

॥ अंतरी घेटवू ज्ञानज्योत ॥
उत्तर महाराष्ट्र विद्यापीठ, जळगांव.

परिपत्रक क्र. ७३ /१९९३

विषय :- सुधारित अभ्यासक्रम जून, १९९३ पासून.

विद्यापीठ अधिकार मंडळाच्या निर्णयानुसार उत्तर महाराष्ट्र विद्यापीठाशी संलग्न असलेल्या कला, विज्ञान आणि वाणिज्य महाविद्यालयांचे मा. प्राचार्य यांना कळविण्यांत येते की, जून, १९९३ पासून कला, विज्ञान आणि वाणिज्य महाविद्यालयांमध्ये खालील वर्गासाठी त्यांच्या समोर दर्शविलेल्या विषयांचा सुधारित अभ्यासक्रम अंमलात येत आहे. आपल्या महाविद्यालयांत खालील वर्गांना त्यांच्या नावा समोर दर्शविलेले विषय शिकविले जात असल्यामुळे त्या त्या विषयांचे नवीन सुधारित अभ्यासक्रम सोबत जोडलेले आहेत.

मा. प्राचार्य, कला, विज्ञान व वाणिज्य महाविद्यालय यांना विनंती करण्यात येते की, त्यांनी या परिपत्रकाचा आशय व नवीन अभ्यासक्रम सर्व संबंधित प्राध्यापकांच्या आणि विद्यार्थ्यांच्या नजरेस आणावा.

- १] द्वितीयवर्ष कला - Applied Statistics.
- २] द्वितीयवर्ष विज्ञान - Geology, Physics.

जा. क्र. अभ्यासक्रम/९३/६/२६/ ५४५५

दिनांक : २१.५.१९९३

जळगांव.

[दे. दा. रावतोळे]

सहा. कुलसचिव.

प्रत माहितीसाठी सादर रवाना :

- १] मा. अधिष्ठाता, कला, विज्ञान विद्याशाखा.
- २] मा. प्राचार्य, सर्व संलग्न कला, विज्ञान व वाणिज्य महाविद्यालय.
- ३] मा. उपकुलसचिव, [परीक्षा विभाग, प्री/अप्टर], उ. म. वि., जळगांव.
- ४] मा. उपकुलसचिव [प्रशासन विभाग], उ. म. वि., जळगांव.
- ✓ ५] मा. सहा. कुलसचिव, परीक्षा विभाग, उ. म. वि., जळगांव.

दुधाता. /-

N O R T H M A H A R A S H T R A U N I V E R S I T Y,

J A L G A O N -425 001.

SYLLABUS FOR S.Y.B.Sc.

GEOLOGY (With effect from June,1993)

Term I

Paper I : Mineralogy, Crystallography & mineral optics.

Paper II : Structural Geology.

Term II

Paper I : Petrology.

Paper II : Principles of stratigraphy, and Introduction to micropaleontology and palaeobotany.

Paper III : Practicles.

Term I : Mineralogy, Crystallography mineral optics and structural problems.

Term-II : Petrology, Fossils, micro-fossils, Plant-fossils and geological maps.

Note :- Field visit should be arranged for the students during both the terms to get themselves acquainted with different for features of geological importance and a common report to be submitted at the end of the year.

-X-X-X-X-X-X-X-

NORTH MAHARASHTRA UNIVERSITY, JALGAON

SYLLABUS FOR GEOLOGY

S.Y.B.Sc.(From June, 1993)

Term-I :

Paper-I Mineralogy, Crystallography & Mineral Optics.

1. Mineralogy : 24 Lectures

1. Definition & Scope.
2. Classification of minerals.
3. Structure of silicates.
4. General characters, chemical relationship, occurrence, physical, optical characters and uses of the following mineral groups.
 - a) Olivine.
 - b) Pyroxene clinopyroxene & Orthopyroxenes, Representation on Hess diagram.
 - c) Amphibole (Tremolite, Actinolite, Hornblende series)
 - d) Mica (Muscovite, Biotite).
 - e) Feldspar (alk feldspar & Plagioclase Series).
 - f) Silica.
 - g) Garnet.

