Maharshi Dayanand University Rohtak

Ordinances, Syllabus and Courses of Reading for

B.A./B.Sc. Part-II (Hons.) Math Examination

Session—1998-99

ORDINANCE : B.A./B.SC./B.COM.(HONOURS). EXAMINATION

1. The Bachelor of Arts(Hons.), the Bachelor of Science (Hons.) and the Bachelor of Commerce (Hons.) Examinations shall be in three parts. Part-I Examination shall be held at the end of the first year Part-II Examination at the end of the second year and Part-III Examination at the end of the third year.

    The Examinations in Part-I,II & III shall be held once a year, ordinarily in the month of April/May, on such dates as may be fixed by the Vice-Chancellor.

    A supplementary Examination for those who are to re-appear in one or more subsidiary or/and qualifying subject in Part-III shall be held ordinarily in the month of September/October of the same year on a date to be fixed by the Vice-Chancellor.

2.(a) No one shall be eligible to join the first year (Part-I) class of B.A./B.Sc./B.Com. (Hons.) Course unless he/she has passed (a) Senior Secondary Certificate (10+2) Examination of Haryana Board of School Education, Bhiwani or (b) B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-I Examination, as the case may be under old scheme of this University; or (c) any other Examination recognised by this University as equivalent to (a) or (b) above, obtaining :-

    i) For ▓▓▓▓▓n to B.A. (Hons.) 50% marks in aggregate or 5▓▓▓▓▓ in the subject of Hons. course.

    ii) For ▓▓▓▓ons.) 60% marks in aggregate and 65% marks ▓▓▓▓ubjects of Hons. Course.

    iii) For B.Com. (Hons.)55% marks in aggregate or 55% marks in the subject of Hons.Course.

b) No one shall be eligible to join the 2nd year (Part-II),class of the B.A./B.Sc./B.Com. (Hons.) course unless he has passed First year (Part-I) Exam.of the B.A./B.Sc./B.Com. (Hons.) under new scheme of this University.

c) No one shall be eligible to join the third year (Part-III), class of the B.A./B.Sc./B.Com. (Hons.) Course of this University, unless he had passed 2nd year (Part-II). Exam. (Hons.) under new scheme of this University.

d) A regular candidate of a Department/College admitted to the privileges of this University in the subject of B.A./B.Sc./B.Com./(Hons.) can attend the course of subsidiary and qualifying subjects in other College/Deptt. in case there is no arrangement to teach these subjects in the College/Deptt. where he has taken admission for his main subjects of Hons. Course. The Principal/Head of the College/Deptt. where a student is attending subsidiary and qualifying subjects shall certify that the said student has completed the prescribed number of lectures etc.

3. The Examination in Part-I/Part-II/Part-III shall be open to person.

A. Who has passed not less than one academic year previously the requisite Examination as laid down in Clause-2 above.

B. i) who has been on the rolls of a University Teaching Deptt./College admitted to the privileges of this University throughout the academic year preceding the
   • Examination.

   ii) Whose name is submitted to the　　　　ar/Controller of Examinations by the　　　　d of ' the Department/Principal of College　　　　last attended provided that the Head of the De　　　ent/Principal of the College certified that the candidate has :

a) attended not less than 75% of the full courses delivered to his class in each subject offered by him and 75% of the periods assigned to practical work in each Science subject.

(Lectures and Practical work shall be counted upto 21 days before the commencement of the Examination).

b) satisfactorily performed the work of his class; and

c) Obtained not less than 25% marks in the aggregate of all the subject(s) paper(s) of the result of half yearly house examination held in November/December with 100 marks in each subject.

