinegar, and its hydrolysis, hydrogen substituted acids.
8. Carbonyl chloride and urea-preparation, properties uses and test for urea.
9. Study of primary secondary, tertiary amines and quaternary ammonium compound-preparation properties, separation of mixture of amines, test to distinguish between primary secondary and tertiary amines.
10. Study of organometallic compound of magnesium and its applications.
11. Preparation properties of dibasic acid and tribasic acid oxalic, malonic, succinic, malic and citric acid.

12. Lactic acid, tartaric acids and their optical isomers.
13. Carbohydrates-definition, classification, glucose, fructose-their preparation and properties. Cane sugar, starch, cellulose and their molecular structure.
14. Aromatic hydrocarbons-Aromatic character, Kekule's theory and structure of benzene' properties of aromatic compounds. Coal tar distillation, benzene, toluene, xylenes, their properties and reactions, Konner's absolute method of orientation.
15. Aromatic halogen compound-chlorobenzene, bromobenzene, iodobenzene, benzyl chloride, benzal chloride and their properties.
16. Aromatic nitro compound.
17. Sulphonic acid-benzene sulphonic acid.
18. Phenols-preparation, properties of phenols, nitrophenols, picric anisole.
19. Aromatic alcohol-benzyl alcohol.
20. Aromatic aldehydes - benzaldehyde-salicylaldehydes.
21. Aromatic ketones - Acetophenone, benzophenone.
22. Aromatic acids and their derivatives- Benzoic acid benzoic anhydride, benzamide benzoic esters phenylacetic acid, cinnamic acid, salicylic acid, acetyl salicylic acid, phthalic acid.
23. Aromatic amines-preparation properties of aniline, dimethyl aniline, toluidine, benzylamine, and sulphanilic acid.
24. Preparation properties of diazo compounds (constitution omitted).
25. Phenylhydrazine-preparation properties and uses.
26. Naphthalene and anthracene-their preparation, properties naphthols and naphthaquinones.
27. Elementary idea of amino acids and proteins.
28. Elementary idea of valency electron of carbon and their hybridisation, molecular orbitals, electrophilic and nucleophilic substitution.

### PHYSICAL CHEMISTRY GROUP - B

1. Thermochemistry-Heat of reaction, Heat of formation Hess's law, Kirchoff's equation.
2. Heterogeneous equilibrium-phase rule and its application to one component system of water and sulphur. Solubilities of gases in liquids-Henry's law, binary liquid mixtures-their miscibility distillation, Nernst's distribution coefficient.
3. Elementary ideas of chemical Kinetics-order of reaction and its determination (first and second order only) elementary idea of reaction mechanism.

4. Catalysis – Homogenous and heterogeneous, autocatalysis catalytic poisons, elementary treatment of mechanism of catalysis.

5. Electrolysis and electrolytic dissociation, Faraday's laws, Arrhenius theory of electrolytic dissociation, specific equivalent and molar conductance, measurement of conductance of solution variation of conductance with dilution, transference number, Kohlrausch law, strong and weak electrolytes, degree of dissociation. Ostwald dilution law, principle of solubility product and its applications in analytical chemistry, common ion effect.

6. Elementary treatment of the following topics :-

Acid base concept strength of acids and bases. Ionisation of water, hydrolysis of salts neutralisation hydrogen ion concentration and pH, buffer solutions indicator-theory, choice of indicator theory of acid base indicator.

### 3. BOTANY

Paper – I

– 100 Marks

- (A) MORPHOLOGY      (B) ANATOMY              (C) CRYTOGAMS  
(D) GYMNOSPERMS    (E) ANGIOSPERMS

A. MORPHOLOGY – A general advanced knowledge of the external morphology of vegetative and reproductive organs of the vascular plants with special emphasis on microsporogenesis, megasporogenesis, development of male and female gametophyte a typical monosporic embryo sac, fertilization, embryogeny and endosperm formation.

B. ANATOMY – Basic knowledge of the cells, cell-wall-structure and development, ergastic matters. The shoot-apex and the root apex. Tissues and tissue system. The stele, leaf and branch gaps Primary and secondary structure, the cambium, secondary growth including anomalous types.