2. Crystallography : 7 lecture.

1. Definition.
2. Summary of Crystallographic terms.
3. Cubic system (Pyrite & tetrahedrite type).
4. Hexagonal system (Beryl, quartz, calcite & tourmaline type).
5. Monoclinic (gypsum type).
6. Triclinic (Axinite type).
7. Introduction of the terms Hemihedral, Hemimorphic, Holohedral forms.

3. Mineral Optics : 8 Lectures

1. Properties of crystal/minerals under petrological microscope; Phenomenon of color, form, relief, refractive index, twinkling, pleochroism and pleochroic haloes iso-, and anisotropism, interference colors, extinction,

2. Study of Newton's scale of interference colors.
3. Use of quartz wedge, gypsum and mica - plates.

Term-II

Paper - I Petrology

1. Definition & scope of major branches-I of rocks.
(Igneous, sedimentary & metamorphic)

1. Igneous petrology :

16 Lectures

1. Formation of igneous rocks.
2. Crystallisation of magma and their types.
(Primary, secondary, Basaltic, Tholeiitic, granitic).
3. Unicomponent crystallisation of magma with example.
4. Binary crystallisation of magma
(eutectic only) with example.
5. Different Igneous rock classification in brief
(tabular, IUGS)
6. Microstructures and textures (porphyritic, ophitic, poikilitic, glomeroporphyritic etc. spherulitic, perlitic, perthitic structures.

2. Sedimentary Petrology :

11 Lectures

1. Definition.
2. Introduction to clastic & non-clastic sediments.
3. Textural characters, particle size, size terms, shape, roundness, mature and immature sediments, porosity, permeability.
4. Classification of sediments and sedimentary rocks based on particle size and products of weathering.
5. structures in sedimentary rocks in brief
(Chemical, Mechanical and Biological)

3. Metamorphic Petrology .

12 lectures

1. Definition.
2. Broad classification and general characters.
3. Metamorphic structures.
4. Products of cataclasis
(State, slaty cleavage, crash breccia autoclastic conglomerate, cata clasite, angen gneiss mylonite.

- ultra mylonite, pseudotachylite,
5. Thermal metamorphism of pure Limestone & dolomite and Arenaceous rocks (with different cementing material)
 6. Dynamothermal metamorphism of oergillaceous rocks, quartzo - feldspathic rocks, Basic igneous rocks.

Paper-II

Term I : Structural Geology

1. Definitions and relation with other branches and objectives. 3 Lectures
2. Concept of strike, dip (true & apparent) bedding, Lamination, stratification, outlier, inlier, true and verticle thickness of strata, width of outcrops, use of clinometer compass and brunton compass. 3 Lecturs.
3. Introductory techniques in geological mapping. 1 Lectures
4. Forces - Tensional compressional, couple & torsional forces. 2 Lectures.
5. **Folds**
 - 1) Definition elements of folds, axis, axial plane, limb, hinge, crestal line & plane trough line & plane) 16 Lectures
 - 2) Definition and characters of Anticline, anticlinorium, syncline, synclinerium symmetrical, assymetrical folds.
 - 3) Definition and characters of different folds :- overturned, recumbent, isoclinal cheveron, box, fan, monoclinic, homoclinal, structural terrace, open, close, drag, decollement, drapir, disharmonic, suprataneous, light, parallel, similar plunging folds.
 - 4) Fold system.
 - 5) to find out depth of folding.
 - 6) Recognition of fold in the field by
 - 1) Direct observation (toposheet study)
 - 2) Attitude of beds.
 - 3) Areal map pattern.
 - 4) Topographic characters.
 - 5) Drilling and mining data.
6. **Fault :-** 14 Lectures
 1. Definition
 2. Movements along fault - (translational, rotational, relative, absolute, apparent)
 3. Slip, shift and separation along fault.
 4. effects of faulting on strata in short.

5. classification of faults (geometrical & genetic).
6. Recognition of fault in the field and map symbols.

7. Joints : 5 Lectures

1. Definition.
2. General characters.
3. Classification (genetic & geometrical).

Term-II

Paper II Principles of stratigraphy and introduction to micropaleontology and palaeobotany.

1. Micropalaeontology - 21 Lectures

1. Introduction, definition, branches & scope.
2. Sampling, collection, chemical & mechanical separation of fossils and laboratory techniques.
3. Morphology of hard parts, geological and geographic distribution and uses of Ostracoda and foraminifera.

