DAYALBAGH EDUCATIONAL INSTITUTE
(Deemed to be University)

SYLLABUS FOR
ADMISSION TEST

2022-2023

(This cancels all previous issues)

DAYALBAGH, AGRA – 282 005

CONTENTS

STRUCTURE OF WRITTEN OBJECTIVE TEST

- Each question in objective test will require about 60 seconds for answering.
- Duration of Test for All Courses: Two hours, except for

Level of questions for B.A. in (Arts/Fine Arts (B.F.A.), B.Sc. (Home Science), B.A. (Social Science), B.A. Social Science (Human Service Management), B.Com in Accounting (TDP), B.Com., B.Sc. B.Sc (Cognitive Science), B.B.A., B.B.A. (Logistics), B.B.A. (Retail), B.Voc. Courses will be of Intermediate examination. However (i) Quantitative Ability for entrance test of B. Com., B.Com. Accounting (TDP), B.B.A., B.B.A. (Logistics), B.B.A. (Retail), B.Voc. in Dairy Technology, Water Sanitation & Waste Management, Agricultural Technology, Internet of Things, Automobile, Renewable Energy, Banking and Finance, AI & Robotics, Digital Manufacturing, Telematics, Greenhouse Technology, Accounting and Taxation, Telecommunications, Management and Manufacture of Homeopathic Drugs, Management and Manufacture of Ayurvedic Drugs will be of Level B (High school mathematics), whereas Quantative Ability for Entrance Test of B.Voc.in Apparel Design, Textile, Food Processing & Preservation, Pottery and Ceramic Design, Commercial Arts, Tourism and Hospitality, Bamboo and wood Technology, Recycled craft Design and Certificate Programmes will be of Level C (VIII Class mathematics)

- (ii) General Science paper for entrance test of B.Sc. (Home Science) will be of High School level.
- Level of questions for B.Tech. (Part-time) Electrical will be same as the Common Syllabus for all programs except mathematics.
- Level of questions for B.Ed. Section B & D will be upto secondary level and for M.Ed. course it will be of B.Ed. level.
- Level of questions for M.B.A. (Agriculture/Business Management/General Management/ Innovation/M.A. Soc. SC. (Bus. MGMT), M.Tech. M.Voc. PGDCSA, PGDJMC, PGDBD, PGDBE, and PGDTDP courses will be up to Graduate (10+2+3) examination.

STRUCTURE OF WRITTEN OBJECTIVE TEST FOR DIPLOMA IN ENGINEERING AND POLYTECHNICS

- Each question will require about 60 seconds for answering.
- Duration of test for the Diploma in Engineering (Group 'A") will be of two hours and for Diploma in Polytechnics (Group 'B', 'C', 'D'), duration of test will be of One hour and thirty minutes.
- Level of questions for all courses shall be High School examination, except the Diploma in Polytechnics (Modern Office Management & Secretarial Practice), for which level of questions shall be of Intermediate examination.

SUBJECT COMBINATION FOR DIFFERENT COURSES

- **Group 'A': Diploma in Engineering - Automobile, Electrical, Electronics, Mechanical, Civil, Architecture Assistantship and Vocational Diploma in Automobile/IT, Vocational Diploma in IT, Leather Footwear Technology (CASD).**

  The test paper shall have four sections, all compulsory, on Mathematics, Physics, Chemistry, and General Knowledge & Current Affairs.

- **Group'B': Diploma in Polytechnics - Interior Designing & Decoration, Textile Designing.**
  The test paper shall have questions, all compulsory, on General Science and General Knowledge & Current Affairs.

- **Group 'C': Diploma in Polytechnics - Garment Technology.**

  The test paper shall have questions on Home Science, Garment Technology and on General Knowledge & Current Affairs.

- **Group 'D': Diploma in Polytechnics - Modern Office Management & Secretarial Practice.**

  The test paper shall have three sections on Hindi, English, and General Knowledge & Current Affairs.

- **Certificate:** The Online Test will be of One hour duration. The Question Paper will consists of 60 questions from Science, Mathematics, Social Studies and General Knowledge & Current Affairs.

SUBJECT COMBINATION FOR DIFFERENT COURSES

(1) **(I) B.A. (Arts./Hons./B.A. (Social Science) Hons.:** B.A. & B.A. (Social Science) Online Test paper will have questions each on the following fifteen subjects: Hindi, English, Home Science, Music (Sitar/Vocal), Music (Tabla), Sanskrit, Economics, Political Science, Psychology, Sociology, Physics, Mathematics, Zoology and General Science (High School level) besides one compulsory section on General Knowledge & Current Affairs. A candidate will be required to answer questions of any four subjects including the compulsory section depending on the major subjects they intend to take for their B.A./B.A. (Social Science) programme, in accordance with the grouping as mentioned in the prospectus. Candidates intending to take Drawing & Painting as one of the major subjects, will answer questions of any three subjects in their OMR Sheet (answer-sheet), whereas regarding assessment for the fourth subject of Drawing & Painting, they will take a practical test in continuation to the Online Test. The duration of Online Test will remain same for all.

(II) B.A. Social Sciences (Specialization in Cognitive Science): Subject option for Online Test (for Students from Humanities) The test paper will have questions from the following Subjects: Hindi, English, Home Science, Music (Sitar/Tabla/Vocal), Sanskrit, Economics, Political Science, Psychology, Sociology, Maths besides one compulsory section on General Knowledge & Current Affaris. A candidate will be required to answer questions on any four subjects including the compulsory section depending on the major subjects they intend to take in the Under Graduation Programme in accordance with the grouping as mentioned in the Prospectus.

Or

Subject Option for Online Test: (for students from Science) Besides one compulsory paper on General Knowledge & Current Affairs, the test shall have questions on Botany, Chemistry, Mathematics, Physics, Zology, Economics and Psychology. Out of the seven subjects, the candidates will attempt any three subjects depending on the subjects they are likely to offer as major and Faculty Ancillary Courses in accordance with the grouping as mentioned in the Prospectus.

Or

Subject Option for Online Test: (for students from Commerce) Four compulsory sections each having 30 questions

a. Book Keeping and Accountancy
b. Business Organization
c. Economics/Banking/Commercial Mathematics/High School level Mathematics
d. General Knowledge and Current Affairs

(The standard of the Online Test will be of intermediate level.)

(III) B.A. Social Sciences (Human Service Management): The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs, (ii) English

Language, Expression and Comprehension, (iii) Logic & Reasoning, (iv) Quantitative Ability (Level B).

(IV) B.Com in Accounting (TDP): The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs, (ii) English Language, Expression and Comprehension, (iii) Logic & Reasoning, (iv) Quantitative Ability (Level B).

(2) B.A. (Fine Arts): The test paper shall have the following four sections all of which are compulsory: (i) General Knowledge and Current Affairs, (ii) English Grammar/ Hindi Grammar, (iii) Object Drawing: With light and shade showing background and foreground in pencil on 1/2 imperial size paper, (iv) Any one Composition from memory related to Applied Art, Painting and Sculpture (Modelling from memory in clay).

(3) B.Sc. (Home Science) Hons.: The student shall answer questions in the following subjects depending on stream from which they have passed the Intermediate examination as under:

Arts students (with Home Science)	1. General knowledge 2. English / Hindi / Sanskrit 3. Home Science 4. General Science (High School level)
Science Students	1. General Knowledge 2. English / Hindi / Sanskrit 3. Biology / Mathematics 4. Physics / Chemistry.

(4) B.B.A. Hons./B.B.A Logistics/Retail: The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs (ii) English Language, Expression and Comprehension (iii) Logic & Reasoning (iv) Quantitative Ability (Level B).

(5) B.Com. Hons./B.Com in Corporate Accounting & Law: The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs (ii) English Language, Expression and Comprehension (iii) Logic & Reasoning (iv) Quantitative Ability (Level B).

(6) B.Sc. (Hons)/ B.Sc. (Hons.) Applied Botany Science: Besides one compulsory paper on General Knowledge & Current Affairs, the test shall have seven subjects, all having equal marks on Botany, Chemistry, Mathematics, Physics, Zoology, Economics and Psychology. Out of the seven subjects, the candidates will attempt any three subjects depending on the subjects they are likely to offer as major and faculty half courses in accordance with grouping as mentioned in the Prospectus.

(I) B.Sc (Cognitive Science): The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs (ii) English Language, Expression and Comprehension (iii) Logic & Reasoning (iv) Quantitative Ability (Level B).

(7) (I) B.Voc. - Dairy Technology/Water Sanitation & Waste Management/Agricultural Technology/Internet of Things/Automobile/Renewable Energy/Banking and Finance/AI and Robotics/DigitalManufacturing/Telematics/Greenhouse Technology/Accounting and Taxation/Telecommunications/Management and Manufacture of Homeopathic Drugs/Managment and Manufacture of Ayurvedic Drugs

The test paper shall for B.Voc. Programmes in Dairy Technology, Water, Sanitation & Waste Management, Agricultural Technology, Internet of Things, Automobile and Renewable Energy, Banking & Finance, AI and Robotics, Digital Manufacturing, Telematics, Greenhouse Technology, Accounting and Taxation, Telecommunication, Management and Manufacture of

Homeopathic Drugs, Managment and Manufacture of Ayurvedic Drugs will be common and following four subjects all compulsory (i) General Knowledge and Current Affairs, (ii) Hindi & English Grammar (iii) Logic & Reasoning (iv) Quantitative Ability ***(Level-B: High School Mathematics)***.

(II) B.Voc. - Apparel Design/ Textile/Food Processing & Preservation/ Pottery and Ceramic Design/Commercial Arts/Tourism and Hospitality/Bamboo & Wood Technology/Recycled Craft Design

The test paper shall for B.Voc. Programmes in Apparel Design, Food Processing & Preservation, Textile, Pottery & ceramic Design, Commercial Arts and Tourism & Hospitality will be common and following four subjects all compulsory (i) General Knowledge and Current Affairs, (ii) Hindi & English Grammar (iii) Logic & Reasoning (iv) Quantitative Ability ***(Level-C: VIII Class Mathematics*)**.

(8) **B.Tech. (Part-time) Electrical**: The test paper shall have the following four sections all of which are compulsory: (i) General Knowledge and Current Affairs, (ii) Logical & Quantitative Ability, (iii) Mathematics and (iv) Basic Electrical Engineering. The topics in Mathematics include Matrices, Differential & Integral Calculus, Vector Analysis & Vector Calculus, Ordinary & Partial Differential Equations and Statistics. The topics of Basic Electrical Engineering are Basic Circuit Analysis, AC Circuits, Magnetic Circuits & Transformers, Electrical Machines and Electrical Measurements.

(9) BHMS: Through NEET conducted by CBSE Board.

(10) **B.Ed.**: The written entrance test will be of two hours duration. It will consist of four Sections A, B, C and D of Multiple Choice Questions.

Section A:	General Knowledge & Current Affairs
Section B:	Language Proficiency (Hindi & English)
Section C:	Teaching Aptitude
Section D:	Subject Knowledge in Science, Social Sciences and Mathematics up to secondary level

(11) **Post-Graduate Diplomas & M.B.A.**: Online Test will have duration of 2 hours having questions which will judge the aptitude, analytical and comprehension ability besides critical thinking of the candidates regarding subject concerned. Additionally, there will be compulsory section which will include questions on general awareness (General Knowledge, Indian Culture, Indian Agriculture, etc.). For admission to PGDFM and PGDTDP courses, a practical test will be conducted in lieu of the Online Test.

(12) **Post-Graduate Degrees (excluding M.B.A.)**: Online Test will be of 2 hours duration having questions on the subject concerned of degree level, additionally, there will be a compulsory section which will include questions on general awareness (General Knowledge, Indian Culture, Indian Agriculture, etc.). In the subjects of performing arts, like, Music and Drawing & Painting, a practical test will be conducted in lieu of the Online Test.

(13) **M.Voc. Online Test:** The Test Paper will be of two hour duration and will have questions that will be of the level of B.Voc. or NSQF level 7 on the subject concerned. Questions will include topics on Food Processing/Apparel Design/Textile/Automobile/Renewable Energy/Dairy Technology. Candidates have to select any one paper from these subjects besides one compulsory paper on General Knowledge and Current affairs.

(14) **M.Ed.**: The Online Test will be of two hours having multiple choice of questions of theory papers of the standard of B.Ed. or equivalent examination.

- School Management
- History and Perspectives of Modern Indian Education
- Pedagogy and Technology for Teaching-Learning
- Foundations of Teaching and Learning

(15) M.Tech.: Syllabus for M.Tech. Online Test will comprise three Sections: (i) General Knowledge & Current Affairs, (ii) Logic & Reasoning, and (iii) Mathematics.

All the questions will be of multiple-choice in nature.

NOTE

Using the Answer Sheet: Candidates have to be careful while using the answer sheets of entrance test. They have to follow the instructions announced in the examination centre/room. It is their own responsibility to make sure that they use the right answer sheet for each test. The supervisor will not be in a position to allow use of fresh answer sheets.
At the conclusion of the test, candidates will be required to return both the test booklet and the answer sheets to the supervisor.
Test Centre Procedure: All candidates are required to reach the test centre 30 minutes before the scheduled time. Everyone is required to possess own pen, pencil, calculator, ruler, sketch pens, poster colours, water container, brushes, etc. Candidates will not be allowed to exchange and/or borrow test/writing material during the examination of entrance-test.

SYLLABUS (HIGH SCHOOL LEVEL)

GENERAL SCIENCE

Unit 1: PHYSICS

1.1 Newton's Law of Motion.
1.2 Work, Power and Energy.
1.3 Thermal Expansion of Solids & Liquids.
1.4 Structure of the Human Eye.
1.5 Thermal Radiation.

Unit 2: CHEMISTRY

2.1 Matter and its states.
2.2 Soap and Saponification.
2.3 Chemical Bonds.
2.4 Metals and Non-Metals-Acids, Bases and Salts.
2.5 Introduction to some important organic and inorganic compounds.

Unit 3: BOTANY

3.1 Structure of Cell, Animal & Plant tissues.
3.2 Classification of Vegetation.
3.3 Reproduction in Plants & Animals.
3.4 Absorption and Movements of Fluid in Plants.
3.5 Respiration in Plants.