#### C. CRYPTOGAMS –

1 ALGAE – General characters, classification, origin and evolution of sex:

(a) MYXOPHYCEAE OR CYANOPHYCEAE

General cell structure, reproduction and nitrogen fixation.

Type study – NOSTOC.

(b) CHLOROPHYCEAE –

Type study – Chlorella, volvox, oedogonium, chaetophora, vaucheria, chara.

(c) BACILLARIOPHYCEAE – A general account.

(d) PHAEOPHYCEAE –

Type study – Ectocarpus, Fucus.

(e) RHODOPHYCEAE

Type study – Polysiphonia.

## PAPER - II

- 100 Marks:

- (1) **PHYSIOLOGY** (2) **ECOLOGY** (3) **PLANT GEOGRAPHY** (4) **ELEMENT OF CYTOLOGY** (5) **GENETIC AND PLANT BREEDING**  
(6) **ECONOMIC BOTANY.**

1. **PHYSIOLOGY** : Plant and water relationship. Absorption of water and their translocation, transpiration - process and factors affecting and significance of transpiration, type or state of water in the soil their availability for plants, drought resistance.

Mineral Nutrition - Macronutrients and micronutrients, Nitrogen metabolism, Nitrogen cycle. Enzymes - classification, properties and mode of action - Photosynthesis - mechanism and factors, affecting and Respiration Mechanism, factors effecting and Respiratory quotient. Growth and Development - Factors influencing growth Auxins and their actions in plants; photoperiodism, vernalisation Movements - Autonomous and Induced movements.

2. **ECOLOGY** : Ecological concept - organisation level, individual, population, community and ecosystem. Ecological factor - climate (Rainfall, Wind, Temperature, Light), Edaphic, Biotic, Origin development and organisation of a community. Hydrosere, to water.

3. **PLANT GEOGRAPHY** - Vegetation (General) of Eastern Himalayas. General knowledge on the Phy-to-Geographical regions of India

4. **CYTOLOGY** - Parts of a generalised cell and properties. Detailed study of Mitochondria, Plastids, Chromosomes, Nucleic Acid, Mitosis, Polyploidy.

5. **GENETICS AND PLANT BREEDING** - Mendel's Law of Inheritance Linkage and crossing over. Chromosome theory of heredity. Mutation. General principles and technique of Plant Breeding, and its significance in agriculture.

6. **ECONOMIC BOTANY** - The scope, cultivation and processing of the following -

- (a) Cereals - Rice, Maize
- (b) Pulses (Legumes) - Soybean, Pea, Gram, Groundnut.
- (c) Oils - Mustard, Coconut.
- (d) Fibres - Cotton, Jute
- (e) Drugs - Ranwolfia, Cinchona.
- (f) Beverage - Tea
- (g) Sugar - Sugar-Cane
- (h) Timber - Sal, Teak.

FUNGI — General characters, classification, economic importance.

(a) PHYCOMYCETES—

Type study—phytophthora, cystopus.

(b) ASCOMYCETES—

Sexual Reproduction, Development of Ascus and Ascospores

Type study—Peziza Erysiphe.

(c) BASIDIOMYCETES—

Type study-Ustilago, Puccinia, Psalliota.

(d) DEAUTEROMYCETES—

Type study-Helebinthosporium, Fusarium.

(3) LICHENS — A general account

(4) BACTERIA & VIRUSES — A general account.

(5) BRYOPHYTA— General characters, classification, origin and evolution of Bryophyta, origin and development of sporophyte.

Type study—

(a) Hepaticae — Marchantia

(b) Anthocerotae — Anthoceros

(c) Musci — Sphognum.

(6) PTERIDOPHYTES— General characters, classification, Heterospory and its significance.

Type study—

(a) Lycopsida — Lycopodium, Selaginella.

(b) Pteropsida — Marsilea.

D. GYMNOSPERMS— General characters, classification, a general knowledge of fossilisation.

Type study—

(a) Coniferales — Pinus (Morphology, life cycle)

(b) Gnetales — Gnetum (Morphology, life cycle and affinity)

E. ANGIOSPERMS— General knowledge of the Principles of classification, outline systems of classification Artificial, Natural and Phylogenetic, Concept of Species, Nomenclature

A knowledge of the following families including Phylogenetic affinities and economic importance.

(a) Monocotylalene — Gramineae, Palmae, Liliaceae, Musaceae, orchidaceae.