2. Palaeobotany :
- 1) Definition and general characters.
 - 2) Classification, systematic position generic definition, geological distribution and uses of
 1. Glossopteris
 2. Gangamopteris.
 3. vertibraria
 4. Ptillophylum.
 5. Nilsonia.

3. Principles of stratigraphy - 20 Lectures.

1. Principles of stratigraphy
 - i) Uniformitarianism.
 - ii) Order of superposition.
 - iii) Faunal succession.
2. Processes controlling stratification.
 - i) vertical succession.
 - ii) lateral succession.
3. Unconformity -
 - 1) Definition,
 - 2) Structural and environmental classification.
 - 3) Importance, recognition and evidences of unconformity.
4. Principles of correlation.
5. Outline to code of nomenclature in stratigraphy.
6. Stratigraphic (geological) time scale.

Paper - III

PRACTICALS

1. Mineralogy :- Megascopic :- chlorite, staurolite, Appophyllite, stilbite, malachite, Agurite, Bronzite, wolframite, in addition to F.Y.B.Sc. minerals.
Microscopic : optical properties & identification of Quartz, calcite, Orthoclase, olivine, Biotite, plagioclase, garnet, microcline, hornblende, Augite.
2. Crystallography :-
Crystal model study of
 - i) Cubic system (Pyrite, tetrahedrite type).
 - ii) Hexagonal (beryl, calcite, tourmaline and quartz type).
 - iii) Monoclinic (gypsum type)
 - iv) Triclinic (axinite type).
3. Petrology : Megascopic :- F.Y.B.Sc. rocks and Dunite, diorite, Graphitic granite, Ditchstone, obsidian, syenite, sand-stone (freestone, flagstone) arkose, coral limestone, crinoidal limestone, shell limestone, laterite, bauxite, Actinolite schist, mica-schist mica gneiss, mica garnet schist, marble, quartzite, slate, augen gneiss, chlorite schist.
Microscopic :- Granite, Gabbro, basalt, pitchstone, sandstone, fossil limestone, marble, Quartzite, Hornblende schist, mica schist, micagneiss, mica-garnet schist, hornblende gneiss, augen gneiss.
4. Fossils
 1. Megafossils as studied in F.Y.B.Sc.
 2. Microfossils (Ostracoda, foraminifera)
 3. Plant fossils (glossopteris, vertibraria, gangamopteris Nilsonia).
5. Structural problems :
 1. Involving true and apparent dip in gradient.
 2. Involving true and vertical thickness, width of outcrop (with and without hill slope)
 3. Three point problem used to find out strike, direction true dip amount and direction only.

6. Geological maps :

1. One conformable series.
2. two conformable series and unconformity.
3. one/two conformable series with vertical dyke
4. one/two conformable series with fault.
5. one/two conformable series with fault and vertical dyke.

7. Field work :- To undertake field training to understand the basics of geological concepts in an area and submission of report will constitute a compulsory part of this practical course.

8. Oral based on field report :-

BOOKS :-

1. Elements of mineralogy - Rutley.
2. Text book of mineralogy - Doma.
3. Petrology - Tyrell.
4. Structural Geology - Billings.
5. Stratigraphic Principles & Practice - Weller.
6. Text book of palaeobotany - Arnold.
7. Principles of micropalacontology - Brassier.
8. Principles of palacontology - Woods.
9. Igneons sedimentary and metamurphic letrology - Best.
10. Field Geology - Lahee.

-x-x-x-x-x-x-x-

dbb./-

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

SYLLABUS FOR SECOND YEAR B.A. (S.Y.B.A.)

From June, 1993.