Unit 4: ZOOLOGY

4.1 Blood and Lymph
4.2 Respiratory System
4.3 Nervous System and Sense Organs
4.4 Reproductive System

4.5 Excretion.

Unit 5: HEALTH AND HYGIENE

5.1 Tobacco, Alcohol and Narcotic Drugs.

5.2 Environmental Pollution.

5.3 General Knowledge about communicable diseases and diseases spread through air.

5.4 Diseases spread through water and food.

5.5 Non communicable diseases.

रसायन विज्ञान

यूनिट 1:

1.1 द्रव्य–रूप, प्रकृति और व्यवहार, पदार्थ के प्रकार, तत्व एवं उसका वर्गीकरण (धातु, अधातु), यौगिक और उनके मिश्रण, पदार्थ की संरचना, परमाणवीय सिद्धान्त।

1.2 अणु और परमाणु, परमाणु संरचना, इलेक्ट्रान, प्रोटॉन, न्यूट्रान, नाभिक की संरचना।

1.3 परमाणु संख्या और द्रव्यमान संख्या, समस्थानिक तथा समभारिक तत्व।

1.4 परमाणु तथा अणु का द्रव्यमान– मोल की संकल्पना, यौगिक संरचना की प्रतिषतता।

1.5 रासायनिक अभिक्रियायें–भौतिक तथा रासायनिक परिवर्तन, उनमें भेद, योगात्मक, विस्थापन, वियोजन, अपघटन अभिक्रियायें, आक्सीकरण अपचयन अभिक्रिया ।

यूनिट 2:

2.1 मन्द तथा तीव्र अभिक्रियायें, उत्प्रेरित, ऊश्माक्षेपी और ऊश्माषोशी अभिक्रियायें।

2.2 रासायनिक समीकरण तथा उनका संतुलन।

2.3 रासायनिक आबंद्ध–आयनिक और सहसंयोजी आबंद्ध की उत्पत्ति।

2.4 इलेक्ट्रोवैलेन्ट, सहसंयोजी यौगिकों के प्रगुण।

2.5 विद्युत रासायनिक श्रेणी–विद्युत रासायनिक श्रेणी के आधार पर धातुओं की सक्रियता।

यूनिट 3:

3.1 अम्ल, क्षार, लवण– अम्ल तथा क्षार की अभिधारणा H3O+, OH. के आधार पर, सूचक, pH पैमाना, अम्ल तथा क्षार के रासायनिक गुण, उदासीनीकरण क्रिया, लवण तथा लवणों के प्रकार, सामान्य, अम्लीय, क्षारीय, मिश्रित, द्विक, संकर लवण।

3.2 रासायनिक संयोग के नियम।

3.3 ऑक्सीकरण तथा अपचयन।

3.4 औद्योगिक रासायन–साबुन, साबुनीकरण, साबुन की स्वच्छीकारक क्रिया।

3.5 रसायन की भाशा–प्रतीक, संयोजकता, रासायनिक सूत्र, तत्व का तुल्यांकी भार।

यूनिट 4:

4.1 आयन और परमाणु में अन्तर, आयन की संयोजकता, रासायनिक सूत्र एवं उसकी उपादेयता।

4.2 कार्बनिक रसायन–कार्बनिक रसायन का परिचय, परिभाशा और कार्बनिक रसायन का क्षेत्र, कार्बनिक तथा अकार्बनिक यौगिकों में अन्तर, कार्बन परमाणु की समचतुश्फलकीय प्रकृति का प्रारम्भिक ज्ञान।

4.3 कार्बनिक यौगिकों का वर्गीकरण, एलिफैटिक तथा एरोमेटिक, संतृप्त हाईड्रोकार्बन (मीथेन और ईथेन)।

4.4 असंतृप्त हाईड्रोकार्बन (एथिलीन और एसीटीलीन) बनाने की विधियाँ, गुण तथा उपयोग।

4.5 पेट्रोलियम–पेट्रोलियम की उत्पत्ति, पेट्रोलियम का षोधन।

यूनिट 5:

5.1 SO_2 तथा NH_3 गैसें बनाने की विधि तथा रासायनिक गुण।

5.2 कुछ प्रमुख रासायनिक यौगिकों का परिचय–रासायनिक नाम, अणुसूत्र, प्रमुख गुण तथा उपयोग, धावन सोडा, खाने वाला सोडा, नौसादर, फिटकरी, ब्लीचिंग पाउडर।

5.3 धातु कर्म का परिचय– कॉपर (ताँबा) का धातु कर्म।

5.4 तत्वों का वर्गीकरण–मेण्डलीफ की आवर्त सारणी के सामान्य लक्षण।

5.5 रेडियोधर्मिता–परिचय, रेडियोधर्मी किरणों के गुण, रेडियोधर्मी समस्थानिक तथा उनके अनुप्रयोग।

CHEMISTRY

Unit 1:

1.1 Matter: Nature and behaviour, types of matter, elements and their classification (metal & non-metal), compounds and mixture, composition of matter, Atomic theory.

1.2 Molecules and atom – structure of atom: electron, proton, neutron, structure of nucleus.

1.3 Atomic number and mass number. Isotopes and isobars.

1.4 Mass of atoms and molecules, Concept of mole, percentage composition of compounds.

1.5 Chemical reaction- physical and chemical changes, their differences. Addition, displacement, dissociation, decomposition and oxidation-reduction reactions.

Unit 2:

2.1 Slow & fast reaction, catalytic, endothermic & exothermic reaction.

2.2 Balancing of chemical equation, chemical equation.

2.3 Chemical Bonds – origin of ionic and covalent bond.

2.4 Properties of electrovalent and covalent compounds.

2.5 Electrochemical series. Activity of metals on the basis of electro chemical series.

Unit 3:

3.1 Acid, Base and Salt. Concept of Acid and Base on the basis of (H3O+, OH-) ions. Indicators, pH scale, Chemical properties of Acid and Base, Neutralization reaction. Salt and type of salts-Normal, Acidic, Basic, Mixed, Double, Complex salt.

3.2 Laws of chemical combination.

3.3 Oxidation & Reduction.

3.4 Industrial chemistry – Soap, Saponification, cleansing action of soap.

3.5 Language of chemistry, symbols, valency, chemical formula, equivalent weight.

Unit 4:

4.1 Difference between ion and atom, valency of ion, chemical formula and its uses.

4.2 Organic chemistry- introduction to organic chemistry, definition and field of organic chemistry. Difference between organic and inorganic compounds, regular tetrahedral nature of carbon atom.

4.3 Classification of organic compound, aliphatic and aromatic compound, saturated hydrocarbons (methane and ethane).

4.4 Unsaturated hydrocarbons (ethylene and acetylene) methods of preparation, properties and uses.

4.5 Petroleum, origin of Petroleum, Refining of Petroleum.

Unit 5:

5.1 SO_2 and NH_3 gases. Method of preparation and chemical properties.

5.2 Introduction to some important chemical compounds, chemical name, molecular formula, important properties and uses- washing soda, baking soda, salt ammoniac, alum, bleaching powder.

5.3 Introduction to Metallurgy- Metallurgy of Copper.

5.4 Classification of Elements- General characteristics of Mendeleev's Periodic Table.

5.5 Radioactivity- Introduction, characteristics of radioactive rays, radioactive isotopes & their uses.

भौतिक विज्ञान

यूनिट 1:

1.1 मापन–मूल मात्रक, मूल राशियाँ, मूल मात्रकों की एस0आई0 प्रणाली, मानक मीटर, मानक क्रिग्रा, मानक सेकण्ड, माइक्रॉन आंगस्ट्राम तथा प्रकाश वर्ष, व्युत्पन्न मात्रक।

1.2 गति एवं बल–गति की सापेक्षता, विस्थापन, समान तथा असमान गति, चाल और वेग, त्वरण, गति के समीकरण एवं सरल आंकिक प्रश्न, बल का अर्थ, पिण्ड का जड़त्व, सन्तुलित एवं असन्तुलित बल और त्वरण।

1.3 न्यूटन के गति के नियम, संवेग और बल के साथ सम्बन्ध और वस्तु का द्रव्यमान, उपर्युक्त के आधार पर सरल आंकिक प्रश्न, क्रिया और प्रतिक्रिया, बल सदैव युग्म के रूप में विद्यमान रहते हैं।

1.4 न्यूटन के गुरुत्वाकर्षण नियम, गुरुत्वाकर्षण जनित त्वरण।

1.5 कोटिमान और सार्थक, अंक अल्पतमांक, 'शून्यांक त्रुटि और अनुप्रयोग।

यूनिट 2:

2.1 कार्य, सामार्थ्य एवं ऊर्जा–कार्य एवं सामर्थ्य का सम्बन्ध, जूल, वाट, किलोवाट–घंटा, कार्य एवं सामर्थ्य सम्बन्धी सरल गणनाऐं।

2.2 गतिज ऊर्जा एवं स्थितिज ऊर्जा, ऊर्जा के स्रोत, ऊर्जा मूल स्रोत के रूप में, सूर्य ऊर्जा के अन्य स्वरूप (द्रव्यमान ऊर्जा सहित), ऊर्जा रूपान्तरण के व्यवहारिक उपयोग, ऊर्जा संरक्षण।

2.3 तरंग गति–तरंग की प्रकृति, तरंग के माध्यम से संचरण, तरंग के प्रकार–अनुप्रस्थ, अनुदैर्ध्य, आवर्त गति, सरल आवर्त गति की संकल्पना, विस्थापन, आयाम, आवृत्ति, आवर्तकाल, तरंगदैर्ध्य और उनके मात्रक।

2.4 ध्वनि–ध्वनि की प्रकृति, ध्वनि का वेग, तारत्व, ध्वनि तरंगों का परास, ध्वनि का परावर्तन तथा उसके अनुप्रयोग।

2.5 किसी तरंग के तरंगदैर्ध्य, आवृत्ति तथा आवर्तकाल में सम्बन्ध, उपरोक्त पर आधारित सरल आंकिक प्रश्न, तरंग के संवर्ण में ऊर्जा का स्थानान्तरण।

यूनिट 3: उष्मा

3.1 ऊष्मा–उष्मीय प्रसार, ठोसों तथा द्रवों का ऊष्मीय प्रसार, महत्व, रेखीय, क्षेत्रीय तथा आयतन प्रसार गुणांक में संबंध।

3.2 ताप की अभिधारणा ताप मापन, पारे का तापमापी ताप के पैमाने।

3.3 ऊष्मा का संचरण, ऊष्मा के सुचालक तथा कुचालक एवं उनका तुलनात्मक अध्ययन, ऊष्मा चालन के व्यवहारिक उदाहरण, ऊष्मा संवहन, ऊष्मीय विकिरण और प्रकाश।

3.4 ऊष्मीय विकिरण के गुण, उत्सर्जन, अवशोषण, विकिरण ऊर्जा का दैनिक जीवन में महत्व, ऊष्मा के मात्रक, विशिष्ट ऊष्मा तथा ऊष्माधारिता एवं इस पर सरल आंकिक प्रश्न।

3.5 ऊष्मा का मापन, अवस्था परिवर्तन, आर्द्रता एवं उससे सम्बन्धित घटनायें।

यूनिट 4: प्रकाष

4.1 मानव आँख द्वारा प्रकाश का परसेप्सन, गोलीय दर्पण एवं लेन्स द्वारा प्रतिबिम्ब का बनना, सरल आंकिक प्रश्न।

4.2 मानव नेत्र की संरचना–नेत्र लेन्स की फोकस दूरी और रेटिना पर प्रतिबिम्ब का बनना, नेत्र दण्ड ओर 'ंकु के स्वरूप का संक्षिप्त विवरण, वर्णाधार।

4.3 दृष्टि दोष, निकट दृष्टि और दूर दृष्टि, दृष्टि दोष निवारण, रंगभेद।

4.4 दूरदर्शी एवं सूक्ष्मदर्शी–सिद्धान्त, संरचना, खगोलीय दूरदर्शी की क्रियाविधि और संयुक्त सूक्ष्मदर्शी।

4.5 प्रकाश का अपवर्तन, स्नैल का नियम, अपवर्त्तनांक, पूर्ण आन्तरिक परावर्तन।

यूनिट 5: विद्युत

5.1 ऊर्जा के स्रोत, चालक, प्रतिरोधक, धारा का मापन, विभवान्तर, प्रतिरोध तथा इनमें सम्बन्ध पर आधारित सरल आंकिक प्रश्न।

5.2 धारा का ऊष्मीय प्रभाव, उष्मा, विद्युत धारा, प्रतिरोध और समय में सम्बन्ध, ऊष्मीय प्रभाव पर आधारित विद्युत उपकरण, मात्रक, विद्युत 'ाक्ति एवं इस पर आधारित आंकिक प्रश्न।

5.3 विद्युत धारा का चुम्बकीय प्रभाव। धारावाहिक चालक द्वारा चुम्बकीय क्षेत्र, कुण्डलीय और परिनलिका। विद्युत मोटर के अनुप्रयोग।

5.4 विद्युत चुम्बकीय प्रेरण का प्रारम्भिक ज्ञान, फ्लैमिंग का बायें हाथ का नियम, विद्युत जनित्र–डी.सी. एवं ए.सी.

5.5 घरों में इस्तेमाल होने वाली विद्युत, घरेलू वायरिंग, फ्यूज, सुरक्षा की युक्ति, विद्युत से खतरे।

PHYSICS

UNIT 1:

1.1 Measurements – Fundamental units and dimensions, S.I. system, standard meter, standard kilogram, standard second, micron, angstrom and light year, Derived units.

1.2 Motion and Force- Relativity of motion, displacement, uniform and non-uniform velocity, speed and velocity, equations of motion and simple numerical problem, meaning of force. Inertia of a body, equilibrium and non-equilibrium, force and acceleration.

1.3 Newton's laws of motion, relation between momentum and force and mass of a body-simple numerical problems based on these concepts. Action and reaction. Forces as couple of force.

1.4 Newton's laws of gravitation, acceleration due to gravity.

1.5 Order of magnitude & significant figure – least count, zero error and applications.

UNIT 2:

2.1 Work, power and energy- Relation between work and power, joule, watt, kilowatt-hour, simple calculations of work and power.

2.2 Kinetic and potential energy, sources of energy, fundamental source of energy. Different forms of solar energy including mater energy. Applications of energy transformations, conservation of energy.

2.3 Wave Motion- nature of wave, transmission through wave, types of waves-transverse, longitudinal, periodic motion, concept of simple harmonic motion, displacement, amplitude, frequency, time period, wavelength and their units.

2.4 Sound- nature of sound, velocity of sound, pitch, range of sound waves, reflection of sound and its uses.

2.5 Relation between wavelength, frequency and time period of a wav, simple numerical problems based on them, transference of energy in the form of wave.

UNIT 3:

3.1 Heat- thermal expansion, thermal expansion of solids and liquids, importance, relation between linear, superficial & volume expansion coefficient.

3.2 Concept of temperature, thermometery, Mercury thermometers, scales of temperature.

3.3 Transmission of heat, good and bad conductors of heat and their comparative study, practical examples of heat conduction, heat connection, thermal radiation and light.

3.4 Properties of thermal radiation, emission, absorption, importance of radiation in daily life, units of heat, specific heat, thermal capacity- simple numerical problems based on this.

3.5 Calorimetery, change of state, humidity and related concepts.

UNIT 4:

4.1 Perception of light by human eye, spherical mirrors and lenses-image formation, simple numerical problems.

4.2 Structure of human eye, focal length of eye lens and formation of image on retina, brief description of rods and cones, basis of colours.

4.3 Defects of vision, myopia, hypermetropia, correction of defects, colour discrimination.

4.4 Telescope and Microscope- principle, construction, working of astronomical telescope and compound microscope. White light, wavelengths of colours.

4.5 Refraction of light, Snell's Law, Refractive Index, Total Internal Reflection.

UNIT 5:

5.1 Sources of energy, conductors, resistors, measurement of current, potential difference, resistance and their relationship- numericals.

5.2 Heating effects of current, relation between heat, electric current, resistance and time. Electrical appliances based on heating effects, units, electrical energy and numericals based on them.

5.3 Magnetic effects of electric current. Magnetic field due to a current carrying conductor- coil and solenoid. Applications of electric motor.