4. a) A student who is unable to appear in the Annual Examination due to shortage of attendance and has complied with the requirements of Clause-3 (b) (ii) (c) may be exempted from this requirement when he appears in the Examination in the following year or thereafter, after making up the deficiency in lectures.

   b) A student who has completed the required percentage of Lectures and practicals may be permitted to appear in the Examination in the same year or the following year as an ex-student even if as a regular student he did not comply with the requirements of Clause-3 (b) (ii) (c).

   i) For promotion from B.A./B.Sc./B.Com.(Hons). Part-I to Part-II a candidate shall be required to clear 50% of theory papers atleast one theory papers of the main subject and from part-II to Part-III he shall have to clear atleast 50% of the theory paper of the main subject of Part-I and Part-II taken together. While calculating 50% papers fraction may be ignored. For Example, if the number of papers is 5 the candidate will be required to clear atleast two papers. A student will be considered to have cleared Honours Paper(s) if he obtains atleast 40% marks in that/ those paper(s).

   Provided that a student joining Honours in the 2nd year may be allowed to clear the first year. Honours paper either in second year or in second and third year together.

   ii) For promotion from Part-II to Part-III, a student shall be required to clear all the subsidiary/qualifying subjects of Part-I of the Honours Course even if such a subject is studied in 2nd year in terms of Clause-2 (b) (ii).

5.   a)   A student after passing B.A./B.Sc./B,Com.(Hons.)
            Part-I Examination may be permitted to change over to
            the B.A./B.Sc./B.Com. Part-II Course within one month
            of the stsrt of admission to this course provided that the
            Principal of the College/Head of Department where he
            is studying, is statisfied that the student will be able to
            carry on with the new course.

Provided a student after passing B.Sc./B.Com. (Hons.) Part-I
Examination shall have to a appear in the subject of English of
B.A. Part-I alongwith B.A. Part-II Examination, unless he has
already qualified in this subject.

       b)   A student who joins.B.A. Part-II class may be allowed to
            change one or more of his elective subjects within one
            month of his joining B.A. Part-II Class.

       c)   A candidate apearing in B.A. Part-II Privately may offer
            elective subjects other than taken by him for B.A.
            (Hons.) Part-I Examination.

6.   The amount of admission fee shall be as under :-

Name of Examination	Regular students	Ex-students
1. B.A.(Hons.) I,II &III	100/-	110/-
2. B.Sc.(Hons.) I,II &III	120/-	130/-
3. B.Com.(Hons.) I,II &III	100/-	110/-

Plus Rs.10/- per practical subject for B.A./B.Sc./B.Com.(Pass
& Hons.)

7.   A candidate shall submit his admission application to the
     Registrar/Controller of Examinations on the prescribed form
     with the required certificates signed by the Head of the
     University Teaching Department/Principal of the college, the
     candidate has last attended, both in the case of students of
     University Teaching Departments/College admitted to the
     privileges of the University and ex-student.

8.   i) The medium of instruction shall be:-

    (a) Hindi in case of Hindi

    (b) English in case of English, Physics, Chemistry and Maths;

    (c) English/Hindi or Sanskrit in case of Sanskrit

    (d) English/Hindi in case of other sbjects.

  ii) The question papers will be set:

    (a) in Hindi in case of Hindi

    (b) in English in case of English, Physics, Chemistry and Maths:

    (c) in English and Hindi in case of Sanskrit.

    (d) English/Hindi in case of other subjects.

  iii) The candidates shall write their answers:

    (a) in Hindi in case of Hindi.

    (b) in Hindi or English or Sanskrit in case of Sanskrit.

    (c) in English in case of English, Physics, Chemistry and Mathematics; and

    (d) in English or Hindi in case of other subjects.

9.   The minimum number of marks required to pass shall be as under:-

    i)   Main subject (Honours) 40% marks in the aggregate and 35% in each papers (written and practical separately).

    ii) Qualifying and subsidiary subjects: 35% marks in each for qualifying and subsidiary subjects (written and practical separately)

10.i) A candidate who fails in one or more qualifying/subsidiary subjects(s) may be admitted to the supplementary exam. held in the same year and/or at the next annual Examination in the subjects(s) and if he passes in it he shall be deemed to have passed the examination.