APPLIED STATISTICS (GENERAL)

1. Theory of attributes :
 - 1.1. Notation and Terminology, Classification according to attributes, Order of classes (upto 3 attributes), Dichotomy.
 - 1.2. Class frequencies, Positive class frequencies, Negative class frequencies and contra class frequencies, Ultimate order class frequencies.
 - 1.3. Relationship among different class frequencies, Method of operators (upto 3 attributes).
 - 1.4. Fundamental set of class frequencies.
 - 1.5. Concept of association, dis-association and independence.
 - 1.6. Yule's coefficient of Association (Q). Interpretation.
 - 1.7. Examples & Problems.
2. Correlation : (For ungrouped data)
 - 2.1. Concept of bivariate data correlation between two variables.
 - 2.2. Positive, negative and absence of correlation with examples.
 - 2.3. Scatter diagram method.
 - 2.4. Karl Pearson's correlation coefficient (r) : Definition, Computation and Interpretation.
 - 2.5. Concept of Rank correlation : Spearman's rank correlation coefficient, Definition, Computation and Interpretation (without ties).
 - 2.6. Examples and Problems.
3. Regression : (for ungrouped data).
 - 3.1. Concept of Regression Statement of Regression equations. Definition of Regression Coefficients, Relationship between correlation coefficient and regression coefficients. Restrictions on the values of regression coefficients.
 - 3.2. Coefficient of Determination & its Interpretation.
 - 3.3. Fitting of Regression lines and estimation.
 - 3.4. Determination of mean values from Regression equations.
 - 3.5. Examples and Problems.

4. Index Numbers (II).
 - 4.1 Cost of living index numbers meaning, Utility, construction, precautions i) Family Budget method.
ii) Aggregate expenditure method (By using Arithmetic mean only.
 - 4.2. Fixed base and chain base I.Nos. Base shifting, Deflation, Purchasing power of money.
 - 4.3. Weighted mean of Index numbers.
 - 4.4. Examples & Problems.

-x-x-x-x END OF FIRST TERM -x-x-x-x-x-x

5. Statistical Quality Control : (SQC)
 - 5.1. Meaning Utility and purposes of SQC.
 - 5.2. Statistical process control, lot control.
 - 5.3. Chance causes and assignable causes of variations.
 - 5.4. meaning and types of control Charts.
 - 5.5. Construction of X and R charts.
 - 5.6. Examples and Problems.
6. Sample Surveys :
 - 6.1. Concept of population, Sample, Sample frame, Sampling unit.
 - 6.2. Objective of Sample survey.
 - 6.3. Designing a questionnaire characteristics of a good questionnaire.
 - 6.4. Sampling and non sampling errors.
 - 6.5. Methods of Sampling, Simple Random Sampling, Stratified random sampling, Systematic sampling and their illustrations. (Mathematical treatment is not expected).
 - 6.6. Problems on designing a simple sample survey.
7. Sequencing Problem :-
 - 7.1. Statement of a sequencing problems of two machines & n jobs, (Algebraic method only).
 - 7.2. Calculation of total time elapsed, idle time of machine.
 - 7.3. Examples and Problems.
8. Set Theory :-
 - 8.1. Meaning of a set, Methods of describing a set.
 - 8.2. Types of sets : Null set, subset, Universal set, Disjoint set, Complement of set, with illustrations.
 - 8.3. Operations on set : Equality of two sets, Intersection, Union of sets (Atmost three sets).
 - 8.4. Simple numerical problem

Special Note : Students are allowed to answer in Marathi also.

REFERENCE BOOKS :-

1. Statistical methods by S.P. Gupta.
2. Business statistics by S.C. Gupta, Indra Gupta.
3. Operations Research by P.K. Gupta, D.S. Hira.

NORTH MAHARASHTRA UNIVERSITY, JALGAON.

SYLLABUS FOR SECOND YEAR B.A. (S.Y.B.J.)

From June, 1993.

APPLIED STATISTICS (GENERAL)

1. Theory of attributes :
 - 1.1. Notation and Terminology, Classification according to attributes, Order of classes (upto 3 attributes), Dichotomy.
 - 1.2. Class frequencies, Positive class frequencies, Negative class frequencies and contra class frequencies, Ultimate order class frequencies.
 - 1.3. Relationship among different class frequencies, Method of operators (upto 3 attributes).
 - 1.4. Fundamental set of class frequencies.
 - 1.5. Concept of association, dis-association and independence.
 - 1.6. Yule's coefficient of Association (Q). Interpretation.
 - 1.7. Examples & Problems.
2. Correlation : (For ungrouped data)
 - 2.1. Concept of bivariate data correlation between two variables.
 - 2.2. Positive, negative and absence of correlation with examples.
 - 2.3. Scatter diagram method.
 - 2.4. Karl Pearson's correlation coefficient (r) : Definition, Computation and Interpretation.
 - 2.5. Concept of Rank correlation : Spearman's rank correlation coefficient, Definition, Computation and Interpretation (without ties).
 - 2.6. Examples and Problems.
3. Regression : (for ungrouped data).
 - 3.1. Concept of Regression Statement of Regression equations. Definition of Regression Coefficients, Relationship between correlation coefficient and regression coefficients. Restrictions on the values of regression coefficients.
 - 3.2. Coefficient of Determination & its Interpretation.
 - 3.3. Fitting of Regression lines and estimation.
 - 3.4. Determination of mean values from Regression equations.
 - 3.5. Examples and Problems.