5.4 Elementary knowledge of electromagnetic induction, Flemings left hand rule, electric dynamo dc and ac.

5.5 Electricity used in houses, domestic wiring, fuses, safety device, damagers from electricity.

गणित

यूनिट 1:

1.1 संख्या पद्वति पूर्णांक, परिमेय संख्यायें, परिमेय संख्याओं के गुण धर्म (योग का क्रम विनिमेय नियम, साहचर्य नियम, योज्य तत्समक, योज्य प्रतिलोम, गुणन का क्रम विनिमेय नियम, साहचर्य नियम, बंटन नियम, गुणनात्मक तत्समक, गुणनात्मक प्रतिलोम)। परिमेय संख्याओं का दशमलव निरूपण। अपरिमेय संख्यायें, अपरिमेय संख्याओं का दशमलव निरूपण।

1.2 समुच्चय सिद्धान्त–समुच्चय का निरूपण, अवयव, विभिन्न प्रकार के समुच्चय (परिमित तथा अपरिमित समुच्चय, रिक्त समुच्चय, समष्टीय समुच्चय, समान समुच्चय, समतुल्य समुच्चय, एकल समुच्चय)।

1.3 उपसमुच्चय, समुच्चयों पर संक्रियायें (समुच्चयों का सम्मिलन, समुच्चयों का सर्वनिष्ठ, अन्तर समुच्चय, पूरक समुच्चय) वेन आरेख तथा इनका अनुप्रयोग।

1.4 लघुगणक का अर्थ, लघुगणक को घातीय रूप में व्यक्त करना, आधार 10 पर सामान्य लघुगणक, पूर्णांश एवं अपूर्णांश।

1.5 प्रति लघुगणक का अर्थ, लघुगणक के नियम।

यूनिट 2:

2.1 बीजीय व्यंजकों के गुणनखण्ड, द्विघात बहुपद के गुणनखण्ड, द्विघात त्रिपद व्यंजक (ax^2+bx+c, $a\neq0$) के गुणनखण्ड (मध्य पद को दो भागों में बांटकर तथा पूर्ण वर्ग बनाकर)

2.2 गुणनखण्ड प्रमेय, शेषफल प्रमेय तथा बहुपदों (चार घात से अधिक के नहीं) के गुणनखण्ड में इनका उपयोग।

2.3 गुणनखण्ड विधि से बहुपदों का लघुत्तम समापवर्त्य तथा महत्तम समापवर्तक।

2.4 परिमेय व्यंजक का अर्थ, व्यंजक का योग, व्यवकलन, गुणन एवं भाजन। व्यंजक का सरलीकरण, योज्य व्युत्क्रम, गुणन व्युत्क्रम।

2.5 सांख्यिकी–केन्द्रीय प्रवृत्ति का मापें: समान्तर माध्य, माध्यिका, बहुलांक।

यूनिट 3:

3.1 एक चर में रैखिक समीकरण, इनका हल तथा वाणिज्यिक गणित और मेन्सुरेशन में इनका अनुप्रयोग।

3.2 दो चरों में रैखिक समीकरण–दो चरों में युगपत रैखिक समीकरणों का हल, युगपत रैखिक समीकरण निकाय का संगत/असंगत होना, समीकरण पर आधारित इबारती प्रश्नों का हल।

3.3 द्विघात समीकरण का अर्थ, समीकरण का हल (गुणनखण्ड विधि एवं सूत्र द्वारा), द्विघात समीकरण का विवित्तकर एवं इसके मूलों की प्रकृति, दिये मूलों से समीकरण बनाना, इबारती प्रश्नों में समीकरण के अनुप्रयोग।

3.4 मेन्सुरेशन– घन, घनाभ, बेलन, शंकु तथा गोले का वक्रपृष्ठ, संम्पूर्ण पृष्ठ एवं आयतन

3.5 समांतर चतुर्भुज के गुण पर आधारित प्रश्न, किसी चतुर्भुज के समांतर चतुर्भुज होने के प्रतिबंध और उन पर आधारित प्रश्न।

यूनिट 4:

4.1 त्रिकोणमितिः किसी समकोण Δ में न्यूनकोण के त्रिकोणमितीय अनुपात, त्रिकोणमितीय अनुपातों में व्युत्क्रम संबंध तथा अन्य पारस्परिक संबंध।

4.2 0°, 30°, 45°, 60°, 90°, $90^\circ\pm\theta$, $180^\circ\pm\theta$ तथा $nx360^\circ\pm\theta$ के त्रिकोणमितीय अनुपात निकालना।

4.3 त्रिकोणमितीय सर्वसमिकायें–

$\sin^2\theta + \cos^2\theta = 1$

$\sec^2\theta = 1 + \tan^2\theta$

$\text{cosec}^2\theta = 1 + \cot^2\theta$

4.4 दो कोणों के योग और अंतर के त्रिकोणमितीय अनुपात तथा किसी कोण के अपवर्त्य तथा अपवर्तक के त्रिकाणमितीय अनुपात किसी कोण के sine और cosine के योग व अन्तर को उनके गुणनफल के रूप में व्यक्त करना।

4.5 वृत्त संबंधी प्रमेय तथा वृत्त की स्पर्श रेखा संबंधी प्रमेय पर आधारित प्रश्न।

यूनिट 5:

5.1 निर्देशांक ज्यामितिः दो बिन्दुओं के बीच की दूरी। रेखाखण्ड को दिये हुये अनुपात में विभाजित करने वाले बिन्दु के निर्देशांक। त्रिभुज का क्षेत्रफल।

5.2 सरल रेखा के समीकरण (प्रवणता रूप में, अन्तःखण्ड रूप में, लम्ब रूप में), रेखा का व्यापक समीकरण।

5.3 सरल रेखा के समान्तर तथा लम्बवत् रेखाओं के समीकरण। सरल रेखा पर किसी बिन्दु से डाले गये लम्ब की लम्बाई।

5.4 दो सरल रेखाओं के प्रतिच्छेद बिन्दु के निर्देशांक, दो सरल रेखाओं के बीच का कोण।

5.5 त्रिभुज में असमिका संबंध, समरूप त्रिभुज पर आधारित प्रश्न। चक्रीय चतुर्भुज।

MATHEMATICS

UNIT 1:

1.1 Number System- Integers, Rational numbers, Properties of rational numbers (commutative law and Associative law for addition, additive identity, additive Inverse, Commutative law and Associative law for multiplication, multiplicative identity, multiplicative inverse, distributive law), Decimal representation of rational number, Irrational numbers, decimal representation of irrational number.

1.2 Set theory- Representation of Set (Tabular or Listing form, Rule form), elements of Set, Types of Set (Finite and Infinite set, empty set, universal set, equal set, equivalent set, singleton set).

1.3 Subsets, union of sets, Intersection of sets, Set Difference, Complement of a set, Venn diagram and its application.

1.4 Logarithm– Meaning of logarithm, Common logarithm (logarithm of any number at base 10), characteristic and mantissa.

1.5 Meaning of Anti-logarithm, Laws of logarithm.

UNIT 2:

2.1 Factorisation of Algebraic Expression, factorisation of two degree Polynomial, factorisation of two degree trinomial by dividing middle term into two parts and by making perfect square.

2.2 Remainder theorem and factorisation theorem (Not Proof) and its use in factorisation of polynomial (Not greater than four degree)

2.3 Least Common Multiple (LCM) and Highest Common Factor (HCF) of Polynomials using factorisation.

2.4 Rational Expression-Meaning, Addition, Subtraction, Multiplication and division of Rational expression. Simplification of Expression, Additive Inverse and multiplicative Inverse of Rational expression.

2.5 Statistics: Measure of central tendency- Arithmetic mean, Median, Mode of ungrouped and grouped data.

UNIT 3:

3.1 Linear equation in one variable, Its application in Commercial mathematics and in mensuration.

3.2 Linear equation in two variable- Solution of simultaneous linear equation in two variable, Consistent/ Inconsistent system of simultaneous linear equation, Problems based on system of linear equations.

3.3 Quadratic Equation: Solution of equation (using factorisation method and using formula), Discriminate of Quadratic equation, Nature of roots of the equation, forming a quadratic equation from given roots, Application of quadratic equation.

3.4 Mensuration- Curved surface area, Total surface area and volume of cube, cuboid, Right circular cylinder, cone and sphere.

3.5 Numerical Problem based on properties of parallelogram, Condition for a quadrilateral to be a parallelogram and Numerical problems related to it.

UNIT 4:

4.1 Trigonometry: Trigonometrical ratio of acute angle in a right angle triangle, Inverse relationship in trigonometrical ratio.

4.2 Trigonometrical ratio of angles 0°, 30°, 45°, 60°, 90°, $90^\circ \pm \theta$, $180^\circ \pm \theta$, $nx360^\circ \pm \theta$.

4.3 Trigonometrical identities

$\sin^2\theta + \cos^2\theta = 1$

$\sec^2\theta = 1 + \tan^2\theta$

$\text{cosec}^2\theta = 1 + \cot^2\theta$

4.4 Trigonometrical ratio of Sum and difference of two angles, Trignometrical ratio of multiples of an angle. Sum of sines of two angles and difference of sines of two angles (i.e., SinC+SinD and SinC-SinD), Sum of cosines of two angles and difference of cosines of two angles (CosC+CosD, CosC-CosD). Simple problems based on the above.

4.5 Problems related to the theorems on Circle and tangent to the circle.

UNIT 5:

5.1 Co-ordinate Geometry: Distance between two points, Co-ordinate of a point dividing a line segment in a given ratio, Area of a triangle.

5.2 Equation of straight line in different form (Gradient form, Intercept form, Perpendicular form), General equation of line.

5.3 Equation of a line parallel to a given line and perpendicular to a given line, Length of the perpendicular drawn from a point on a straight line.

5.4 Co-ordinate of a point of Intersection of two lines, Angle between two straight lines.

5.5 In equality relation in triangle, similar triangle, cyclic quadrilateral – Problems based on these.

SYLLABUS: DIPLOMA IN GARMENT TECHNOLOGY

UNIT 1: Drawing Skills

1.1 Drawing Equipment
1.2 Colouring Equipment
1.3 Nature Drawing & Object Drawing
1.4 Knowledge about human figure
1.5 Geometrical Shapes

UNIT 2: Colour Knowledge

2.1 Colours Scheme
2.2 Colours in Nature
2.3 Types of Colours
2.4 Mixing of Colours (Primary, Secondary, Tertiary)
2.5 Importance of Colour in Life

UNIT 3: Fabrics and Sewing

3.1 Fabrics used in different Climate
3.2 Washing care of fabrics
3.3 Sewing on Fabrics
3.4 Knowledge of Sewing Machine
3.5 Different parts of Garment

UNIT 4: Embroidery

4.1 Basic Hand Embroidery Stitches
4.2 Appropriate fabric for Embroidery
4.3 Tools of Embroidery and Tracing Techniques
4.4 Embroidery Motifs and their positions on article
4.5 Colour Combination used in Embroidery

UNIT 5: Creativity and Calculations

5.1 Calculations (addition, subtraction, multiplication, division)
5.2 Conversion of Units
5.3 Collage and Sketching
5.4 General Awareness on Designing of Garments
5.5 Measurement of Garments

परिधान तकनीक

इकाई 1: चित्रकला का कौशल

1. चित्रकला के उपकरण
2. रंगाई के उपकरण
3. प्राकृतिक चित्रकला तथा वस्तु चित्रकला
4. मानव आकृति का ज्ञान

5. ज्यामितीय आकार

इकाई 2 : रंगों का ज्ञान

1. रंग योजनाएं
2. प्रकृति में रंग
3. रंगों के प्रकार
4. रंगों का मिलाना
5. जीवन में रंगों का महत्व

इकाई 3 : वस्त्र व सिलाई

1. विभिन्न मौसम में प्रयुक्त वस्त्र
2. वस्त्रों की धुलाई
3. वस्त्रों की सिलाई
4. सिलाई मशीन का जानकारी
5. परिधान के भाग

इकाई 4: कढ़ाई

1. हाथ की कढ़ाई के प्रमुख टाँके
2. कढ़ाई के लिए उपयुक्त वस्त्र
3. कढ़ाई के उपकरण व छपाई की विधियाँ
4. कढ़ाई के नमूने व वस्त्रों पर उनका स्थान
5. कढ़ाई में प्रयुक्त रंग योजनाएं

इकाई 5: सृजनात्मकता व गणना

1. गणना (जोड़ना, घटाना, गुणा व भाग)
2. इकाईयों के परिवर्तन
3. कोलाज़ व रेखाचित्र
4. परिधान के डिज़ाइन
5. परिधान के नाप

SYLLABUS (INTERMEDIATE LEVEL): SCIENCE

BOTANY

Unit 1:

1.1 **Cell Structure**: Ultra structure, organelles, Nucleus and Nuclear membrane, mitochondria, plastids, centrosomes, lysosomes, Endoplasmic reticulum, ribosome, protoplasm, cell wall, non protoplasmic cell inclusions.

1.2 **Cell Theory**: Cell fundamental structural and functions unit of life. Features of prokaryotic cell; Difference between plant cell and animal cell

1.3 **Cell Cycle**: Difference between mitosis and meiosis. Significance of mitosis and meiosis.

1.4 **Biomolecules**: Proteins, carbohydrates, fats, nucleic acid – structure and functions; enzymes.

1.5 **Plant Tissue**: Paranchyma, collenchymas, sclarenchyma; meristematic tissues: shoot and root apical meristem, intercalary meristem; xylem; trachieds; phloem.

Unit 2:

2.1 **Ecology and Environment:** Habitat & Niche-it's meaning; food Chain, Food web; mutualism, competition, predation, parasitism.

2.2 **Population characteristics:** Birth rate, Death rate, age/density.

2.3 **Ecosystem**: Types, components, energy flow, biogeochemical cycle-carbon & phosphorus cycle; Pyramids–pyramid of number, biomass, energy.

2.4 **Ecological succession Ecological services:** Deforestation and case studies related to environmental problems.

2.5 **Air pollution and control measures:** Water pollution and control measures, Solid waste and radioactive waste management. Green house effect, global warming, ozone depletion, acid rain.

Unit 3:

3.1 **Diversity in plants**: Kingdom fungi, important classes, characters.

3.2 **Important characters and classification in various kingdoms:** Algae, bryophytes, pteridophytes.

3.3 **Lichens**.

3.4 **Angiosperms and Gymnosperms**: 3-5 main identifying features and at least two examples from each.

3.5 **Angiosperms**: Classification into class, their characteristics and examples.

Unit 4:

4.1 **Tools for the study of diversity**: Herbaria & botanical gardens.

4.2 Morphology (modifications), anatomy and functions of root, stem, leaf, inflorescences, fruit, seeds and flower.

4.3 **Plant reproduction**: vegetative, Asexual and Sexual

4.4 **Micro propagation:**

4.5 **Sexual reproduction** in flowering plant. Seed germination and dormancy.

Unit 5:

5.1 **Improvement in food production**: Green Revolution. Hybridization, Hybrid vigour. Tissue culture, Single cell protein

5.2 **Biofortification:** GMO, Bt crops.

5.3 Diffusion, osmosis, water absorption, ascent of sap.

5.4 Photosynthesis Respiration

5.5 Transpiration, Translocation of food, plant harmones. Basic knowledge of photo periodism and verbalization.

CHEMISTRY

Unit 1: GENERAL CHEMISTRY

1.1 & 1.2 Atomic structure-Atom, subatomic particles, discovery of electrons, protons, neutrons, Rutherford model of the atom, Bohr's model of the hydrogen atom, Rydberg relationship.

1.3 & 1.4 Elementary concepts of binding energy, electronic configuration, electron shells, subshells, quantum numbers, Pauli's exclusion principle, Hunds' rule, Aufbau principle, shapes

of s, p and d orbitals.

1.5 Environmental Chemistry: Environmental pollution - air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants, acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming- pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategies for control of environmental pollution.

Unit 2

2.1 Mendeleev's classification of the elements, basis for periodic classification, variation of general properties like ionization enthalpy, electron affinity, atomic volume etc.