- (b) Dicotyledeas — Cruciferacs, Tiliaceae, Melvaceae, Rutoceae, Legu-  
ninoceae, Umbellifarae, Compositae, Solonaceae,  
Verbanaceae, Labiateae, Cucurbitaceae, Euphor-  
biaceae

## PHYSICS

### PAPER— I

- 100 Marks

### GENERAL PHYSICS

Units and dimension of a physical quantity, dimensional equations and appli-  
cations. Movement of inertia and radius of gyration, angular momentum, kinetic  
energy in rotational motion. Theorems of perpendicular and parallel axis, calcu-  
lation of moment of inertia for rod and Rectangular lamina about axis of sym-  
metry. Differential equation of simple harmonic motion and its solution, kinetic  
and potential energy in simple harmonic and its solution, kinetic and potential  
energy in simple harmonic motion, Composition of simple harmonic motions,  
resolution, of simple harmonic into two equal and opposite circular motions; Lis-  
sajous figures, compound and torsional pendulum, determination of Bygkater's  
pendulum.

Experimental determination of G by Boy's method, calculation of gravitatio-  
nal potential and field due to thin spherical shell and solid sphere, Kepler's laws  
and its deduction.

Deformation in solids, Hooke's law, elastic constants, inter-relations between  
elastic constants. Bending of a light bar fixed at one end.

Viscosity of fluids, Poiseuille's equation, experimental determination of visco-  
sity of liquids (Poiseuille's method).

Surface tension, relation between surface tension and surface energy, angle of  
contact, excess pressure inside a soap bubble, rise of liquid in a capillary tube.

Production and measurement of low pressure diffusion pumps, McLeod gauge.

### SOUND

Free vibration, Forced vibration, resonance, transverse and longitudinal wave.  
Vibration of string, velocity of transverse waves in strings, stationary waves in  
strings and air columns, Kundt's tube experiment.

Electrically maintained tuning fork, determination of frequency of a tuning  
fork (Melde's experiment).

Recording and reproduction of sound, Ultrasonic sound, application of Ultra-  
sonic waves. Acoustics of Building & Reverberation.

### OPTICS

Refraction at spherical surfaces, thin lens and combination of two thin lenses  
separated by a distance 'd' spherical aberration and chromatic aberration, achro-  
matic combination of lenses. Eye pieces—Ramsden & Huygen's eyepiece.

Determination of velocity of light by Michelson's Method.

Interference of light, Fresnel's biprism, colours of thin films, Newton's ring. Diffraction of light-Fresnel's half period zone, diffraction at a straight edge, Fraunhofer diffraction-single slit, double slit and a plane grating (Elementary deduction).

Polarization of light-plane, polarized light, double refraction, Nicol prism, polarimetry.

## HEAT

Specific heats of gases and their determination.

Kinetic theory of gases, perfect gas laws, theory of specific heats. Brownian motion and determination of Avogadro's number.

Andrew's reduced equation of state, critical constants.

First law of thermodynamics Mechanical equivalent heat (J) and its determination by Callendar and Barnes method. Isothermal expansion, C.C.R., equation for an adiabatic

### P V

Change, determination  $\gamma$  by Clements and Desormes method. Porous-plug experiment, Joule-Thomson Effect; Temperature of inversion; liquefaction of gases. Production and measurement of low temperature.

Second law of thermodynamics, Reversible and irreversible processes, CARNOT CYCLE Entropy, Absolute scale of temperature, Carnot's equation.

## STATISTICAL ELECTRICITY:

Capacity of sphere, two concentric spheres, two coaxial cylinders, two parallel plates, Energy of a condenser, Forces between the plates of a condenser, effect of dielectrics on capacity, electrometers-attracted disc; comparison of capacities, measurement of dielectric constant of solid in the form of a slab.

Electric charges inverse square law of electrostatics, Electrostatic potential, electric field, dielectric constant (specific inductive capacity), mechanical forces on charged conductors, energy in an electrostatic medium, electric induction, Gauss's theorem and its applications.