4. Index Numbers (II).
 - 4.1 Cost of living index numbers meaning, Utility, construction, precautions i) Family Budget method.
ii) Aggregate expenditure method (By using Arithmetic mean only).
 - 4.2. Fixed base and chain base I. Nos. Base shifting, Deflation, Purchasing power of money.
 - 4.3. Weighted mean of Index numbers.
 - 4.4. Examples & Problems.

-x-x-x-x END OF FIRST TERM -x-x-x-x-x-x

5. Statistical Quality Control : (SQC)
 - 5.1. Meaning Utility and purposes of SQC.
 - 5.2. Statistical process control, lot control.
 - 5.3. Chance causes and assignable causes of variations.
 - 5.4. meaning and types of control Charts.
 - 5.5. Construction of X and R charts.
 - 5.6. Examples and Problems.
6. Sample Surveys :
 - 6.1. Concept of population, Sample, Sample frame, Sampling unit.
 - 6.2. Objective of Sample survey.
 - 6.3. Designing a questionnaire characteristics of a good questionnaire.
 - 6.4. Sampling and non sampling errors.
 - 6.5. Methods of Sampling, Simple Random Sampling, Stratified random sampling, Systematic sampling and their illustrations. (Mathematical treatment is not expected).
 - 6.6. Problems on designing a simple sample survey.
7. Sequencing Problem :-
 - 7.1. Statement of a sequencing problems of two machines & n jobs, (Algebraic method only).
 - 7.2. Calculation of total time elapsed, idle time of machine.
 - 7.3. Examples and Problems.
8. Set Theory :-
 - 8.1. Meaning of a set, Methods of describing a set.
 - 8.2. Types of sets : Null set, subset, Universal set, Disjoint set, Complement of set, with illustrations.
 - 8.3. Operations on set : Equality of two sets, Intersection, Union of sets (Atmost three sets).
 - 8.4. Simple numerical problem

Special Note : Students are allowed to answer in Marathi also.

REFERENCE BOOKS :-

1. Statistical methods by S.P. Gupta.
2. Business statistics by S.C. Gupta, Indra Gupta.
3. Operations Research by P.K. Gupta, D.S. Hira.

Unit - I : Oscillations

1) Simple harmonic oscillations :

Linear and angular S.H.M., Applications of S.H.M., Compound pendulum, Torsional pendulum, L - C circuits.

2) Composition of two S.H.M.'s and Lissajous figures :

Two S.H.M.'s -

i) Equal frequencies along the same line of vibration (Analytical method only)

ii) Equal frequencies acting at right angles (Analytical method only with different cases)

iii) At right angles to each other (Time periods in the ratio 1 : 2)

Lissajous figures: Demonstration by mechanical, optical and electrical method, Uses of Lissajous figures (State only).

3) Types of oscillations :

i) Free vibrations, undamped free vibrations, damped vibrations, Differential equation of a damped harmonic oscillator, Discussion of different three cases, Logarithmic decrement energy equation of damped harmonic oscillator, quality factor, damped S.H.M. in an electric circuit (L - C - R example of the reverberation of hall) (Descriptive part only)

ii) Forced vibrations, Resonance, Barton's pendulum, Equation of forced vibrations and its solution, Amplitude of forced vibrations velocity and amplitude resonance, Sharpness of resonance, Energy of forced vibrations, band width, quality factor in terms of absorption, band width application, L - C - R series circuit.

4> Coupled oscillations :

Differential equations of coupled oscillations, co-efficient of coupling (Richardson) electrical and mechanical coupled oscillations.