2.2 Chemical bonding, ionic bonds, covalent bonds, coordinate-covalent bonds, electronic configuration of simple compounds, elementary ideas of hydrogen bonding and its influence on physical properties. Valence Bond Theory and Molecular Orbital Theory of Chemical bonding.

2.3 Oxidation-reduction reactions, oxidation number, balancing of equations by oxidation number and charge.

2.4 Characteristics of bonding in organic compounds, structural formulae, atoms and molecular orbitals, hybridization and covalent bonds, and position isomerism, functional isomerism, geometric isomerism and optical isomerism (lactic acid). Solid State: Classification of solids based on different binding forces :molecular, ionic covalent and metallic solids, amorphous and crystalline solids(elementary idea),unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids ,number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties, Band theory of metals ,conductors, semiconductors and insulators and n and p type semiconductors.

2.5 Ideal gas laws, Dalton's laws of partial pressure, Graham's diffusion law.

Unit 3: INORGANIC CHEMISTRY

3.1 I A, zero group elements, H_2^- inert gases and alkali metals. Position in periodic table of H_2, inert gases and alkali metals (Na and K), on the basis of electronic configuration. Isotopes of H_2. Chemistry and uses of H_2O_2, Na_2CO_3 $NaHCO_3$

3.2 II A & III A group elements-Position in the periodic table of group II A elements (Mg, Ca, Sr and Ba) on the basis of electronic configuration. Chemistry of plaster of Paris, cement, , alums, metallurgy of aluminium and its uses.

3.3 IV A & V A group elements-Position in periodic table of C, Pb, N, P, Sb and Bi on the basis of electronic configuration. Chemistry of stannous chlorides, NH_3, PH_3

3.4 VI A & VII A group elements-Position in the periodic table of Cl_2, Br_2 and F_2 on the basis of electronic configuration. Chemistry of O_3, H_2SO_4, Cl_2, Br_2, F_2 and bleaching powder.

3.5 Transition metals-Position in periodic table of I B, II B and VIII B group elements on the basis of electronic configuration. Metallurgy of Cu, Ag, Zn and Fe. Chemistry of Cu_2Cl_2, $AgN0_3$, $ZnCl_2$, calomel, corrosive sublimate, ZnO, Mohr's salt and $FeCl_3$. Introduction to co-ordination compounds, Werner’s theory; ligands, coordination number, denticity, chelation; IUPAC nomenclature of mononuclear coordination compounds, isomerism; Bonding-Valence bond approach and basic ideas of Crystal field theory, colour and magnetic properties; Importance of Coordination compounds (in qualitative analysis, extraction of metals and in biological systems).

Unit 4: PHYSICAL CHEMISTRY

4.1 Thermodynamics and thermochemistry-First law of thermodynamics, definition, internal

energy, Hess's law of constant heat summation, heat of reaction, heat of combustion, heat of formation, heat of neutralization. Second law of Thermodynamics (brief introduction). Introduction of entropy as a state function, Gibb's energy change for spontaneous and non-spontaneous processes, criteria for equilibrium. Third law of thermodynamics (brief introduction).

4.2 Chemical equilibrium-Law of mass action, equilibrium constant, Le Chateliers principle (qualitative interpretation), effect of temperature, pressure and concentration on equilibrium constant. Chemical Kinetics: Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units, differential and integral forms of zero and first order reactions, their characteristics and half - lives, effect of temperature on rate of reactions – Arrhenius theory, activation energy and its calculation, collision theory.

4.3 Electrochemistry- Arrhenius theory of electrolytes and its limitations, Ostwald's dilution law, degree of dissociation, dissociation constant, acids bases and salts, neutralization, hydrolysis, pH, buffer solutions, acid-base indicators, solubility, solubility product and the common ion effect. Electrolytic and metallic conduction, conductance in electrolytic solutions, specific and molar conductivities and their variation with concentration: Kohlrausch’s law and its applications. Electrochemical cells - Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half - cell and cell reactions, emf of a Galvanic cell and its measurement; Nernst equation and its applications;

4.4 Solutions-Various methods of representing concentrations of solutions, vapour pressure, osmotic pressure, Berkeley and Hartley method of determining osmotic pressure, elevation in boiling point and depression in freezing point to determine molecular weight of nonvolatile substances

4.5 Catalysis-Catalysts, properties of catalysts, types of catalysis, homogeneous and heterogeneous catalysis, theory of catalysis, intermediate compound formation, adsorption theory, enzyme catalysis, colloidal solution types and their properties.

Unit 5: ORGANIC CHEMISTRY

5.1 Nature of organic compounds, purification and separation methods, Detection of elements (C, H, N, S and Halogens).

5.2 Classification of organic compounds and their nomenclature (IUPAC system), Hybridization.

5.3 Hydrocarbons-Alkanes, alkenes and alkynes and alkyl halides (general methods of preparation and properties).

5.4 Hydrocarbons having various functional groups. [Alcohols (monohydric), aldehydes and ketones (formaldehyde, acetaldehyde, acetone), carboxylic acids (monocarboxylic acids), ethers, esters (ethyl acetate) and primary amines] Methods of preparation and important physical and chemical properties.

5.5 Aromatic Compounds-Comparison of aliphatic and aromatic compounds, benzene and its aromatic character, Prepartion, properties of aromatic compounds (nitrobenzene, chlorobenzene, phenol, benzaldehyde, benzoic acid and aniline).

Our food and its composition (introductory ideas about vitamins, carbohydrates, proteins, oils, and fats).

MATHEMATICS

UNIT 1:

1.1 SETS: Sets and their representations, simple set, Finite and Infinite sets, Equal sets, Sub-sets, Subsets of the set of real numbers especially intervals (with notations). Power set, Universal set. Venn diagrams, Union and intersection of sets, Difference of sets, Complement of a set, Properties of complement set.

1.2 RELATIONS AND FUNCTIONS: Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto R x R x R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain; co-domain and range of a function, Real valued function of the real variable, domain and range of a functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference; product and quotients of functions, Types of relations: reflexive, symmetric, transitive and equivalence relations, one to one and onto functions, composite functions, inverse of a function, Binary function.

1.3 TRIGONOMETRIC FUNCTIONS: Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x+\cos^2 x=1$, for all x. Signs of trigonometric functions and sketch of their graphs. Expressing $\sin(x\pm y)$ one $\cos(x\pm y)$ in terms of $\sin x$, $\sin y$, $\cos x$ and $\cos y$. Deducing the identities like the following:

$$\tan(x\pm y)=\frac{\tan x\pm\tan y}{1\mp\tan x\tan y} \qquad \cot(x\pm y)=\frac{\cot x\cot y\mp 1}{\cot y\pm\cot x}$$

$$\sin x+\sin y=2\sin\frac{x+y}{2}\cos\frac{x-y}{2} \qquad \cos x+\cos y=2\cos\frac{x+y}{2}\cos\frac{x-y}{2}$$

$$\sin x-\sin y=2\cos\frac{x+y}{2}\sin\frac{x-y}{2} \qquad \cos x-\cos y=2\sin\frac{x+y}{2}\sin\frac{y-x}{2}$$

Identities related to $\sin 2x$, $\cos 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$. General solution of trigonometric equations of the type $\sin\theta = \sin\alpha$, $\cos\theta = \cos\alpha$, and $\tan\theta = \tan\alpha$. Proof and simple application of sine and cosine rules only.

1.4 INVERSE TRIGONOMETRIC FUNCTIONS: Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

1.5 SEQUENCE AND SERIES: Sequence and series, Arithmetic progression (A.P.), arithmetic mean (A.M.), Geometric progression (G.P.), general term of a G.P., sum of *n* terms of a G.P., geometric mean (G.M.), relation between A.M. and G.M., Arithmetic/geometric series, infinite G.P. and its sum, Sum *to n* terms of the special series Σn, Σn^2 and Σn^3.

UNIT 2:

2.1 COMPLEX NUMBERS AND QUADRATIC EQUATIONS: Need for complex numbers, especially $\sqrt{-1}$ to be motivated by inability to solve every quadratic equation. Brief discription of algebraic properties of complex numbers: Argand plane and polar representation of complex numbers, Statement of fundamental theorem of algebra, solution of quadratic equations in the complex number system. Square root of a complex number, Cube roots of unity and their properties.

2.2 LINEAR INEQUALITIES: Linear inequalities, Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Solution of system of linear inequalities in two variable graphically, Inequalities involving modulus function.

2.3 PERMUTATIONS AND COMBINATIONS: Fundamental principle of counting, Factorial n(n!), Permutations and combinations, derivation of formulae and their connections, simple applications.

2.4 BINOMIAL THEOREM: History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, general and middle term in binomial expansion, simple applications.

2.5 MATHEMATICAL REASONING: Mathematically acceptable statement, Connecting words/phrases, considering the understanding of "if and only if (necessary and sufficient) condition", "implies", "and or", ''implied by","and", "or", "there exists" and their use through variety of examples related to real life and Mathematics, Validating the statements involving the connecting words difference between contradiction, converse and contrapositive.

UNIT 3:

3.1 MATRICES: Concept, notation, order, equality, types of matrices, zero matrix; transpose of a matrix symmetric and skew symmetric matrices, addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication, Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations; Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

3.2 DETERMINANTS: Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix, Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix. Cramer's Rule and its applications.

3.3 LIMITS, DERIVATIVES, CONTINUITY: Derivative introduced as rate of change and as that of distance function, geometrical intuitive idea of limit

$$\lim_{x\to 0}\frac{1}{x},\ \lim_{x\to\infty}\frac{1}{x},\ \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^{x},\ \lim_{x\to 0}\frac{\log(1+x)}{x},\ \lim_{x\to 0}\frac{e^{x}-1}{x}$$

Definition of derivative, relate it to slope of tangent of the curve derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric function. Continuity.

3.4 DIFFERENTIABILITY: Differentiability, derivative of composite functions, Chain rule, derivative of inverse trigonometric functions, derivative of implicit functions, concept of exponential and logarithmic functions to the base e. Logarithmic functions as inverse of exponential functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Largrange's Mean value theorems (without proof) and the geometric interpretation and simple applications.

3.5 APPLICATIONS OF DERIVATIVES: Applications of derivatives: rate of change, increasing / decreasing functions, tangent and normals, approximation, maxima and minima (first derivative test, integrate geometrically and second derivative test given as a provable tool).

Simple problem (that illustrate basic principle and understanding of the subject as well as real- life situations)

UNIT 4:

4.1 INTEGRALS: Integration as inverse process of differentiation, Integration of a variety of functions by substitution, by partial fraction and by parts, only simple integrals of the type to be evaluated.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2}\, dx, \int \sqrt{x^2 - a^2}\, dx$$

$$\int \sqrt{ax^2 + bx + c}\, dx, \quad \int (px + q)\sqrt{ax^2 + bx + c}\, dx, \quad \int \frac{dx}{a + b\cos x}, \int \frac{dx}{a + b\sin x}$$

Definite integrals as limit if a sum, Fundamental Theorem of Calculus (without proof), Basic properties of definite integrals and evaluation of definite integrals.

4.2 APPLICATIONS OF THE INTEGRALS: Applications in finding the area under simple curves, especially lines, areas of circles/ parabolas/ ellipses. (in standard form only)

4.3 DIFFERENTIAL EQUATIONS: Definitions, order and degree, general and particular solutions of a differential equation. Formation of differential equations whose general solution is given. Solution of differential equations by method of separation of variables. Homogeneous differential equations of first order and first degree, Solutions of linear differential equation of the type: $\frac{dy}{dx} + Py = Q$, where P and Q are functions of x and $\frac{dx}{dy} + Px = Q$, where P and Q are functions of y.

4.4 STATISTICS: Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/ grouped data. Analysis of frequency distributions with equal means but different variances.

4.5 PROBABILITY: Random experiments outcomes, sample spaces (set representation), Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events. Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events. Multiplication theorem on probability. Conditional probability, independent events; total probability, Baye's theorem, Random variable and its probability distribution, mean and variance of random variable. Repeated Independent (Bernoulli) trials and Binomial distribution.

UNIT 5:

5.1 STRAIGHT LINES: Briefly recall of 2D from earlier classes, Shifting of origin, Slope of a line and angle between two lines. Various forms of equations of a line; parallel to axes, Point slope form, slope-intercept form, two-point form, intercept form and normal form. General equation of a line. Equation of family of lines passing through point of intersection of two lines. Distance of a point from a line.

5.2 CONIC SECTIONS: Sections of a cone: Circle, ellipse, parabola, hyperbola, a point, a straight line and pair of intersecting lines as a degenerated case of a conic section. Standard equation

of a circle, General equation of a circle; Standard equation and simple properties of parabola, ellipse and hyperbola, Introduction of directix of an ellipse and hyperbola.

5.3 VECTORS: Vectors and scalars, magnitude and direction of a vector, Direction cosines/ ratios of vectors. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line. Vector (cross) product of vectors, Scalar triple product.

5.4 THREE DIMENSIONAL GEOMETRY :Co-ordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula. Direction cosines/ ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines, Cartesian and vector equation of a plane, Angle between (i) two lines, (ii) two planes, (iii) a line and a plane, Distance of a point from a plane.

5.5 LINEAR PROGRAMMING: Introduction, definition of related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

PHYSICS

Unit 1: MEASUREMENT AND MECHANICS

1.1 **Dimensional Analysis:** Examples of Dimensional formulae based on fundamental quantities of S.I. system, Testing of Dimensional Balance, simple examples of establishing relationships among the Physical Quantities through Dimensional Balance.

Motion in a Plane: Scalar Product of a Vector, Scalar product of two Vectors, (Example of work). Vector forms of the Principles of motion and Projectile Motion, Uniform Circular Motion, Angular Displacement, Angular Velocity, Centripetal and Centrifugal forces, simple examples of Centripetal force and simple explanations.

1.2 **Rotatory Motion in a Rigid Body:** Moment of a force, Torque, Angular Acceleration, Angular momentum, and Angular Kinetic Energy, Relationship between angular and linear motion principles, Moment of Inertia, Moment of Inertia of some definite solid shapes.

Universal Gravitation. Motion of Planets and Kepler's Laws, Laws of Gravitation, Universal Gravitation Constant, Derivation of acceleration due to Gravity under different conditions of Gravitation, change in acceleration of gravity with height, Gravitational field, Gravitational Potential Energy, Gravitational Potential, Orbital speed of Satellite, Weightlessness in Satellite, Newtons Laws of motion, friction, work power and energy, centre of mass. Maximum height attained by a Projectile, Escape Energy and Velocity, Binding Energy.

1.3 **Simple Harmonic Motion:** Simple Harmonic Motion as defined in the form of uniform Circular Projectile, Displacement Equations, Restoring Force, Laws of Simple Harmonic Motion in linear form, formulae of Periodic Time, (i) Simple Pendulum and (ii) Ideal spring and its motion. Periodic Displacement Graph of Simple Harmonic Motion. Assumption of Phase and Displacement and its simple nature. Energy Transformation in Simple Harmonic Motion, Conservation of Mechanical Energy, Total Energy, and its relationship with Amplitude, Energy Dissipation and Damping.

1.4 **Elasticity:** Volume and Longitudinal Strain and stress, Hooke's Law and its limitations, Young Modulus, Potential Energy in a stretched wire, Modulus of Rigidity. Bulk Modulus, Elastic

behaviour of a wire under increasing load, Poisson's ratio, Application of elasticity.