## MAGNETISM

Inverse square law of Magnetism. Magnetic Potential line of Force and field, Potential gradient and field intensity potential and field due to a short magnet. Forces and couples between two short magnets, magnetic shell, potential due to a magnetic shell, tangent law, magnetic induction and intensity of magnetisation, magnetic susceptibility and permeability

PAPER — II

———100 Marks

## CURRENT ELECTRICITY

Magnetic Field about a current and its direction-Laplace's law, Equivalent magnetic shell-Ampere's Theorem. Field due to a circular current Field due to a solenoid.

Effect of magnetic field on current, Couple on a rectangular coil carrying current placed in a magnetic field, moving coil galvanometers—dead beat and Ballistic galvanometer current sensitivity and voltage sensitivity of a galvanometer determination of figure of merit.

Thermo-electricity, Peltier and Thomson effect, thermo-electric is thermometry magnetisation of iron. magnetic Hysteresis loss, electromagnetic induction, self and mutual inductance and their determination, Eddy currents, electromagnetic damping. Transient phenomena—growth and decay of currents in different coupled systems, induction coil, alternating current Reactance, Impedance, L—C, L—R, and L—C—R circuits, power in A—C. circuits, power factors, Transformer their theory—construction uses. Current—transmission, electric motors.

### MODERN PHYSICS :

Irons & Ionisation current, Effect of electric and magnetic fields on charged particles in motion, Details study of  $e/m$  for electrons by Thomson method, Millikan's determination of 'e' (Details), Positive rays—Positive ray analysis (Thomson method), Isotopes, Mass spectrograph and (Aston & Bainbridge) Atomic number, X-rays, scattering and determination of wave length by Bragg's X-ray spectrometer Compton effect and its verification, scattering of alpha particles by Nucleus, Nuclear structure of the Atom (Details of Rutherford & Bohr's) Bohr's theory of hydrogen spectrum photo-electric effect—Einstein equation and determination of 'h' by Millikan's method—Photo electric cell and their uses.

5.

### GEOGRAPHY

PAPER – 1

– 100 Marks.

#### GROUP A – PHYSICAL GEOGRAPHY – 60 MARKS

Theories on origin of the earth, Internal structure of the earth, forces of the earth and their effects on the earth's crust; earthquakes and volcanicity, sculpturing of the earth's surface through the agents of denudation such as weathering water, glacier. underground water and wind.

Composition of atmosphere, temperature and pressure distribution, pressure belts and planetary winds, cyclones and anticyclones, precipitation.

Distribution and depth of ocean floor, ocean deposits distribution of salinity of ocean, waves, tides and ocean currents.

#### GROUP B — ECONOMIC GEOGRAPHY — 20 Marks

Meaning and scope of economic geography; factors and systems of agriculture, conditions of growth. distribution production and world trade of rice, wheat, cotton, tea and rubber. Minerals and power resources such as coal, iron-ore petroleum, natural gas and water power, Factors of localisation of industries, details study of cotton textile, iron and steel and chemicals industries. A comparative study of various transport systems.

#### GROUP C — HUMAN GEOGRAPHY — 20 Marks

Meaning and scope of human geography, man and environment, climate and



man, human activities in mountains and plains, distribution of world population, growth structure and distribution of rural and urban settlements.

## PAPER — II

### REGIONAL GEOGRAPHY — 100 Marks.

Candidates will be required to answer five questions three from group 'A' one from group 'B' and one from group 'C'

#### GROUP — A REGIONAL GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE TO NORTH EASTERN REGIONS — 60 Marks.

Physical feature; climate and climatic regions, agriculture and agricultural regions, industrial regions, multipurpose projects, national vegetation and forests, population and food problem, detail geographical account of Kashmir region, Chhotanagpur plateau, lower gangetic valley and Brahmaputra valley, detail geographical study of Mizoram, Meghalaya plateau and Nagaland.

#### GROUP B- REGIONAL GEOGRAPHY OF GREAT BRITAIN, JAPAN AND U.S.A. - 20 Marks.

Relief, climate, natural vegetation, agriculture, mineral resources, industries and industrial regions.

#### GROUP C - MAJOR NATURAL REGIONS - 20 Marks.

Life and industrial development in Equatorial region, Hot desert region, Monsoon region, Mediterranean region and Tundra Region.