(25 Periods, 30 mks)

Unit - II : Wave motion

Differential equation of wave motion, equation for longitudinal and transverse wave and their solutions in one dimension, Principle of superposition of waves, Formation of stationary waves, Relation between particle velocity, wave velocity and group velocity, Energy of simple harmonic progressive wave, Energy density and intensity of wave.

(8 Periods, 10 mks)

Unit - III : Doppler effect

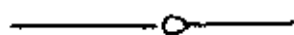
Doppler effect, Doppler effect in sound and astronomy, Expression for apparent frequency (Different cases when source, the observer and medium are in motion), Asymmetric nature of Doppler effect in sound, Doppler effect in light (Symmetric effect) and applications, Limitations of Doppler's principle.

(5 Periods, 6 mks)

Unit - IV : Ultrasonics

Production of ultrasonic waves, Piezo-electric effect, Piezo-electric oscillator, magnetostriction effect and magnetostriction oscillator, Detection of ultrasonic waves and its applications.

(4 Periods, 4 mks)



Optics

1> Geometrical optics :

Introduction to spherical and chromatic aberration . Condition for minimum spherical aberration achromatism of two lenses (a) in contact and (b) separated from each other. Combination of two thin lenses - separated by a distance and in contact. Cardinal points, Ramsden and Huygen eye pieces with their merits and demerits. (6 Periods, 8 mks)

2> Physical optics :

a> Interferences : Idea of coherence. Intensity distribution in interference pattern. Phase change on reflection (Stoke's treatment).. Thin films reflected and transmitted systems. Fringes of equal inclination and equal thickness. Wedge shaped film (normal incidence) Newton's rings- theory and its applications (Determination of wave length, Refractive index of liquids). (10 Periods, 12 mks)

b> Diffraction : Fresnel and Fraunhofer diffraction. Fraunhofer diffraction at single slit and double slits. Theory of plane transmission grating. Intensity distribution in diffraction pattern. Fresnel diffraction- Rectilinear - Propagation of light. Rayleigh's criterion of resolution. Resolving power of an astronomical telescope. (10 Periods, 12 mks)

c> Polarization : Concept of polarization. Polarization by reflection, Brewster's law, Double refraction in uniaxial crystals, Double refracting crystals, Huygen's explanation for normal incidence, Production and detection of circularly and elliptically polarized light. Polaroid, Quarter and Half wave plate, Nicol prism, optical activity and Fresnel's explanation. (10 Periods, 12 mks)

3> Non - linear optics :

LASER'S - Optical pumping and stimulated emission, Meta-stable state, Principle of laser, Types of lasers- He-Ne, Co²⁺, Ruby. Application of lasers. (5 Periods, 6 mks)

REFERENCES :

- | | |
|---------------------------------|------------------------------|
| 1. Fundamentals of optics | - Jenkins and White |
| 2. Text book of optics | - N.Subrahmanyam and Brijlal |
| 3. Principle of optics | - B.K.Mathur |
| 4. Lasers and Non linear optics | - B.B.Laud |

Paper - II : Section - I

1) Motion of charged particle in electric and magnetic fields (Lorentz force), Millikan's method of determination of charge on an electron, Thomson's method of e/m of an electron positive rays Dempster mass spectrograph. (6 Periods, 8 mks)

2) Solar energy : INTRODUCTION :

Energy crisis, Alternative sources of energy, Solar energy as an option.

Solar radiation :

Solar radiation outside the earth's atmosphere, Solar radiation at the earth's surface, Solar spectrum.

Photo thermal conversion of solar energy :

Flat plate collectors, liquid flat plate collector. (Construction, principle of working and area of application)

Photovoltaic conversion of solar energy :

Principle of photovoltaic conversion (P-N junction), Solar cell, types of solar cell (P-N, P-I-N, MIS solar cells) Materials used for solar cell, principle of solar cell, spectral response of solar cell, I-V characteristics of solar cell under dark and illuminated conditions, Open circuit voltage (V_{oc}), Short circuit current (I_{sc}) and Fill Factor of solar cell, Dependence of efficiency of solar cell on the energy gap of semiconductor. (10 Periods, 12 mks)

3> Matter Waves :

Dual nature of matter, de-Broglie wave hypothesis, wave packets, phase velocity, group velocity and particle velocity and relations between them, Electron diffraction, Davisson and Germer experiment, Uncertainty principle, proof of $\Delta x \times \Delta p > h$ (Beiser treatment), different forms of uncertainty principle. (3 Periods, 10 mks)