A candidate who fails in one or more paper(s) of main subjects of Hons. Part-I/Part-II may be allowed on the recommendation of the Principal of the college/Head of the Deptt. concerned to appear/re-appear in the Examination in the papers(s) as an ex-student, without attending a fresh course of instructions within the period permissible to him to clear the papers of Hons. Part-III under clause-12.

ii) A candidate who fails in an Examination or having been eligible fails to appear in an Examination, shall take the Examination as an ex-student according to the syllabus prescribed by the University for regular students appearing for the Examination provided that the syllabus for the candidates who are to re-appear in the Supplementary Examination to be held in September shall be the same as was in force for the regular student in the last Annual Examination.

11. A candidate who has completed the prescribed course of instruction in a recognised College/University Department for B.A./B.Sc./B.Com.(Hons.) Part-III Examination but does not appear in it or having appeared fails, may be allowed on the recommendation of the Principal of the College/Head of the University Deptt. concerned, two consecutive chances as an ex-student to appear/re-appear in the subject(s)/paper(s), as·the case may be without attending a fresh course of instruction. While re-appearing in the Examination, the candidate shall be exempted from re-appearing in paper(s) and or practical(s) in which he has obtained atleast 40 marks.

Provided that the candidate who does not pass the B.A./B.Sc./B.Com.(Hons.) Examination with the two consecutive chances as an ex-student, may be awarded B.A./B.Sc./B.Com.(Pass) Degree without division, if he obtains atleast 35% marks in each qualifying/subsidiary subject, theory and practical separately and in each paper of the main(Honours) subject, theory and practical separately. Provided further that if he does not satisfy the conditions for the award of pass Degree without division as mentioned

above, he shall be declared to have failed in the Examination and shall be required to appear in the Examination denove, after attending the College/Department as a regular student.

12. The successful candidates of B.A./B.Sc./B.Com.(Hons.) Examination who obtain 60% marks or more in the aggregate of the main subject shall be placed in the first Division, those who obtain less than 60% marks but not less than 50% marks in the Second Division and those who obtain less than 50% marks in the Third Division. For the purpose of determining division at the end of Honours Part-III Examination the marks obtained by the candidate in the Hons. subject only at the Honours Part-I, Part-II and III Examination shall be taken in to account.

However the marks obtained in qualifying subjects and subsidiary subjects will be shown in the result card.

13. Six weeks after the termination of the Examination or as soon as thereafter as is possible, the Registrar/Controller of Examinations shall publish a list of the candidates who have passed the examination.Each successful candidate of B.A./B.Sc./B.Com.(Hons.) Examination shall received a Degree stating the division he obtains.

14. A candidate:

   i) Who has passed B.A./B.Sc./B.Com.(Hons.) Examination of this University or ;

   ii) Who resides within the territorial jurisdiction of the University and has passed an Examination declared equivalent to the B.A./B.Sc./B.Com.(Hons.) Examination of this University may appear in a subsequent B.A./B.Sc./B.Com. subsidiary Examination in one or more subjects prescribed for the Examination except the subject in which he has passed the Examination.

A candidate appearing under this Clause shall sit for Part-I and Part-II Examination simultaneously and shall pay admission fee of as prescribed for to the whole examination and additional fee of Rs. 10/- per Science subject Provided that if

the candidate is appearing in a Science subject, he shall study in a College admitted to the previleges of this University for both Part-I and Part-II classes for atleast one academic year preceding the Examination.

The minimum percentage of marks required to pass in each subject shall be as given in Clause-9 above.

15. The candidates who have passed the B.A./B.Sc./B.Com.(Hons.) Examination in the second or third division be allowed to re-appear in one or more subject(s) (Theory papers only) of main subjects of the Part-I,II and Part-III Examination for improvement of division.

    The candidates may also be allowed to improve their score of marks upto 45% in the same manner. However for improvement of division from III to II and to I as well as improvement of score of marks upto 45% only one chance shall be allowed.

    Only two consecutive chances will be allowed for improvement. A candidate re-appearing in one or more subject(s)/paper(s) for the purpose of passing/improvement of division shall pay fee as for the whole examination.