1.5 **Surface-Tension:** Cohesive and Adhesive Forces, Assumptions of Surface forces through some examples of liquids, Capillary cohesion and its natural uses, some events based on the Surface Tension. Shape of liquid Meniscus in a glass tube, Angle of contact, Pressure difference between the 2 sides of a curved liquid surface. Formula for the rise of the liquid in a capillary tube.

Flow of Liquids: Perfect (Ideal) liquid, Stream-lined Flow, Energy of a Flowing Liquid, (Pressure, Kinetic and Potential) Bernoulli's Theorem, and its Applications. Assumptions of a Viscous Liquid, Velocity Gradient of Viscosity, Coefficient of Viscosity, Stoke's Law, Terminal Speed.

Unit 2: HEAT & GENERAL PROPERTIES OF MATTER IN BULK STATE

2.1 **Kinetic Model of Gases:** Molecular Agitation, Assumptions of Kinetic theory, Molecular weight of Gaseous Pressure, Number of Molecules and its dependance on their velocity, Boyle's Laws of Gases, Thermal Equilibrium and concept of Temperature, Temperature and Kinetic Energy, Boltzman Constant, Deviations in Common Gases under the laws of Perfect Gases, Finite size of Molecules, Inter-molecular Forces.

Kinetic Models of Liquids and Solids: Thermal Expansion, Freezing Point, Boiling Point and Explanation of Latent Heat.

2.3 **Thermo-dynamics:** Work done by a Thermo-dynamics system, Internal Energy (Constant dQ-w), The First Law of Thermo-dynamics (dQ=du+w), Difference between Specific Heats of an Ideal gas on constant volume and constant pressure, Derivation of the Equation C_p-C_v=R, Form of Internal Energy (linear, rotational, molecular and lattice vibrations in molecules), Internal Energy (Randomized Molecular Motion), Explanation of Second Law of Thermo-dynamics.

2.4 **Heat Engines:** Second Law of thermodynamics reversible and irreversible processes, conversion of heat in to work; heat engine and its efficiency, carnots ideal heat engine and its efficiency, carnots ideal refrigerator, limitation of First law of thermodynamics, second law of thermodynamics.

2.5 **Iso-thermal and Adiabatic Processes:** General Assumptions and Examples, Relationship between Isothermal and Adiabatic processes in an ideal gas, slope of Isothermal curve and adiabatic curve, work done in adiabatic and isothermal expansion.

Heat Transmission: Thermal conduction in a rod of a good conductor material, Rate of thermal conduction and its transverse section, Temperature gradient, Heat conduction coefficient, Explanation of thermal conduction through Kinetic Model, Free Electron Model for metallic thermal conduction. Thermal resistance. Convection, currents in nature.

Unit 3: LIGHT & WAVE-MOTION

3.1 **Refraction of Light at Spherical Surfaces**: Formula for refraction on concave and convex spherical surfaces (Lenses), Refraction formulae for thin lenses, Dependence of focal length on refraction, Joint focal length of two lenses when put together. Total internal reflection, dispersion, scattering of light through a prism. Reflection of light, spherical and plane mirrors.

3.2 **Telescope and Microscope:** Human eye, Correction of eye defects, Visual angle; Magnifying power of optical instrument, Simple microscope, Compound microscope, Refracting telescope. Concept of Resolving Power, Need of big eye-piece lens in Telescope, Resolving power of microscope, structure and function of Electron-Microscope.

3.3 **Progressive Waves:** Disturbances in wave-motion, and Energy transference, Time and Distance, Displacement Graphs in Progressive Waves, Phase and Phase Difference.

Wave-nature or Light: Electromagnetic Spectrum (From Gamma Rays to Hertzian Waves) Huygen's

principle, Wave Front, Huygen's Principle of Secondary Wavelets. Diffraction of light.

3.4 **Speed or Mechanical Waves:** Newton's formula for Longitudinal Waves, Revision in Laplace Law for gases, Effect of Pressure and Temperature on gaseous diffusion, frequency, humidity, molecular weight.

Super-position or Waves: Interference of two waves, Interference of waves from Coherent Sources, Description of Young's Experiments, Formation of Fringes, Width of Fringes, Practical examples of light Interference, Effect of introducing a thin transparent plate in the path of one of the interfering beams.

3.5 Beats in Sound Waves, frequency of beats, Stationary Waves in a Bounded Medium, Nodes and Antinodes, Stationary waves in Air Columns, Odd Harmonics, Transverse Waves in a stretched rope, Fundamental frequency of Stationary Waves in a rope, Sonometer, Resonance Tube, and Tunning Fork (Simple musical instruments based on Air Columns and Vibrations as Flute, Sitar and Violin).

Polarization or Light Waves: Un-polarized and Polarized light (Only Transverse Waves), Polarization of light, Production of Plane Polarized light, Polaroid.

Doppler's Effect: Doppler's effect in sound, Examples of Doppler's effect, Doppler's effect in light, Estimation of motion of stars and Galaxies through Doppler's effect.

Unit 4: ELELTRICITY & ELECTRO-MAGNETISM

4.1 **Electric Field and Potential:** Coulomb's Law, Electric field and Potential of a Point charge, Electric Dipole, Couple on an Electric Dipole in a uniform Electric field, Electric Dipole Moment, Electric field and Potential derivations in transverse and longitudinal positions of Dipole, Equipotential surface, Electric field and Potential on uniform plane surface. Gauss theorem and its application.

4.2 **Electric Capacitance:** Concept of Capacitance, Capacitor-Parallel Plate and spherical, Di-electric effect on capacitor, Combinations of Capacitors-in series and in parallel form, Energy of a charged Capacitor, Practical utility and applicability of Capacitor.

Electric Conduction: Free Electron Model of Electric conduction, Drift velocity of free Electrons, Relation between Electric current and drift velocity, Electric Resistance and Ohm's Law, Effect of Temperature on Resistivity, Ohmic and non-ohmic Circuits with examples, Dynamic Resistance.

4.3 **Simple Circuits:** Kirchhoff’s Laws, Combination of Resistance in series and in parallel form, Wheat-Stone's Bridge's Principle, Meter Bridge, Need of High Resistance Instrument for measuring Electro Motive Force (EMF), Principle of Potentiometer and its utility, electric energy and power.

4.4 **Moving Charges and Magnetic Field:** Force on a charge in a Magnetic Field, Motion of Charged particle in a Magnetic field, Explanation of the force on a Current-Carrying Conductor on the basis of the force on a Moving charge, Biot-Savart Law, Magnetic field at the Centre of a Circular Current-Carrying Coil, Magnetic-Field inside a long Current-Carrying Solenoid.

Magnetism: Couple on a Current loop in a Magnetic field, Magnetic Dipole Moment, Magnetic field due to a short Bar-Magnet-End-on Position, Broad-side on Position, Atomic Model of Magnetism, Magnetic Moment in axial rotation and spin of Electrons in Dia, Para and Ferro-magnetic substances, moving coil galvanometer.

4.5 **Electro-magnetic Induction and Alternating Current:** Magnetic flux, Laws of Faraday and Lenz, Explanations of Electro-magnetic Induction with Lorentz's forces, Time, Current and Potential Difference, Alternating Current, Peak value of alternating current, Mean value and Root Mean square value, Mutual Induction, Self-Induction, Effect of Core on self-induction,

Behaviour of Self-induction coil as a resistance, Power in AC Circuit, Wattless current, uses of Transformers, Behaviour of capacitor in Alternating Current circuits, frequency, Resonant Circuits.

Unit 5: ELECTRON, RADIATION, ATOMIC & NUCLEAR PHYSICS

5.1 **Diode, semiconductor and transistors:** Semiconductors of 'n' and 'p' type, Explanation of flow of current in n-p type semiconductors, Simple circuits of p-n-p Transistor, Comparison of transistor with Diode, Characteristics of transistor, Common base & common emitter transistor, amplifier, oscillator, feedback amplifier, transistor as a switch.

5.2 **Dual nature of matter and radiation:** Photo-Electric Effect: Photo-electric emission, Einstein's explanation of Photo electric effect, Work-function and Threshold frequency, Quantum Model of Light, Photo-electric Cell.

Matter waves: wave nature of particles debroglic hypothesis of matter wave, debroglies wavelength. Electromagnetic waves; displacement current, Maxwell equation, em-waves, relation between E and B in free space energy density in em-waves, characteristic of em-waves, transverse nature of em-wave, electro- magnetic spectrum.

5.3 **Structure of Atom:** Thomson's Model of Atomic structure, Qualitative description of Rutherford's α-particle scattering experiment, Rutherford's Model of Atomic structure, inability of Rutherford's model in explaining linear spectrum, Bohr's Model of Atomic structure, Assumptions and formula.

Origin of Spectrum: Series of Hydrogen Spectrum, energy Levels of Atoms, Excitation and Ionization Potential, energy level graph (Emission and Absorption), Explanation of spectrum, calculation of wave-length through Energy transitions, Linear and Band Spectrum and its relationship with substance, Solar Spectrum.

5.4 **Radiation:** Radiation Energy and its similarity with light, Emissive Power and Absorptive Power, Concept of perfectly Black Body, Krichoff's law, newtons law of cooling Stefan's Law, Graphical description of the spectrum of black body radiation, Wein's Principle, Hypothesis of Planck, Planck's constant.

X-Rays: Intensity of X-rays, Control on X-Rays Penetration, Electro-magnetic nature of X-rays. Continuous and characteristic X-rays, Moseley's law.

5.5 **Radio Activity:** Concept of Half-life statistical nature of Radio-active Process, radio active carbon dating. Radioactive decay law and decay constant, explanation of Alpha, Beta & Gamma decay.

Structure or Nucleus: Intra-nuclear force, simple process of Exchange (Fundamental Particles), Electron, Proton, Neutron, Pie Meson, Neutrino and mutual transformation of mass and Energy.

Nuclear Energy: Concept of Nuclear Binding Energy (Examples of Deutron and Alpha), Nuclear Fission, Nuclear Reactor (Critical Mass and Chain Reaction), Retardants and Controlling substances, Uses of Nuclear Reactors, Atomic Fusion, Solar Energy.

Communication system: Bandwidth of signals, bandwidth of medium, earth's atmosphere, propagation of radio waves, maximum line of sight distances, modulation, 3 types of modulation amplitude modulation, its production and detection.

ZOOLOGY

Unit 1:

1.1 Origin of Life, Miller's experiment, place of virus in the evolution of life.

1.2 **Organic evolution:** Basic idea and its evidences, Theories of evolution (Lamarkism and Darwinism), Human evolution

1.3 **Mechanism of evolution:** Definition of variation, causes and kinds of variations (Mutation theory of Hugo de Vries), Natural selection, Hardy-Weinberg's principle, gene flow and genetic drift.

1.4 Mendelian inheritance and deviations from Mendelian inheritance, Human genetics, Sex determination, sex linked characters, human hereditary traits in context of blood groups, genetic disorders like colour blindness, Haemophilia, Down's, Turner's and Klinefelter's syndromes.

1.5 DNA as hereditary material, structure of DNA and RNA, Central Dogma, Gene expression and regulation, Human genome project. DNA fingerprinting.

Unit 2:

2.1 **Digestion:** Alimentary canal and digestive glands, digestive enzymes and hormones, absorption and assimilation of proteins, carbohydrates and fats.

2.2 **Excretion:** Chemical nature of excretory products, modes of excretion, human excretory system- structure and function, urine formation, disorders.

2.3 **Respiration:** Respiratory organs in animals, human respiratory system, Breathing, exchange of gases, transport of gases, respiratory volumes.

2.4 **Circulation:** Composition and coagulation of blood, structure of human heart, cardiac cycle, double circulation, ECG, angina pectoris.

2.5 **Locomotion:** Skeletal muscles, muscle proteins and contraction, joints.

Unit 3:

3.1 **Neural control and co-ordination:** Neurons, nervous system in humans, nerve impulse conduction, sensory organs.

3.2 **Chemical co-ordination and regulation:** Endocrine glands and hormones, hormone action, diseases related with hypo and hyper secretion of hormones.

3.3 **Diversity in living world:** Five kingdom classification, salient features and classification of animals, binomial system.

3.4 Animal tissues

3.5 **Cockroach:** Morphology, anatomy and functions of different systems, life history.

Unit 4:

4.1 **Microbes in human welfare:** In house hold processing, industrial production, energy generation, sewage treatment, biofertilizers.

4.2 **Improvement in food production:** Apiculture, animal husbandry, tissue culture.

4.3 Health and disease parasitic diseases, vaccines, HIV, AIDS, Cancer.

4.4 **Biodiversity and its conservation:** concept and importance of biodiversity, hot spots, national parks and sanctuaries.

4.5 **Biotechnology and its applications:** Genetic engineering, applications of biotechnology in health and agriculture, genetically modified crops, transgenic animals.

Unit 5:

5.1 **Reproduction:** Male and female reproductive systems, gametogenesis- spermatogenesis and oogenesis, Early embryonic development.

5.2 **Reproductive health:** Sexually transmitted diseases, birth contol, Amniocentesis, IVF, ZIFT, GIFT (elementary idea).

5.3 **Osteology:** Study of mammalian bones.

5.4 **Evnironment:** Habitat, Population interactions, Population attributes.

5.5 **Ecosystems:** Components, Energy flow, nutrient cycling, succession.