4> Wave Mechanics :

Wave function and its physical significance, Schrodinger's equation, Time dependant and independant forms, (One dimensional equation) Particle in a one dimensional box. (6 Periods, 8 mks)

5> Bohr and Sommerfield theory of hydrogen atom :

Introduction of atomic spectra, Inadequacy of classical planetary model of hydrogen atom, Bohr's theory of hydrogen atom, Extension of Bohr's theory, Experimental (Frank and Hertz) verification of discrete atomic energy levels, Correspondence principle, Bohr Sommerfield model and relativistic effects, Limitations of quantum mechanical model. (10 Periods, 12 mks)

REFERENCES :

- 1> Fundamental of solar cell. - M. A. Green.
- 2> Solar energy. - S. P. Sukhatme.
- 3> Elementary Modern Physics. - A. P. Arya.
(Addison Wesley)
- 4> Perspectives of modern physics. - Beiser.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

(W.e.f. June, 1993)

S.Y.B.Sc (Physics)

Electronics

Paper - II (Second Term)

1) SEMICONDUCTORS :- Review of atomic structure, Formation of energy bands, Energy band diagrams for conductors, Semiconductor and insulator, Intrinsic and Extrinsic Semiconductor, Dopping (P and N type Semiconductor) p-n junction with forward bias and reverse bias, Junction diode and its characteristics, zener diode, LED. (10 Periods, 12 mks)

2) RECTIFIERS :-

Diode as a rectifier, Half wave and Fullwave Rectifier, Filter ckt (Simple capacitor, L - section filter) Ripple factor, zener diode as a voltage regulator. (6 Periods, 8 mks)

3) TRANSISTOR: (BJT)

Principle of operation, CB, CE and CC configuration, Input output and transfer characteristics for CE configuration, Defination of β_{dc} and β_{ac} , and their interrelation.

Transistor biasing methods, DC load line, operating point.

(8 Periods, 10 mks)

4) AMPLIFIERS :-

Transistor as an amplifier, single stage CE transistor ampli. Idea of black box, h - parameters. Small signal h - parameter (frequency response), equivalent circuits (CE only). Power amplifier Classification of power amplifiers (class A, class B and class C) operational amplifier :Basic idea, symbol, parameter of an ideal and practical op-amp.

(10 Periods, 10 mks)

5) OSCILLATOR :

Feed back and its types positive feed back, Barkhausen criteria, Phase shift oscillator, Wein bridge oscillator, Crystal oscillator, Hartley oscillator. (without derivation)
(8 Periods, 10 mks)

REFERENCES : 1) Integrated Electronics - Millman and Halkias.

2) Basic Electronics - V. K. Mehta.

3) Fundamental of Electronics - J. D. Ryder.

4) Electronics Devices and Circuits - Mottershede.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

(W.e.f. June, 1993)

S.Y.B.Sc. (Physics)

Syllabus of Instrumentation

1) Basic principles of measurements:

Different units, standard calibration, accuracy, with reference to electrical, Mechanical, optical, Magnetic quantities, sensitivity, linearity, stability, signal to noise Ratio, errors. (10 Periods, 12 mks)

2) Measurement of electrical parameters:

Measurement of low and high currents and voltages (examples : ameters and voltmeters of various ranges, electrometers) Measurement of AC and DC voltages using CRO. (7 Periods, 9 mks)

3) Measurement of temperatures:

Measurement of temp using thermometer, thermocouples and pyrometers. (7 Periods, 9 mks)

4) Measurement of Magnetic fields:

Magnetic field (Permanent magnets and electromagnets) Measurement of magnetic field (search coil and Hall gauss-meter) (6 Periods, 8 mks)

5) Measurement of pressure:

Bernoullies relation, and conditions for flow of gas and liquid, flow meters for liquid and gas pressure, Measurements, concept of low and high pressures. (10 Periods, 12 mks)

REFERENCES :

1> Instrumentation: Measurement and Analysis-

- Nakara and Chaudhari.

2> Instrumentation: Devices and Systems-

- Rangan, Mani, Sharma.