    The higher score in the paper(s)/subject(s) in which he re-appears for improvement will be taken into account towards the final result and the marks already obtained by the candidate in the paper(s)/subject(s) in which he has not opted to improve his result shall be carried forwarded. In case the candidate does not improve the division his result shall be declared as, Previous Result Stands.

16. Notwithstanding the integrated nature of this course which spread over than one academic year, the Ordinance in force at the time a student join the course shall hold good only for the Examination held during or at the end of the academic year and nothing in this Ordinance shall be deemed to debar the University, from amending the Ordinance and the amended Ordinance, if any shall apply to all students, whether old or new.

SCHEME OF EXAMINATIONS OF B.A./B.Sc. (HONS.) IN MATHEMATICS PART -II

MAIN PAPERS

		Max. Marks	Time
Paper-III	Analysis-I	100	3 Hours
Paper-IV	Algebra-I	100	3 Hours

Subsidiary Papers
Any two of the following :-

1.	Physics	Theory	2 Papers
		Practical	1 Paper
2.	Chemistry	Theory	3 Papers
		Practical	1 Paper
* 3.	Statistics	Theory	2 Papers
		Practical	1 Paper
** 4.	Geology	Theory	2 Papers
		Practical	1 Paper
** 5.	Electronics	Theory	2 Papers
		Practical	1 Paper

Note : 1. There will be two subsidiary subjects alongwith the papers of the main subject in Part-I & Part-II and in Part-III there will be only main subject.

2. The students will offer only those Subsidiary Subjects in Part-II which they have studied in Part-I.

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* The syllabi will be the same as that of prescribed for B.Sc. (Pass) Part-II examination.

** The syllabi will be prescribed later on.

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Syllabus of B.A./B.Sc.(Hons.) Mathematics (Part-II) 1998-99

Paper-III   **Analysis-I**   Max. Marks : 100
                                            Time : 3 Hours

Unit-I (Two Questions)

Bounded sets, Suprema and Infima in the set of real numbers, order completeness in the set of real numbers, limit point of a set, Bolzano-Weirstrass Theorem. Countability of sets. Sequences of real numbers and their convergence. Cauchy sequences, Cauchy general principle of convergence. Monotone sequences. Limit superior and limit inferior of sequences.

Unit-II (Two Questions)

Infinite series and their convergence. Tests for convergence of an infinite series of positive terms. Leibnitz test for the convergence of alternating series. Absolute convergence and re-arrangement of series. Reimann's Theorem for non-absolutely convergent series. Cauchy Theorem, Merten's Theorem and Abel's Theorem concerning the convergence of the product of two series.

Unit-III (Two Questions)

Properties of continuous functions, Uniform continuity. Condition for the equivalence of the notions of continuity and uniform continuity. Discontinuous functions, type of discontinuity. Discontinuity of monotonic functions. Continuity of functions of two or three variables.

Unit-IV (Two Questions)

Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's form of remainder. Taylor's and Maclaurin's series of elementary functions. Indeterminate forms Differentiability of functions of several variables. Existence of partial derivatives and their relation with differentiability.

Unit-V (Two Questions)

Young's and Schwart's, theorems concerning the equality of f_{xy} and f_{yx}. Implicit functions and existence theorem. Taylor's theorem. Maxima and minima for functions of several variables, Lagrange's method of undertermined multipliers.

Note : The examiner is requested to set 10 questions as indicated in the syllabus. The candidate will be asked to attempt five questions selecting one question from each unit.

Paper-IV   Algebra-I   Max. Marks : 100

                                                        Time : 3 Hours

Unit-I (Two Questions)

Semigroups, groups, different characterizations of groups. Subgroups, Lagrange's Theorem. Cyclic groups.

Unit-II (Two Questions)

Normal subgroups. Quotient groups, Homorphism and Isomorphism theorems. Permutation groups and Cayley's Theorem. Even and odd permutations and A_n.

Unit-III (Two Questions)

Rings, subrings, ideals, quotient Rings, Integral domains.

Unit-IV (Two Questions)

Division Rings, Fields, Subfield, Characteristic of a field, Homorphism and Isomorphism Theorems. Imbedding of a ring without unity in a ring with unity.