SYLLABUS (INTERMEDIATE LEVEL): COMMERCE

The test paper shall have following four subjects all compulsory (i) General Knowledge and Current Affairs, (ii) English Language, Expression and Comprehension, (iii) Logic & Reasoning (iv) Quantitative Ability (10^{th} Level Math)

SYLLABUS (INTERMEDIATE LEVEL): ARTS

चित्रकला

Practical Examination Time: 30 minutes

स्मृति चित्रण (Memory Drawing): किसी एक विषय पर छाया व प्रकाश (Light & Shade) का प्रभाव दिखाते हुए, अपनी स्मृति के आधार पर पेन्सिल से चित्र बनाये।

विषय– माली का सामान/खेल का सामान/चाय के बर्तन/बढ़ई के औजार/बाल्टी व लोटा/अटैची/बन्द किताब/सुराही व गिलास/बिस्तर बन्द/छतरी/टिफिन कैरियर/संदूक/ताला/बोतल/तरकारियों के चित्र/पशु–पक्षी

SYLLABUS (INTERMEDIATE LEVEL): FINE ARTS

ललित कला

Practical Examination Time: 90 minutes

वस्तु चित्रण: सामने रखी हुयी वस्तु को पेंसिल के माध्यम से छाया व प्रकाश का प्रभाव दिखाते हुए चित्रित करना।

संयोजन (स्मृति के आधार पर): एक आकृति को स्मृति के आधार पर संयोजन कर जल रंग या तैल पेस्टल रंगों के माध्यम से चित्रित करना।

मूर्तिकला (स्मृति के आधार पर): मिट्टी के माध्यम से आकृति बनाना।

ECONOMICS

Unit 1: INTRODUCTION, CONSUMPTION & PRODUCTION

1.1 Introduction to Economics, Problem of choice, Indian Economic Thought, Definition of Western Thinkers.

1.2 Consumption-Meaning and Importance, Utility.

1.3 Law of Demand, Price Elasticity of Demand.

1.4 Production-Meaning & Importance, Laws of Production.

1.5 Factors of Production.

Unit 2: PRICE THEORY

2.1 Market-Definition, Classification & Extension of Market

2.2 Cost of Production, M. C., A. C. and their relationship.

2.3 Revenue-T. R., A. R., M. R., and their relationship.

2.4 Price determination under perfect competition.

2.5 Price determination under imperfect competition.

Unit 3: FOREIGN TRADE & PUBLIC FINANCE

3.1 Foreign Trade-Merits & Demerits. Foreign Exchange-Methods of earning foreign exchange.

3.2 Import and Export trade of India.

3.3 Foreign Trade Policy of India.

3.4 Direct & Indirect tax.

3.5 Sources of Income of Central & State Govts.

Unit 4: DISTRIBUTION

4.1 Problems of Distribution, Modern theory of Distribution, National Distribution with reference to India.

4.2 Rent-Definition, Ricardian Theory, Relation between Rent & Price.

4.3 Wages-Money, Wage & Real Wage, Standard of Living Efficiency of Labour, Effect of TU's on rate of wage.

4.4 Interest-Definition, Difference in rate of gross and net interest.

4.5 Profit-Gross and Net Profit.

Unit 5 : ECO. SYSTEMS, STATISTICS & EXCHANGE

5.1 Economic Systems-Capitalism, Socialism and Mixed Economy.

5.2 Statistics-Meaning, Definition and lmportance, Measures of Central Tendency.

5.3 Presentation of Data-Bar diagrams.

5.4 Exchange-Direct & Indirect exchange.

5.5 Economy & Employment-Causes and remedies of unemployment, Present position of unemployment in India.

ENGLISH

Unit 1: COMMON ERRORS IN ENGLISH:

1.1 Errors Related to Nouns and Pronouns

1.2 Errors Related to Tenses

1.3 Errors Related to Prepositions

1.4 Errors Related to Determiners

1.5 Errors Related to Verbs and Verbals

Unit 2: READING COMPREHENSION, FIGURES OF SPEECH, IDIOMS AND PHRASES:

2.1 Reading Comprehension

2.2 Identification of the Figures of Speech

2.3 Uses of the Figures of Speech

2.4 Idioms in Common Usage

2.5 Phrases in Common Usage

Unit 3: TRANSFORMATION OF SENTENCES AND SYNTHESIS

3.1 Clauses and Sentences

3.2 Degrees of Comparison

3.3 Active and Passive Voice

3.4 Direct and Indirect Speech

3.5 Synthesis of Sentences

Unit 4: VOCABULARY

4.1 Antonyms

4.2 Synonyms
4.3 Homonyms
4.4 One Word Substitutions
4.5 Words Often Confused

Unit 5: *THE MERCHANT OF VENICE* by William Shakespeare

5.1 Hornbill (Text-Book), Prose (NCERT)
5.2 Hornbill (Text-Book) Poetry, NCERT)
5.3 Snapshots (Supplementary Reader), NCERT
5.4 General Introducation so Shakespeare's 'The Merchant of Venice' and important Scenes (Casket Scene, Trial Scene, Ring Episode)
5.5 Character (Male & Female) in the Play 'The Merchant of Venice'

हिन्दी

यूनिट 1: हिन्दी गद्य एवं पद्य का विकास

1.1 हिन्दी गद्य साहित्य का विकासात्मक परिचय
1.2 युग प्रवर्त्तक लेखक एवं प्रमुख रचनाएँ
1.3 हिन्दी पद्य साहित्य का विकासात्मक परिचय
1.4 काव्य के प्रमुख कवि एवं रचनाएँ, प्रवृत्तियां
1.5 विभिन्न नवीन विधाएँ–संस्मरण, रेखाचित्र, डायरी, रिपोर्ताज

यूनिट 2: हिन्दी काव्य का विकास– आदिकाल, भक्तिकाल एवं रीतिकाल (प्रमुख कवि, प्रवृत्तियाँ तथा रचनाएँ)

2.1 आदिकाल की सामान्य विशेषताएँ
2.2 भक्तिकाल की सामान्य विशेषताएँ एवं विभिन्न नाम
2.3 निर्गुण एवं सगुण काव्यधारा
2.4 रीतिकाल की सामान्य विशेषताएँ
2.5 रीतिकाल के प्रमुख कवि तथा रचनाएँ

यूनिट 3: हिन्दी काव्य का विकास–आधुनिक काल (प्रमुख कवि, प्रवृत्तियाँ तथा रचनाएँ)

3.1 भारतेन्दु युग तथा द्विवेदी युग
3.2 छायावाद तथा रहस्यवाद
3.3 प्रगतिवाद, प्रयोगवाद तथा नई कविता
3.4 काव्य की प्रमुख विधाएँ–प्रबन्ध (महाकाव्य तथा खण्ड काव्य) तथा मुक्तक
3.5 आधुनिक काल के प्रमुख कवि तथा उनकी कृतियाँ–भारतेन्दु हरिश्चन्द्र, जगन्नाथ दास रत्नाकर, अयोध्या सिंह उपाध्याय 'हरिऔध', मैथिली शरण गुप्त, हरिवंश राय बच्चन, माखनलाल चतुर्वेदी, बालकृष्ण शर्मा 'नवीन', श्रीधर पाठक, सुभद्रा कुमारी चौहान, जयशंकर प्रसाद, सूर्यकान्त त्रिपाठी निराला, सुमित्रानंदन पन्त, महादेवी वर्मा, रामधारी सिंह दिनकर, सच्चिदानन्द हीरानंद वात्स्यायन 'अज्ञेय', नरेन्द्र शर्मा, भवानी प्रसाद मिश्र, गजानन माधव मुक्तिबोध, गिरिजा कुमार माथुर, धर्मवीर भारती।

यूनिट 4: काव्य शास्त्र

4.1 रस–सामग्री–स्थायी भाव, विभाव, अनुभाव, संचारी भाव

4.2 रसों की परिभाषा तथा उदाहरण (हास्य, श्रृंगार, वीर, करूण, वात्सल्य) रस के भेद–

4.3 शब्दालंकार– अनुप्रास, यमक, 'लेष

4.4 अर्थालंकार–उपमा, रूपक, उत्प्रेक्षा, व्यतिरेक, सन्देह, भ्रान्तिमान

4.5 छन्द–दोहा, सोरठा, चौपाई, रोला, कुण्डलिया, छप्पय कवित्त, सवैया।

यूनिट 5: व्याकरण

5.1 सन्धि (स्वर, व्यंजन, विसर्ग), समास, उपसर्ग, प्रत्यय

5.2 शब्द रूप–राम, फल, लता, कवि, भानु, धातुरूप– पठ्, भू, दृश

5.3 लोकोक्ति तथा मुहावरे

5.4 पद–संज्ञा, सर्वनाम, क्रिया, विशेषण

5.5 विपरीतार्थक शब्द, समानार्थक शब्द, वाक्यांश के लिए एक शब्द ।

HOME SCIENCE

Unit 1 : INTRODUCTION TO ANATOMY & PHYSIOLOGY

1.1 Digestive System - Anatomy & Physiology of the alimentary canal, Liver, Pancreas, Gall bladder.

1.2 Circulatory System- Heart, Blood, Blood Cells, Plasma and Serum.

1.3 Skeletal System-Joints & Movements.

1.4 Male & Female Reproductive System - Fertilization, Ovulation & Menstrual Cycle and Conception.

1.5 Endocrine System- Functions of Various Endocrine glands.

Unit 2 : FOOD, NUTRITION AND PRESERVATION

2.1 Definition & Functions of Food, Nutrition & Nutrients.

2.2 Balance Diet & Importance of Meal Planning.

2.3 Deficiency Diseases of Nutrients.

2.4 Classification & Functions of Vitamins and Minerals.

2.5 Definition & Methods of Food Preservation (Preparation of Jam, Jelly, & Pickles.

Unit 3 : FABRIC & APPAREL

3.1 Sewing Machine its Parts & Maintenance.

3.2 Care & Maintenance of Clothes.

3.3 Types of Stitching & Embroidery.

3.4 Factors Influencing Selection of Apparel -Age, Size, Climate, Occupation, Figure & Fashion.

3.5 Storage of Clothes.

Unit 4 : CHILD DEVELOPMENT & FAMILY STUDIES

4.1 Growth & Developement.

4.2 Meaning and Importance of Human Development.

4.3 Family: Meaning, Classification, Functions & Changing Pattern of Family in India.

4.4 Child Marriage & Dowry System.

4.5 Forms of Marriage & Divorce - Laws & Acts.

Unit 5 : HUMAN BODY & HEALTH CARE

5.1 Respiratory System - Parts Functions.

5.2 Excretory Organs - Skin, Liver, Large Intestine, Lungs and Kidneys.

5.3 Nervous System - Nerve Cell, Brain, Central Nervous System.

5.4 Communicable & Infectious Diseases & Immunization.

5.5 General Cleanliness.

संगीत (सितार व गायन)

यूनिट 1: पारिभाषिक शब्दावली

स्वर, सप्तक, तारता, तीव्रता व गुण, शुद्ध स्वर, विकृत स्वर, श्रुतियाँ, शुद्ध स्वरों का आन्दोलन एवं तार पर शुद्ध स्वरों का स्थापना। आलाप, तान, मुर्की, कण, कम्पन, मींड़, गमक, छूट, आरोह, अवरोह, पकड़, वादी–संवादी, अनुवादी, विवादी, अंश, न्यास, अल्पत्व–बहुत्व, चिकारी, खरज, तोड़ा, तिहाई, जमजमा।

यूनिट 2: राग–विज्ञान एवं वाद्य का ज्ञान

पूर्वराग–उत्तरराग, सन्धि प्रकाश राग, परमेल प्रवेशक राग, संगीत में थाटों का वर्गीकरण, व उससे रागोत्पत्ति, हिन्दुस्तानी और कर्नाटक पद्धतियों के स्वरों का तुलनात्मक अध्ययन, तानपुरा एवं सितार का अंग वर्णन एवं स्वर में मिलाने का ज्ञान।

यूनिट 3: गायन–वादन शैलियॉ

ध्रुपद, धमार, गीत, लक्षणगीत, ठुमरी, तराना, भजन, त्रिवट, चतुरंग, होली, कठिन अलंकारों की रचना, मसीतखानी एवं रजाखानी गत।

यूनिट 4: इतिहास व जीवनियॉ

1. भारतीय संगीत का संक्षिप्त इतिहास
2. जीवनियॉ– शारंगदेव, तानसेन, अमीर खुसरो, भातखंडे, विष्णु दिगम्बर, गोपाल नायक।

यूनिट 5 : राग–ताल अध्ययन

1. निर्धारित रागों का शास्त्रीय अध्ययन।
2. छोटे स्वर समुदायों के आधार पर राग–पहिचान, **निर्धारित रागः** वृन्दावनी सारंग, भीमपलासी, भैरव, केदार, मालकौंस, जौनपुरी, दुर्गा, देस, पूर्वी, हमीर, बहार।
3. निर्धारित तालों का 'शास्त्रीय अध्ययन।
4. छोटे तालांशों के आधार पर ताल–पहिचान, **निर्धारित तालें:** दादरा, कहरवा, रूपक, दीपचन्दी, झपताल, एकताल, चौताल, धमार, त्रिताल।

संगीत (तबला)

यूनिट 1 पारिभाषिक शब्द

1.1 संगीत, स्वर, सप्तक, विभिन्न गायन शैलियां
1.2 ठेका, मात्रा, सम, ताली, खाली, विभाग, आवर्तन
1.3 पेशकार, कायदा, पल्टा, रेला
1.4 उठान टुकड़ा, मुखड़ा, मोहरा, परन तिहाई
1.5 लय, ताल, लयकारी, ताल के दस प्राण

यूनिट 2 विभिन्न प्रकार के संगीत वाद्य अपने वाद्य का अंग वर्णन एवं मिलाने का विषेष ज्ञान, व वर्ण निकास

2.1 भारतीय वाद्य वर्गीकरण

2.2 तत् एवं सुषिर वाद्य

2.3 घन एवं अवनद्ध वाद्य

2.4 तबले का अंग वर्णन

2.5 तबला वाद्य को मिलाने की विधि एवं तबले के वर्ण

यूनिट 3 पाठ्यक्रम की तालों में लयकारी एवं ठेकों के कुछ बोलों के आधार पर तालों को पहचानने की योग्यता

3.1 पाठ्यक्रम में निर्धारित बन्द बोलों की तालों का परिचय

3.2 पाठ्यक्रम में निर्धारित खुले बोलों की तालों का परिचय

3.3 विभिन्न गायन शैलियों के साथ पाठ्यक्रम की तालों का प्रयोग

3.4 पाठ्यक्रम की तालों में लयकारी

3.5 दिये गये बोलों के आधार पर तालों को पहचानने की योग्यता

यूनिट 4 तबला वादन के घराने एवं बाज, पाठ्यक्रम में निर्धारित तालों में पेषकार, कायदा, टुकड़े, मुखड़े, तिहाई इत्यादि को लिपिबद्ध करने की योग्यता

4.1 घरानाः अर्थ एवं महत्व, तबले के विभिन्न घराने

4.2 घरानों की वंश परम्परा

4.3 बाजः अर्थ एवं वर्गीकरण, तबले के विभिन्न बाजों की विशेषतायें

4.4 पाठ्यक्रम की तालों में कायदा, पेशकार लिपिबद्ध करना।

4.5 टुकड़े, मुखड़े एवं तिहाई लिपिबद्ध करना

यूनिट 5 भारतीय संगीत का इतिहास, भारतीय संगीतज्ञः षारंगदेव, तानसेन, अमीरखुसरो, भातखण्डे, विष्णु दिगम्बर, गोपाल नायक

5.1 प्राचीन एवं मध्यकाल में संगीतः संक्षिप्त परिचय

5.2 आधुनिक काल में संगीतः स्वतंत्रता पूर्व एवं स्वतंत्रता प्राप्ति के पश्चात्

5.3 पं० शारंगदेव एवं डा० अमीर खुसरो का जीवन परिचय एवं सांगीतिक योगदान

5.4 पं० गोपाल नायक एवं तानसेन का जीवन परिचय एवं सांगीतिक योगदान

5.5 पं० विष्णु दिगम्बर पलुस्कर एवं पं० विष्णु नारायण भातखण्डे का जीवन परिचय एवं सांगीतिक योगदान

POLITICAL SCIENCE

Unit 1:

1.1 Meaning and Scope of Civics
1.2 Associations
1.3 Citizenship
1.4 Rights and Duties
1.5 Law

Unit 2:

2.1 State-Meaning & Theories of Origin of State
2.2 Functions of State
2.3 Aristotle's classification of State
2.4 Unitary and Federal Government
2.5 Parliamentary and Presidential form of Government

Unit 3:

3.1 Preamble and Salient Features of Indian Constitution
3.2 Fundamental Rights
3.3 Directive Principles of State Policy

3.4 President of India

3.5 Prime Minister of India

Unit 4:

4.1 Central Council of Ministers

4.2 Vice-President of India

4.3 Central Legislative-Lok Sabha and Rajya Sabha

4.4 Relation between Centre and States

4.5 Supreme Court

Unit 5:

5.1 High Courts 5.2 District Courts

5.3 Local Self Government 5.4 Democracy 5.5 U.N.0.

PSYCHOLOGY

Unit 1:

1.1 Psychology-Meaning, Definition, Scope and Importance.

1.2 Methods of Psychology- Introspection, Observation (General and Therapeutic), Experimental Method.

1.3 Response Mechanism-Central, Autonomic and Peripheral Nervous Systems.

1.4 Neuron- Structure & functions of neuron, Localization of brain functions.

1.5 Motivation- Importance in Behaviour, Innate and Acquired Motives, Different approaches.

Unit 2:

2.1 Emotions-Meaning and Nature, Simple and Complex emotional States, Physical changes & Role of Emotions in experience and behaviour.