#### BOOKS RECOMMENDED PHYSICAL GEOGRAPHY

1. Principles of physical geography - F.J. Moukhouse.
2. Physical geography - P.Lake (Indian Edition)
3. A text book of geomorphology - P.G. Worcester
4. Elements of physical geography - G.T.Trawortha
5. Principles of physical geography -A. Dasgupta and A.N. Kapoor.

#### ECONOMIC GEOGRAPHY

1. Economic and commercial geography- M.C.Agarwalla and J.R. Monga
2. Economic geography - Dr. R.N Dubey
3. Economic geography - A. Dasgupta
4. Economic geography - J.L.Guha and P.R. Chatteraj

#### HUMAN GEOGRAPHY

1. Principles of Human geography - E. Huntington
2. Introduction to Human Geography - J.H.G. Lebon
3. Introduction to Human geography - D.C Money

#### REGIONAL GEOGRAPHY

1. India a Regional Geography - R.L.Singh
2. Geography of India - Gopal Singh
3. Japan- G.K. Trewartha.

6	<b>ANTHROPOLOGY</b>	
Paper I.	Physical Anthropology and prehistory	- 100 Marks,
Paper II.	Social and Cultural Anthropology	- 100 Marks.
7	<b>ZOOLOGY</b>	
Paper I.	Group 'A' Chordata Group 'B' General Principles of Zoology	- 100 Marks.
Paper II.	Group 'A' Non-chordata Group 'B' Embryology	- 100 Marks.
8	<b>GENERAL ECONOMICS</b>	
Paper I.	Principles of Economics and Theory of Money.	- 100 Marks
Paper II.	Public Finance & Indian Economics	- 100 Marks
9	<b>POLITICAL SCIENCE</b>	
Paper I:	Part 'A' Political Philosophy of Plato, Aristotle and their predecessors. Part 'B' Principles of Political Science	- 100 Marks
Paper II.	(1) Constitution of Great Britain, the United States of America, the Union Socialists of the Soviet Republic and India.  (2) Local Self Government in India With special emphasis on Local Self-Government in Assam.	- 100 Marks
10	<b>EDUCATION</b>	
Paper I.	Principles of Education and Educational Psychology	- 100 Marks
Paper II.	History of Education in India with particular reference to modern education.	- 100 Marks
11	<b>INDIAN HISTORY</b>	
Paper I.	From the prehistoric period to 1200 A.D.	- 100 Marks.
Paper II.	From 1200 A.D. to 1947.	- 100 Marks.
12.	<b>BRITISH HISTORY</b>	
Paper I.	From 1485 to 1714	100 Marks
Paper II.	From 1714 to 1947	100 Marks

**13. WORLD HISTORY**

Paper I.	From 1789 to 1914	100 Marks
Paper II.	From 1914 to 1947	100 Marks

**14. ENGLISH LITERATURE**

Paper I.	Poetry and Drama	100 Marks
Paper II.	Prose Text and Composition	100 Marks

The books and pieces thereof are approximately those of the North Eastern Hills University for the Degree Course Examination. The candidates are expected to answer critical questions on the authors and the poets and the general characteristic of the literature.

**15. HINDI**

Paper I.	Prose and Poetry	100 Marks.
Paper II.	Drama, Unsedn, Essay and History of India.	100 Marks

**16. ADVANCED ACCOUNTANCY AND AUDITING**

Paper I	Advance Accountancy	100 Marks
Paper II	Auditing	100 Marks

**17. BUSINESS ORGANISATION AND COMMERCIAL LAW**

Paper I.	Business Organisation	— 100 Marks
Paper II.	Commercial Law	— 100 Marks

**18. PRINCIPLE OF ECONOMICS & MODERN ECONOMICS DEV**

Paper I.	Principles of Economics	— 100 Marks
Paper II.	Modern Economics Development of India and other great powers	— 100 Marks

**19. INTERNATIONAL LAW**

Paper I.	History of International Law	— 100 Marks
Paper II.	Law of the belligerents and neutrals in war	— 100 Marks

**SCHEDULE II**

**GOVERNMENT OF MIZORAM  
APPLICATION FORM FOR GRADE II OF M.C.S.**

To be filled in by the candidates 'Own' handwriting. Before completing the application form the candidates must carefully study the Notice, Rules and other instructions and abide by them.

Affix signed photograph  
passport size (5cm x 7cm  
approx)

Closing date :

(All answers must be given in words and not by dashes or dots).