Unit-V (Two Questions)

Vector Spaces, subspaces, bases and dimension, linear transformations. Algebra of linear transformations. Matrices and linear transformations, Rank and nullity of linear transformations.

Note : The examiner is requested to set 10 questions as indicated in the syllabus. The candidate will be asked to attempt five questions selecting one question from each unit.

Paper-V   Differential Equation and Mechanics-I

Max. Marks : 100
Time : 3 Hours

Unit-I (Two Questions)

Triple products. Differentiation and integration of a vector function on an interval. Differentiation of a product of two vectors Gradient divergence and curl of a vector. Moments of a (Localised) vector about a point, Scalar moment of a vector about a directed line.

Differential Equations. First order differential equations. Second order differential equations with constant and variable coefficient. Homogeneous linear differential equations. Systems of linear differential equations.

Unit-II (Two Questions)

Basic concepts of mechanics. Basic laws of mechanics. Inertial frames of reference. Work and Energy. Principles of Linear momentum, angular momentum and energy for a particle. Conservation field and potential energy. Principle of conservation of energy for a particle.

Rectilinear motion: Uniformly accelerated motion (including connected system). Resisted motion. Harmonic Oscillator. Damped and forced vibrations, elastic springs and strings. Hookes law. Vertical and Horizontal vibrations of a particle attached to an elastic string.

Unit-III (Two Questions)

Motion in a plane: Components of velocity and acceleration: Cartesian, radial and transverse; tangential and normal. Projectile motion in a non-resisting medium. Constrained motion in a horizontal circle, conical pendulum. Constrained motion on a smooth vertical circle. Simple pendulum motion of a particle under a central force. Differential equation of a central orbit in both reciprocal polar and pedal co-ordinates, Newton's law of gravitation and planetary orbits. Kepler's laws of motion deduced from Newton's law of gravitation and vice-versa.

Unit-IV (Two Questions)

Coplanar force systems. Necessary and sufficient condition for equilibrium of a particle. Triangle law of forces, polygon law of forces and Lami's theorem.

Moment of a force about a line. Varignon's theorem for concurrent force systems. Necessary condition for a system of particles to be in equilibrium.

Equipollent force system-definition. Couples, moment of couple, equipollence of two couples. Reduction of a general plane force system. Parallel force systems. Centre of gravity formulae, use of symmetry and standard results (statements only). Principle of virtual work for a system of particles.

Unit-V (Two Questions)

Motion of a system of particles in a plane. Motion of the mass centre and motion relative to the mass centre. Principles of linear momentum, angular momentum and energy for a system, Two body problem.

Infinitesimal displacement of a plane lamina. Necessary and sufficient conditions for equilibrium of a rigid body movable parallel to a fixed plane. Problems on equilibrium under forces including friction (excluding indeterminate cases) Stable equilibrium, Energy test of stability (problems involving one variable only).

Note :The examiner is requested to set 10 questions as indicated in the syllabus. The candidate will be asked to attempt five questions selecting one question from each unit.

(Hons.) Subsidiary Subjects Part-II Chemistry

Part-II   At the end of second year

		Duration Hrs.	Marks
Paper-IV	Inorganic	3	33
Paper-V	Physical	3	33
Paper-VI	Organic	3	34
Practical Test		6	50

Note :   10% of the marks in the Practical shall be reserved for the class record of the candidate. 10 marks for viva-voce.

B.Sc. (Hons.) (Subsidiary Subjects) Part-II Examination

Paper-IV **Inorganic** Max. Marks : 33

Time : 3 Hours

1. **Acids and Bases :** Elementary idea of Bronsted-Lowry and Lewis concept of acids and bases (proto-donor acceptor and electrondonor acceptor systems) Relative strengths of Lewis acids-bases and the effect of substituents and the solvent on them.

2. **General properties of 3rd elements & coordination compounds :** Molecular compounds, werners coordination theory IUPAC system of nomenclature of coordination compounds. Discussion of outer and inner orbit-complexes. Role of tracer elements (N, K, Mg, Ca, Mo, Fe, Co, Cu, Mn, Cr, P, S, Cl and I) in biological systems.