2.2 Theories of Emotions- James-Lange, Cannon-Bard, Schachter.

2.3 Learning- Maturation & Learning, imitation, Methods of learning, Favourable conditions of learning.

2.4 Theories of Learning- Conditioning, Trial & Error, insight. Learning curve, Transfer of learning.

2.5 Psychological Testing- Meaning, Nature & Types of tests (Verbal, non-verbal, Group & Individual). Intelligence tests, Personality tests & Aptitude tests.

Unit 3:

3.1 Guidance- Meaning & Importance, Types (Educational, Vocational and Personal). Guidance in India with special reference to U.P.

3.2 Delinquency- Causes (Environment and Psychological).

Prevention of Delinquency- Reformatory Homes, Psychotherapy.

3.3 Attention- Nature, Meaning, Interest, Determinants of Attention.

3.4 Perception- Nature, Meaning, Sensation, Gestalt Theory, Role of Emotions & Motivations in Perception. Illusion and Hallucination.

3.5 Memory- Retention, Levels of Retention, Favourable conditions of Memorization, Economic ways of Memorization, Methods of Measurement of Memory, Forgetting, causes & determinants.

Unit 4:

4.1 Personality-Meaning, Determinants, Heredity, Role of Endocrine glands, Environment (Home, School and Society), Personality traits & types of Personality.

4.2 Statistics in Psychology- Meaning, Nature, organization of data and its importance, Measures of Central tendency- Mean, Median and Mode – Meaning, uses & importance.

4.3 Mental Health- Meaning, Scope & Utility, Causes of Mental illness, Ways to cure & prevent mental illness.

4.4 Psychology in industry- Personnel selection, Working conditions, Human factors in Industry, Social welfare activities for workers, strikes and Lockouts.

4.5 Group Tension- Its increase, Casticism, Communalism, Religionism and Languageism in India. Ways of Eradication of Group tension.

Unit 5:

5.1 Environmental Psychology- Nature, Characteristics, Classification, Environmental Pollution, its effect on human behaviour, Ways to remove environmental pollution.

5.2 Famous Intelligence tests- Standford Binet, Weschler scale, Bhatia's battery.

5.3 Famous personality tests and related tests- M.M.P.I., D.A.T., Interest tests, Adjustment tests.

5.4 Difference between Tests & Experiments- Steps of Tests & Experiments.

5.5 Report writing (Both in experiment & test)

1. Whole & part method of memorizing
2. Mirror drawing
3. Span of Attention
4. Free Association (words list method)

संस्कृत

यूनिट 1: वैदिक एवं लौकिक साहित्य

1.1 वेद एवं उपनिषद् 1.2 रामायण एवं महाभारत 1.3 कालिदास

1.4 भास 1.5 बाणभट्ट एवं दण्डी, माघ, भारवि

यूनिट 2: प्रत्यय, कर्तृवाच्य, प्रत्याहार, माहेष्वर सूत्र

2.1 क्त, क्तवतु, शतृ, शानच् 2.2 तुमुन्, अनीयर्, क्त्वा, ल्यप्

2.3 ल्युट्, तृच्, टाप् ण्वुल् 2.4 कर्तृवाच्य, कर्मवाच्य, भाववाच्य 2.5 प्रत्याहार, माहेश्वर सूत्र।

यूनिट 3: शब्द रूप, धातु रूप

3.1 राम, हरि, गुरू, रमा, मति, नदी, धेनु, फल, वारि, दधि, मधु

3.2 पितृ, भगवत्, करिन्, राजन्, वाच्, श्री, स्त्री, आप्, जगत्, नामन्

3.3 सर्व, तद्, यद्, किम्, युष्मद्, अस्मद्, इदम्, एतद्, अदस्

3.4 भू, पठ्, पा, गम्, दृश्, स्था, नी, घ्रा, 'ाक्, पृच्छ रक्ष्

3.5 आत्मनेपद– लभ्, सेव्, विद्। उभयपद–नी,याच्, दा, ग्रह्, ज्ञा, चुर्, कृ।

यूनिट 4: समास एवं सन्धि

4.1 तत्पुरूष, अव्ययीभाव, बहुव्रीहि 4.2 कर्मधारय, द्वन्द्व, द्विगु
4.3 स्वर सन्धि 4.4 व्यंजन सन्धि 4.5 विसर्ग सन्धि।

यूनिट 5: कारक एवं अनुवाद

5.1 कारक–प्रथमा व द्वितीया विभक्ति के सूत्र 5.2 तृतीया व चतुर्थी विभक्ति के सूत्र
5.3 पंचमी, षष्ठी व सप्तमी विभक्ति के सूत्र 5.4 अनुवाद हिन्दी–संस्कृत 5.5 अनुवाद संस्कृत–हिन्दी।

SOCIOLOGY

Unit 1: BASIC CONCEPTS OF SOCIOLOGY

1.1 Sociology: Meaning and Scope.
1.2 Relation of Sociology with Economics & Psychology, Social Anthropology, History
1.3 Society: Meaning and Characteristics, Difference between animal and human society.
1.4 Community & Social Group-Concepts.
1.5 Association & Institution-Meaning, Features.

Unit 2: SOCIAL CHANGE AND CONTROL

2.1 Social Change: Meaning & Features.
2.2 Factors of Social Change: Cultural, Economic and Geographical.
2.3 Impact of Urbanization and Industrialization and globalization on Indian Society.
2.4 Social Control: Meaning and Types.
2.5 Informal Agencies of Social Control, Family, Play Group, Religion, Customs & Traditions.

Unit 3: HINDU SOCIAL ORGANIZATION

3.1 Hindu Social Organization: Features.
3.2 Varna Vyavastha: Features and Significance in Traditional Society.
3.3 Caste System: Features.
3.4 Samskar: Meaning & Types of Major Samskars.
3.5 Ashram-Vyavastha: Importance.

Unit 4: SOCIAL DISORGANIZATION

4.1 Social Disorganization: Meaning and Features.
4.2 Crime: Meaning and Types.
4.3 Crime: Causes.
4.4 Juvenile Delinquency: Meaning & Causes.
4.5 Poverty and Unemployment: Meaning, Causes and Effects Terrorism

Unit 5: MAJOR SOCIAL INSTITUTIONS

5.1 Family: Nuclear and Joint, Meaning, Features & Importance in an Individual's life, Drawbacks of Joint Family System & Causes of its disintegration.
5.2 Marriage: Meaning & Types.
5.3 Religion
5.4 Panchayati Raj: Meaning & Organization, Role of Panchayat in the Past.
5.5 Co-operatives: Meaning and their Role in Rural Society.

SYLLABUS: (Modern Office Management & Secretarial Practice)

Unit 1: General Knowledge & Current Affairs

1.1 Environment

1.2 India: States, Capitals, Cities & Languages

1.3 Sports & Games: Terms associated with different sports & games, Leading sports persons.

Unit 2: Hindi (Intermediate Level)

Unit 3: English (Intermediate Level)

यूनिट 1 : सामान्य ज्ञान एवं तत्कालीन घटनाएँ

1.1 पर्यावरण

1.2 भारत : विभिन्न राज्य, राजधानियाँ, शहर और भाषाएँ

1.3 खेलकूद : खेलकूद से संबंधित शब्दावली, प्रमुख खिलाड़ी

यूनिट 2 : हिन्दी (इण्टरमीडियट स्तर)

यूनिट 3 : अंग्रेजी (इण्टरमीडियट स्तर)

SYLLABUS: B.TECH. (PART TIME) ELECTRICAL

GENERAL KNOWLEDGE, LOGICAL & QUANTITATIVE ABILITY – Syllabus same as the Common Syllabus for all programs (see pages 75 to 77 of syllabus book for Online Tests).

MATHEMATICS:

Matrices: Adjoint and inverse of a matrix, rank of a matrix, characteristic roots and vectors.

Differential Calculus: Differentiation of a product of two functions, quotient of two functions, function of a function, parametric and implicit functions, logarithmic differentiation. Application of differential calculus to problems of rate, velocity, acceleration, small errors, gradient and in co-ordinate geometry for tangent, normal, sub-tangent, sub-normal etc. Successive differentiation, Leibnitz's Theorem, MacLaurin's and Taylor's theorems, Polar coordinates, derivative of an arc, radius of curvature, partial differentiation of functions of two and three variables only. Problems of maximum and minimum values.

Integral Calculus: Formulae for the integration of x^n, e^x, x^{-1}, $Sin(x)$, $Cos(x)$, $1/\sqrt{(1-x^2)}$, $1/\sqrt{(x^2-1)}$, $1/(1+x^2)$, Sec^2x, $Cosec^2x$.Problems of integration by substitution, by parts and by partial fractions. Definite integrals and Gamma function. Use of the above integration formulae for area, volume, mean values and problems of engineering subjects.

Differential Equations: First-order, variables separable. Homogeneous differential equations. First-order linear differential equations. Exact differential equations. n^{th} order linear differential equations with constant coefficients and homogeneous linear differential equations.

Vector Analysis: Definition, representation, mod, null and unit vectors. Addition, subtraction, dot product & cross product of two vectors, application to work, area linear and angular velocity, vector differentiation and integration.

Vector Calculus: Differentiation and Integration of vectors, Gradient of a scalar point function, Divergence and curl of a vector point function and their physical meaning, line, surface and volume integrals, Gauss and Stoke's theorems (without proof) , Simple applications.

Ordinary & Partial Differential Equations:

(i) **ODE**: Method of variation of parameters, Ordinary differential equations of second order, Solution in series, Legendre's and Bessel's equations and their recurrence relations.

(ii) **PDE**: Simultaneous and total differential equations, elementary partial differential equations of first order, homogeneous and non-homogeneous partial difference equations with constant coefficients. Solution for wave, heat conduction and transmission equations.

Statistics: Moments, Moment generating functions, mathematical expectation, Binomial, Poisson's and Normal distribution, curve fitting, correlation and regression.

BASIC EECTRICAL ENGINEERING

UNIT 1: CIRCUIT ANALYSIS

Review of basic concepts of units, voltage, current, power, energy, etc. R, L and C – their geometrical, circuit and energy view point. Ohm's law, KVL, KCL, Mesh Analysis and Nodal Analysis. Thevenin's and Norton's Theorems, Superposition theorem. Maximum power transfer Theorem. Star Delta conversion.

UNIT 2: AC CIRCUITS

Principles of single phase and three phase generation (qualitative treatment only). Steady state analysis of RC, RL and RLC circuits for sinusoidal excitation. Phasor notation, RMS Values, Power Factor, Resonance. Complex Power, active and reactive power. 3-phase (balanced and unbalanced) system.

UNIT 3: MAGNETIC CIRCUITS AND TRANSFORMERS

Ampere's Circuital law and Constant Flux Theorem. B-H curve, Magnetic circuit calculations. Hysteresis and Eddy Current losses. Transformers: construction e.m.f. equation, ratings phasor diagram on No-load & Full load, Open circuit & short circuit tests, efficiency and regulation, operation of auto-transformers.

UNIT 4: ELECTRICAL MACHINES

Classification, construction, emf and torque production. Characteristics of DC motors and generators, application. Induction motors: revolving magnetic field, principle of torque production, ratings, construction (squirrel cage and wound rotor). Torque-speed characteristics. Applications.

UNIT 5: ELECTRICAL MEASUREMENTS

PMMC meters, moving iron ammeter and voltmeter. Dynamometer wattmeter, AC energy meter. Extension of instrument ranges.

(B.VOC.) PROGRAMMES

B.Voc. - Apparel Design/ Textile/ Food Processing & Preservation/ Pottery and Ceramic Design/ Commercial Arts/ Tourism and Hospitality/ Bamboo & Wood Technology/ Recycled Craft Design.

B.Voc. - Dairy Technology/ Water, Sanitation & Waste Management/ Agricultural Technology/ Internet of Things/ Automobile/ Renewable Energy/ Banking and Finance/ AI and Robotics / Digital Manufacturing/ Talimatics/ Greenhouse Technology/ Accounting and Taxation/ Telicommunication/ Management and Manufacture of Homeopathic Drugs/Managment and Manufacture of Ayurvedic Drugs.

Syllabus of B.Voc. (See Hindi & English grammar on page 40 to 41 and rest of the courses from page no 75 to 77).

HINDI GRAMMER (Intermediate Level)

यूनिट–1 : स्वर, व्यजन, वर्ण एवं शब्द विधान

1.1 स्वर के प्रकार, संख्या

1.2 व्यंजन वर्ग

1.3 अल्पप्राण, महाप्राण ध्वनियां

1.4 शब्द के प्रकार, शब्द संपदा

1.5 रूढ, यौगिक, एवं योगरूढ शब्द

यूनिट–2 : संधि, संज्ञा, सर्वनाम, लिंग, वचन

2.1 सन्धि के प्रकार, स्वर स्वयंजन और विसर्ग

2.2 संज्ञा के भेद

2.3 सर्वनाम के भेद, पुरूष

2.4 लिंग भेद, लिंग के नियम, पुलिंग से स्त्रीलिंग बनाना

2.5 वचन के भेद, वचन परिवर्तन

यूनिट–3 : काल, क्रिया, विशेषण, क्रिया विशेषण, शब्द रचना

3.1 काल के प्रकार

3.2 क्रिया के भेद, संयुक्त क्रिया और सहायक क्रिया

3.3 परिभाषा, भेद, रचना

3.4 क्रिया विशेषण का वर्गीकरण

3.5 उपसर्ग और प्रत्यय

यूनिट–4 : कारक, समास, अव्यय, वाक्य, विराम चिन्ह

4.1 कारक के प्रकार एवं चिन्ह

4.2 समास के प्रकार

4.3 वाक्य विभाग, वाक्य रचना

4.4 अव्यय के भेद

4.5 विराम चिन्हों की पहचान

यूनिट–5 : शब्दावली

5.1 पर्यायवाची

5.2 विलोम

5.3 सामान्य प्रयोग के मुहावरे

5.4 सामान्य प्रयोग की लोकोक्तियां

5.5 अनेक शब्दों के लिए एक शब्द

ENGLISH GRAMMAR (Intermediate Level)

UNIT 1: COMMON ERRORS IN PARTS OF SPEECH

1.1 Errors Related to Nouns and Pronouns
1.2 Errors Related to Adjectives
1.3 Errors Related to Articles
1.4 Errors Related to Adverbs and Conjunctions
1.5 Errors Related to Prepositions

UNIT 2: VERBS

2.1 Primary Auxiliaries
2.2 Modal Auxiliaries
2.3 Transitive and Intransitive Verbs
2.4 Finite Verbs
2.5 Non-Finite Verbs

UNIT 3: TENSES AND IDIOMS AND PHRASES

3.1 Present Tense
3.2 Past Tense
3.3 Future Tense
3.4 Idioms in Common Usage
3.5 Phrases in Common Usage

UNIT 4: TRANSFORMATION OF SENTENCES

4.1 Clauses and Sentences
4.2 Degrees of Comparison
4.3 Question Tags
4.4 Reported Speech
4.5 Passive Voice

UNIT 5: VOCABULARY

5.1 Antonyms
5.2 Synonyms
5.3 Homonyms
5.4 One Word Substitutes
5.5 Words Often Confused

SYLLABUS (GRADUATE LEVEL): SCIENCE

BOTANY

Unit 1: THALLOPHYTA

1.1 Algae 1.2 Fungi 1.3 Virus
1.4 Bacteria, Mycoplasma 1.5 Microbiology

Unit 2: ARCHEGONIATAE

2.1 Bryophyta 2.2 Pteridophyta 2.3 Gymnosperm
2.4 Palaeobotany 2.5 General

Unit 3: ANGIOSPERM

3.1 Taxonomy 3.2 Anatomy 3.3 Embryology
3.4 Economic Botany

Unit4: ECOLOGY AND PHYSIOLOGY

4.1 Ecosystem, climate and Plant responce, Edaphic factor
4.2 Biotic inter-relationship, conservation, pollution

4.3 Photosynthesis, photosynthetic apparatus, mechanism
4.4 Biochemistry, hormones, vernalization, photoperiodism
4.5 Respiration, Enzymes.