1. Name in full (block letters)
2. Postal address in full (in block letters) to which communications should be sent.
3. Exact date of birth (in Christian era)
4. (a) Are you married? (a)  
(b) If your answer to (a) is 'Yes' state (b) whether you have more than one wife living.
5. (a) Place of birth and the State in (a) which it is situated.  
(b) District and state to which you belong (in case of a displaced person, the District and place in which he has settled after migration should be stated).
6. Give below particulars of place (S) where you have lived for more than one year during the last five year. Place (including district) of residence.  
Address \_\_\_\_\_ Period of residence with dates. \_\_\_\_\_
7. (a) Are you a citizen of India by birth and or/by domicile?  
(b) If you are not a citizen of India to what place do you claim to belong?
8. (a) Are you a displaced person from areas which now form Pakistan? (a)  
(b) If so, what was the date of your migration? (b)  
(c) What was your address before migration? (c)  
(d) Is an affidavit necessary in your case? (d)

Strike out the words which are not applicable and answer the question.

9. State your Religion

- (b) (i) Are you a member of a Scheduled (b)(i) Caste? Answer 'Yes' or 'No'
- (ii) Are you a member of Scheduled Tribes? (ii)
- (iii) If the answer to (i) (or (ii) is 'Yes' give (iii) the name of Caste or Tribe?
- (iv) Have you attached an original certificate (iv) from a competent authority in support of your claim?

10. Your father's name and place of birth — — — — —
11. Is or was your father a citizen of India by birth and/or domicile? — — — — —
12. Did your father ever change his nationality? If so, give particulars — — — — —
13. Did your father's postal address (if dead give last address) and profession. — — — — —

14. What language (including Indian language) can you read. Write or speak ? Give particulars and state the Examinations. If any, passed in each. — — — — —

Read only	Speak only	Read and Speak	Read, write&Speak	Examination passed
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15. Educational Institution attended.  
 (a) Secondary or High School (including National Defence Academy)  
 (b) University or other Institution of higher education attested

Name of University/Institution	College if any with address	Date of entering	Date of leaving
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Strike out the words which are not applicable and answer the question.

16. (a) Give a particulars of all examination passed and degree obtained (commencing with the Matriculation or tenth class of a higher Secondary School or equivalent examination)

Examination or degree	Class or Divison obtained	Year	Subjects taken	Name of University Institution/ Board
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Name of Institutions with address	Date of entering	Date of leaving
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17. If you are employed under Government, or have at any time been employed under Government give details of the service rendered in various offices and scale of pay of the post held.

Name of the Department/Office	Post in which employed and scale of pay	Period of Service From ! To
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18. Attach a summary of not more than two page of your life experience indicating any special background which you feel may show your aptitude for a healthy outdoor life in the hills, leadership, decision-making and original and lucid thought.

19. (a) Are you free debt. (a)  
 (B) If you are under liability to repay money (b) advanced by any Institution or party for your education or for any other purpose state the particulars.  
 Answer 'Yes' or 'No' to question (a) if the answer is 'No' answer question (b) clearly.

20. Have you ever been convicted by a criminal court and if so, in what circumstances and what was the sentences ?

21. State the name of treasury/state Bank of India from which you submit Treasury Challan and the number and dates of Treasury Challan.

Name of Treasury/ State Bank	Number of Treasury Challan	Date	Value Rs.-----P
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22. Give a list of documents attached to the application.

(a)  
(b)  
(c)  
(d)  
(e)  
(f)  
(g)

23. In the space below write clearly the optional subject in which you wish to be examined, no change in the selection of optional subjects once made will be allowed.

(i) optional subject 2 (two)  
(a) -----  
(b) -----

**DECLARATION TO BE SIGNED BY THE CANDIDATE**

I hereby declare that the statement in this application are true to the best of my knowledge and belief.

Date... ..

Signature.....

**FOR THE USE OF GOVERNMENT SERVANT ONLY**

**Certificate by Head of Department or Office**

I. Certified that Shri... .. Holds a temporary post/permanent post Under the Central/State Government, His character so far as known to me is good and I am not aware of any circumstances which shows that he would be unsuitable any appointment to any of the services/post (s) if successful in the examination.

Date....

Signature .....