3. General trends in the chemistry of p-block elements. Preparation, properties, uses and structures of the following compounds. Tin chlorides, hydrazine, hydroxylaming and azides, oxides, oxyacids and halides of phosphorus, tartaremetic, hydrogen sulphide (analytical applications), oxides and oxyacids of sulphur, sulphyryl chloride and thionyl chloride, oxy acids of chlorine.

Paper-V **Physical** Max. Marks : 33

Time : 3 Hours

1. **Liquids :** Vapour pressure, variation of vapour pressure of liquids with temperature (Clausicus-Claperon Equation). Surface tensions viscosity, their experimental determination and applications. Parachor, Rheochor and their applications.

2. **Solutions :** Henery's Law, Raoult's Law, critical solutions temperatures, fractional distillation and steam distillation

osmosis and measurement of osmotic pressure, Effect of solutes on boiling points and freezing points of solutions, Calculation of morecular weights. Abnormal Molecular weight.

3. **Heterogenous equilibria:** Phase rule, phase diagrams of water and sulphur system. Nernst's distribution law, solvent extraction.

4. **Chemical Thermodynamics :** Energy, work, Heat capacity. The first law of Thermodynamic, heat of a reaction at constant pressure and constant volume. Hess's law, Kirchoff's Equation. The second Law of Termodynamics. Entropy(s) Determination of entropy changes for reversible transition process. Free Energy(G), Free energy change and Chemical equillibrium.

5. **Electrochemistry :** Galvanic cells, standard electrode potential types of electrodes, measurement of pH . Photochemistry: Lambert-Bear's Law: Law of photochemistry equivalence: quantum efficiency, High and low quantum yields reasons for high and low quantum yields. Photo electric cell. Phosphorescence and fluorescence.

Paper-VI   Organic   Max. Marks : 34

Time : 3 Hours

Carbohydrates : Classification, properties and uses. Preparation of cane sugar, constitution of glucose and fructose, mutarotatic General study of: Cycloalkanes, arenes, halogen substituted aromatic compounds. Simple phenols, nitro and amino compounds aldehydes and ketones, phenolic aldehydes and ketones carboxylic acids (mono and di); Electrophilic substituion; Orientation in aromatic compounds.

Descriptive study of benzene, toluene, cholorobenzene, sulphonic acid, sulphanilic acid, phthalic acid and salicyclic acid. Napthalene preparation, structure and synethesis, preparation of a naphthol & naphthylamines. Preparation of di & tri hydroxophenol constitution of pyridines and quinoline.

Practical Test   Inorganic   Max. Marks : 50
                                            Time : 6 Hours

(a) Qualitative analysis of inorganic mixtures, containing not more than four ionic species (excluding insoluble substances out of the following) :

Pb^{2+}, Hg^{2+}, Ha^{2+}, Ag^{1+}, Bi^{3+}, Cu^{2+}, Cd^{2+}, As^{3+}, Sb^{3+}, Sn^{2+}, Sn^{4+}, Fe^{2+}, Fe^{3+}, Cr^{3+}, Al^{3+}, Co^{2+}, Nc^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}, N_{H4}^{1+}, K^{1+}, Co_3^{2-}, S^{2-}, SO_3^{2-}, $S_2O_3^{2-}$, NO_2^{1-}, CH_3COO^{1-}, F^{1-}, Cl^{1-}, Br^{1-}, I^{1-}, NO_3^{1-}, SO_4^{2-}, $C_2O_4^{2-}$, PO_4^{3-}, BO_3^{3-}.

(b) Bravimatric estimation of barium and SO_4^{2-} as $BaSO_4$, iron as Fe_2O_3 and Copper as $CuCNS$.

Organic

(a) Purification of Organic Compounds by crystalization (from water or alcohal) and distillation.

(b) Detection of functional groups in mono-functional organic compounds.