3> Electronics instrumentation and measurement techniques-

(Second and Third edition) - Cooper, Helfrick.

NORTH MAHARASHTRA UNIVERSITY, JALGAON

(W.e.f. June, 1993)

S.Y.B.Sc.(Physics)

Syllabus of Meteorology and Space Physics

1) Atmosphere :- Composition of the atmosphere, Hydrostatic equilibrium, The hydrostatic of special atmosphere, The homogeneous atmosphere, Isothermal and adiabatic atmosphere, Standard atmosphere.

Vertical divisions of the atmosphere, troposphere, stratosphere, mesosphere, thermosphere.

Ionosphere : methods of exploring the ionosphere (e.g. cathode ray oscillograph method, an imaginary method. etc)

The cause of aurora, The air glow, The cause of the air glow. (12 Periods, 15 mks)

2) Solar and terrestrial radiation :- The nature of solar radiation, terrestrial radiation, Radiative heating and cooling of the atmosphere, Radiative equilibrium and the stratosphere, The mean annual heat balance.

(8 Periods, 10 mks)

3) Ozone in the atmosphere :- General characteristics of ozone, Measurement of the amount of ozone in the atmosphere, Ozone and weather day to day variations. (6 Periods, 8 mks)

4) Basic measurements in meteorology and space physics, Different parameters to be measured and their ranges, (temperature, density, wind, humidity, rainfall, pressure etc)

(8 Periods, 10 mks)

5) Basic devices and transducers suitable for atmospheric study and their uses platinum resistance thermometer, aneroid barometer, rain gauge, pyranometer, anemometer, photomultiplier, infra-red detector.

Theory of radiosonde and its use in the measurement of meteorological parameters. Theory and use of radio telescope. (6 Periods, 7 wks)

- REFERENCES**
- 1) Introduction to theoretical meteorology - Hoss
 - 2) General climatology - Critchfield.
 - 3) Exploring the atmosphere -- G.M.B. Dobson.
-

NORTH MAHARASHTRA UNIVERSITY, JALGAON

(W.e.f. June, 1993)

S.Y.B.Sc. (physics)

List of experiments

(At least four experiments from each group)

Group I : General Physics, Heat and sound.

- i) Kater's pendulum.
- ii) 'Y' by Koenig's method.
- iii) Log decrement.
- iv) Surface tension by Jaeger's method.
- v) S.T. by fergusson's method.
- vi) Stefan's fourth power law.
- vii) Thermocouple.
- viii) Stroboscope : frquency of A.C and tunnig fork.
- ix) Bottle as a resonater (Neck constant).

Group II : Light

- i) Dispersive power of a prism.
- ii) Double refracting prism.
- iii) Diffraction grating.
- iv) Fresnel's biprism.
- v) Newton's Rings.
- vi) Polarimeter.
- vii) Diffraction at cylindrical obstacle.

Group III : Electricity Magnetism and Modern physics

- i) Carey Foster's Bridge : Low resistance and calibration.
- ii) Earth Inductor : Determination of H,V and dip.
- iii) Measurement of high resistance.
- iv) Verification of circuit theorems.
- v) Mutual inductance by Maxwell's method.
- vi) Comparision of capacities by De Sauty's method.
- vii) I-V characteristics of solar cell.
- viii) Characteristics of photo cell.

Group IV (A) Electronics

- i) Zener regulated power supply.
- ii) Bridge rectifier with filters and study of ripple factor.
- iii) Transistor characteristics Common base, Common emitter.
- iv) Single stage transistor amplifier.
- v) Study of phase shift oscillator.(using transistor)
- vi) Hartley oscillator.

OR

Group IV (B) Instrumentation

- i) Study of multimeter.
- ii) Verification of Bernoullie's equation.
- iii) Measurement of frequency by beat method.
- iv) Measurement of magnetic field by search coil method.
- v) Use of C.R.O. as a tool for measurements.

OR

Group IV (C) : Metereology and space physics.

- i) Determination of absolute humidity by chemical hygrometer.
 - ii) Construction of dew cell and its calibration to measure dew point.
 - iii) Measurement of the rainfall using a tipping bucket rain gauge.
 - iv) Construction of a cup counter anemometer for measurement of wind speed.
 - v) Platinum resistance thermometer.
 - vi) Thermister.
-

JBB/SET1