B.Sc. Physics (Subsidiary) Part-II

		Duration Hrs.	Marks
Paper-III	Waves and Oscillation	3	50
Paper-IV	Electromagnetism & Atomic Physics	3	50
Paper-V	Practical Test	5	50

Note :20% of the marks shall be reserved for the Laboratory records of the candidates.

Syllabus & Courses of Readings

Paper-III   **Waves and Oscillations**   Max. Marks : 50
                                            Time : 3 Hours

Free, damped and Forced vibration and resonance. Nature and equation of wave motion.

Principle of superposition. Formation of standing waves in air columns and stretched strings. Superposition of two travelling waves and beat phenomenon. Doppler effect.

Fermat's principle and its application.

Refraction at spherical surfaces deduction of lens maker's formula. Coaxial system of two thin penses separated by a distance cardinal points. Defects of image-chromatic and spherical abberations Achromatic combination of lenses and prisms. Direct vision spectroscope. Sextant Eye-pieces (Ramsden and Huyghens).

Interference of two beams. Division of amplitude and division of wave front. Double slit, Bi-prism, Colour of thin films. Newton's rings. Michelson's interfermometer.

Presnel class of diffraction. Half period of zones, zone plate; rectilinear propagation of light, Diffraction at a straight edge, slit and wire. Faunhofer class of diffraction. Expression for intensity due to a single slit plane transmission grating. Rayleigh cirterion for the resolving power. R.P. of telescope microscope and eye, resolving power of a grating. Double refraction. Polarisation Huyghen's construction of wave front. Quarter and half-wave plates. Analysis of polarised light Polarimetry.

Paper-IV   Electromagnetism & Atomic Physics

Max. Marks : 50
Time : 3 Hours

Electrostance

Coulomb's law, Gauss's theorem and its application. Force on the surface of charged conductor. Energy per unit volume of the medium.

Current Electricity

Magnetic field due to current. Ampere law, Field due to straight and circular current and due to a solenoid. Equivalence of a magnetic shall with a current circuit. Moving coil ballistic galvanometer.

Kirchhoff's laws and their applications in simple cases; Wheatstone's Bridge and its sensitivity. Carey Foster's bridge Crompton potentiometer.

Self and mutual inductance and their measurement. Calculation of L for a solenoid. Growth and decay of current in a circuit containing L, C. and R.

Hysteresis : B.H. Curve by ring method. Alternating current. A.C. circuits containing L.C. and R. Tuned circuits (parallel and series_. Rotating magnetic field and induction motor. Electromagnetic waves. Hert's experiment. Diode valve, Rectifier. Triode valve as detector, amplifier and oscillator.

Atomic Physics :

Measurement of and by Millikan's method e/m of position rays by Parabole method Isotops and isobars. Cathode ray oscillograph.

Diffraction of X-rays. Bragg's law. Determination of X-ray wave length. Radioactivity Law of decay and growth. Half life and average life. Large angle scattering of a particles and Rutherford model of an atom Nuclear model of the atom. Bohr's theory of hydrogen spectra, photoelectric effect. Determination of planck's constant. Wave theory of matter.

| **Paper-V** | **Practical** | Max. Marks : 50 |
| | **List of Experiment** | Time : 5 Hours |

1. Rigidity of a Wire-Max-well's needle.

2. Young's modulus of a wire Searle's Apparatus by Optical lever.

3. Determination of Elastic constants by Searle's app.

4. 'Y' by bending using (i) microscope (ii) optical lever.

5. Viscosity of water.

6. Refractive index of prism using spectrometer.

7. Wavelength of sodium light by diffraction grating.

8. Wavelength of sodium light by Newton's ring.

9. Specific rotation using Polarimeter.

10. Resolving power and Dispersive power of a prism using mercury light.

11. Low resistance by (i) Carey Foster Bridge.

12. Characteristic Curves for a Triode valve.

13. To draw a graphy between temperature and thermo emf. Using a potentiometer.

14. Study of ballistic galvanometer charge senstivity and C.D.R.

15. Transistor characteristics.

16. Melde's Experiment.