Unit 5:

5.1 Cytology 5.2 Genetics 5.3 Plant breeding
5.4 Cell biology 5.5 Nucleic acids.

CHEMISTRY

Unit 1: GENERAL CHEMISTRY-I

1.1 & 1.2 Atomic Structure and Nuclear Chemistry: Discovery of electrons, protons, neutrons, Rutherford model, Bohr's model, Rydberg relationship, Binding energy, Shells, Subshells, Quantum numbers, Pauli's Exclusion principle, Hund's rule, Aufbau principle, Composition of the nucleus, nuclear forces, binding energy, group displacement law, rate of disintegration and half life, nuclear fission and fusion, Hazards of radiations uses of radioisotopes.

1.3 & 1.4 Chemical Bonding: (A) Ionic bond: Packing of ions in crystal, lattice energy, Born-Haber equation, Polarizing Power and polarizability, fajan's rule, hydration energy and (B) Covalent Bond: General characteristics, resonance, hybridization, sigma and pi bonds, bond energy, bond moment and dipole moments, L.C.A.O and M.O. theory, bonding, anti-bonding and non-bonding orbitals, M.O. configuration of simple diatomic molecules, Comparison of V.B. and M.O. theories.

1.5 Periodic Classification: Periodic classification and periodicity of elements, s, p, d and f block elements, the long form of periodic table including recent classification, periodicity in properties-a general consideration.

Unit 2: GENERAL CHEMISTRY-II

2.1 Gaseous State: Gas laws, Kinetic theory, Maxwell distribution law, Most probable, average and root mean square velocities of molecules. Principle of equipartition of energy, Molecular basis of heat capacity, Mean free path and collision frequencies, Real gases, Van der waals equation of state, implications of the Van der waals equation, Law of corresponding states and reduced equations of state. Critical Phenomena and Critical Constants, Liquefaction of gases.

2.2 Quantum Mechanics: Black-body radiation, heat capacities, photoelectric effect, the compton effect, the diffraction of electrons, de-Broglie equation, Heisenberg's uncertainity principle, postulates of quantum mechanic, operators, normalization and orthogonality of wave functions, eigen value and eigen functions, Schrodinger equation to the free particle and particle in a box and their solutions, quantum numbers.

2.3 Spectroscopy: Rotational, Vibrational and Electronic Spectra.

2.4 Theory of Ionization: Strong and weak electrolytes, pH of acids and bases, pH Hydrolysis, acid base titration, acid-base indicator, common ion effect, buffer solutions, activity coefficient,

2.5 Solution: Raoult's Law and Henry's Law, Relative lowering of vapour pressure, Elevation in boiling point, depression in freezing point, osmotic pressure, Van't Hoff factor, abnormal molar mass.

Unit 3: INORGANIC CHEMISTRY

3.1 Group studies (s & p): Hydrogen, Trends in physical and chemical properties of the elements and their important classes of compounds of (a) s-block elements, Solvation (including liquid ammonia) complexation tendencies, anomalous behaviour and diagonal

relationships, (b) p-block elements-Oxidation state diagrams on the basis of redox potential, inert pair effect and catenation, (c) d & f block elements Colour and spectral behaviour, Chemistry of Sc and Cu, magnetic behaviour, General study of the lanthanides & Actinides.

3.2 Principles or Metallurgy: (a) Chief modes of occurrence of metal, Principles of froth floatation, gravity separation and chemical leaching methods, Role of carbon and other reducing agents, Electrolytic reduction (b) Qualitative idea of free energy-temperature graphs, (c) Methods of purification and refining of metals, methods like zone refining and ion-exchange, Solvent extraction and electrolytic methods.

3.3. Aqueous and Non-aqueous solvents Aqueous Chemistry: Introduction, conventions and units in aqueous solution chemistry, hydration of ions and solubilities of salts, ionisation of acids in aqueous solution, complex formation, formation constants of complexes.

Non-aqueous Chemistry: Study of solvents such as liquid ammonia and liquid SO_2, fluoro sulphuric acid, N_2O_4 and $POCl_3$, Coordination model of solute-solvent interaction in polar, protic and aprotic solvents.

3.4 Coordination Chemistry: Werner's theory, stereochemistry, isomerism in coordination complexes, field theories to explain bonding, magnetism, geometry and colour of coordination complexes, Stability, Determination of composition of complexes by spectrophotometry, calorimetric, pH-metric and conductometric methods and dipole.

3.5 Crystal field theory: Jahn-Teller effect, thermodynamic effects of crystal field splitting, enthalpies of hydration for M^{2+} ion, lattice energies of MCl_2 compounds etc. Ligand field theory: Molecular orbital treatment of octahedral complexes and bonding MO's for tetrahederal and square planar complexes, Electronic spectra of transition metal complexes, general features, theoretical aspects of d-d spectra, selection rules, weak field splitting schemes, Orgel diagrams, selected examples of d-d spectra including mixed ligand systems e.g., Co(en) Cl_2 Cl_2 charge transfer effect.

Unit 4: PHYSICAL CHEMISTRY

4.1 Crystalline state: Types of bonding in solids, Law of constancy of angles, concept of unit cell, seven crystal systems, Bravais lattices, law of rational indices, Miller indices, symmetry elements in crystals, point groups and 32 crystal classes.

4.2 Thermodynamics: First law of thermodynamics and internal energy, enthalpy, relation between C_p and C_v, calculation of w, q, dU and dH for expansion of an ideal gas, Joule-Thompson coefficient and inversion temperature, Standard states, standard enthalpy of formation, Hess's law of constant heat summation, enthalpy of solution, enthalpy of dilution, enthalpy of neutralisation, enthalpy of ionisation and enthalpy of formation of ions, Bond dissociation energies, Born-Haber cycle, Kirchhoff's equation, Spontaneous processes, Carnot's cycle, second law of thermodynamics, entropy, entropy changes of different processes, Clausius-Clapeyron equation, chemical potential, Gibbs-Duhem equation, Variation of chemical potential With T and P and X. Third Law of Thermodynamics and Concept of residual Entropy

4.3 ELECTROCHEMISTRY: Conductivity and its measurements, Kohlraush law, Variation of molar conductivity with concentration of weak and strong electrolytes, Conductometric titrations, Transfer numbers, Determination using Hittorf's moving boundary methods, Application of conductance measurement for determining solubility and solubility products, degree of ionisation, ionic product of water and hydrolysis constant. Electrolytic and galvanic cells, reversible and irreversible cells, Nernst equation, Free energy of a cell reaction. Debye-Huckel theory of strong electrolytes, Activity and activity coefficients, Debye-Huckel limiting equation for activity coefficients. Onsagar equation, electrical double layer, origin of electrode potentials, concentration cells, liquid junction potentials.

4.4 Chemical Kinetics and Photochemistry: Order and molecularity of a reaction, integrated forms upto second order only, methods of determination of order of a reaction, reaction mechanism, complex reactions, effect of temperature on reaction rate, Collision theory of unimolecular and bimolecular reactions, Absolute reaction rate theory, Kinetics of reaction in solutions: salt effect, effect of pressure and dielectric constant on reaction rates. Kinetics of heterogeneous reaction: Langmuir's theory of unimolecular and bimolecular surface reactions. Fast reactions. Laws of photochemistry, quantum efficiency and its measurements, reasons of low and high quantum yields, photochemical excitation and photosensitization, Luminiscences.

4.5 Catalysis, Surface Chemistry and Phase Equilbria: Homogenous and heterogenous catalysis, theories of catalysis, acid base catalysis, industrial application.

Adsorption: Types of adsorption, chemical and physical adsorption, Freundlich adsorption isotherm, Langmuir's adsorption isotherm, BET adsorption theory and isotherm, heat of adsorption, Gibbs adsorption equation. Phase, components, Degree of freedom, The Phase Rule, One Component Systems (Water system, CO_2 system, S system), Two Component Systems (Types A-Simple systems, Type B-Systems in which stable Compound is formed) Applications Distribution coefficient, distribution law, conditions for the validity of distribution law. Association and dissociation of solute, Chemical combination of solute with one of the solvents. Applications of distribution law, process of extraction.

Unit 5: ORGANIC CHEMISTRY

5.1 Hydrocarbons: Introduction, isomerism, synthesis, physical properties, chemical reactivity of (a) Alkanes and Cycloalkanes (b) alkenes (c) alkynes mechanism of free radical halogenations, Bayer's strain theory, Electrophilic addition reactions and their mechanism, Markownikoff's rule, peroxide effect, Polymerisation.

5.2 Aliphatic Compounds: Introduction, methods of synthesis, general properties, synthetic applications of alkyl halides, alcohols and ethers, aldehydes and ketones, carboxylic acids and their derivatives, Pinacol- pinacolone re-arrangement, nucleophilic addition reactions, Cannizaro's reaction, Mannich reaction, Reformatsky reaction, acidity of alpha hydrogen atom in carbonyl compounds, aldol condensation, Perkin's reaction, Knoevenagel reaction, mechanism of esterification and hydrolysis of esters, Alpha-beta unsaturated acids, Introduction to substituted acids, alpha-halo acids, alpha-hydroxy acids and amino acids, Introduction to carboxylic acid derivatives, methods of synthesis and relative reactivity of acid halides, amides and anhydrides.

Aliphatic amines: Nomenclalure, methods of preparation, separation of amines, general properties of ethyl/methyl amines, diethylamine.

5.3 Aromatic Compounds and aromaticity: Nomenclature and isomerism of aromatic compounds, synthesis, physical properties and chemical reactions of aromatic hydrocarbons, Phenols, aromatic halogen compounds, aromatic nitro amino and diazo compounds, aromatic acids and sulphonic acids.

5.4 Stereochemistry: Structure and configuration, geometrical isomerism, E and Z system of nomenclature, Optical isomerism, elements of symmetry and chirality, D and L nomenclalure, R and S system.

5.5 Carbohydrates and our food: Introduction, occurrence, classification, inter-relationship amongst monosaccharides, Interconversion of aldoses and ketoses, our food and its composition (Introductory idea of vitamin's, Carbohydrates, proteins, oils and fats).

MATHEMATICS

Unit 1: CALCULUS

1.1 Co-ordinate System of Plane and Space, Polar Coordinates, Cartesian, Spherical and Cylindrical Coordinates, Increasing and Decreasing Functions

1.2 Real valued functions of real variable -, Local and absolute maxima, minima, Concavity, Point of Inflection, Curvature and torsion

1.3 Functions of several variables - Maxima and Minima

1.4 Double and Triple integration

1.5 Line and Surface Integrals, Green's Theorem, Gauss Divergence Theorem, Stokes Theorem.

Unit 2: ANALYSIS (Real and Complex)

2.1 Sequence and Series, Power series, Tests of convergence

2.2 Limit, Continuity, Differentiability of real valued functions of real variable

2.3 Limit, Continuity, Differentiability of complex functions

2.4 Holomorphic/Analytic Functions

2.5 Riemann Integration, Complex Integration

Unit 3: DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS

3.1 First Order and First Degree (Exact) equations, Linear Differential Equations with constant coefficients

3.2 Differential Equations of First order but not of First degree, Solution in Series (Legendre, Bessel)

3.3 Partial Differential Equations: Linear and Non-Linear of First Order

3.4 Laplace Transforms, Inverse, Convolution

3.5 Fourier Transforms-Infinite, Finite.

Unit 4: ALGEBRA AND LINEAR ALGEBRA

4.1 Group, Subgroup, Cyclic Group, Quotient Group

4.2 Group Homomorphism, Isomorphism

4.3 Ring, Ideal, Field

4.4 System of Linear Equations, Vector Spaces, Basis, Dimension

4.5 Linear Transformation, Rank of a Matrix, Invertibility, Eigen Values, Eigen Vectors.

Unit 5: NUMERICAL ANALYSIS

5.1 Interpolation: Forward, backward and central operators and differences, divided difference. Newton's forward difference, backward difference and divided difference formula. Lagrange's Interpolation formula, Gauss forward and backward formula, Stirling's formula, Bessel's formula and Everett's formula. Missing term technique.

5.2 Descarte's rule of signs, Bisection method, Regulafalsi method, Secant method, Newton Raphsonmethod, geometrical interpretation and order of convergence of methods.

5.3 Numerical Differentiation and Integration.

5.4 Numerical solution of ODE: Taylor's method, Picard's method, Euler's method, Euler's modified method, Runge-Kutta methods, Milne's predictor corrector method.

5.5 Linear system of equations and Eigenvalue problem, Gauss elimination and Gauss Jordan Method, Factorization method, Cholesky's, Dolittle, Crout methods, Jacobi's method, Gauss Seidal method, Eigenvalues and Eigenvectors, Power method.

PHYSICS

Unit 1: MECHANICS, RELATIVITY & THERMAL PHYSES

1.1 Frames of Reference and Special Theory of Relativity: Intertial and Non-Inertial Frames of Reference, Galilean Transformation, Michelson-Morley Experiment, Lorentz Transformation, Length Contraction and Time Dilation, Conservation of momentum, variation of mass.

1.2 Dynamics of Particles in a conservative Field and Dynamics of Rigid Bodies: Conservative Force Field, Planetary Motion, Gravitational Field and Potential, Reduced Mass, angular momentum of a system with centre of mass, Theorems of Moments of Inertia, Calculation of M.I. of different bodies at different axes.

1.3 Viscosity, Elasticity and Harmonic Oscillator: Streamlined and Turbulent flow, Row of liquid through capillary tubes, Stoke's formula, Definition of Elastic Constants and their relation, Bending of beam, Hamonic Oscillator, Damped Harmonic Oscillator, Vibrational states of diatomic molecules.

1.4 Equation of State and Kinetic Theory of Gases: Perfect Gas Equation, Virial Coefficients, Vander Waal's equation, Zeroth law of thermodynamics, Law of equi-partition of energy, Kinetic Theory of Transport Phenomena, Conductivity, Viscosity and Diffusion.

1.5 First & Second Law of Thermodynamics & Thermal radiation: Reversible & Irreversible Processes, Carnot engine, Entropy and its physical significance, Disorder, Maxwell's Thermodynamical Relations and their applications, Claussius-Clayperon Latent Heat Equation, Specific heat equation, Joule-Thomson effect and liquefaction of gases, Energy density of diffuse radiation, Stefan's, Wien's laws and Rayleigh-Jean's law.

Unit 2: ELECTRICITY, MAGNETISM & ELECTRONICS

2.1 Electric Charge, Electrostatic Field and Potential: Coulomb's law in vector form, Gauss's Law and its applications, Gauss's Divergence Theorem, Line integral of Electric Intensity, Electric Potential and its Calculation, Method of Electrical images, energy stored by a charged condenser, capacity of different types of capacitors.

2.2 Electric fields in matter and varying Current: Polar and non-polar molecules, Induced dipole moment, atomic polarisability, electric susceptibility and electric polarisation, Equation of Continuity, Lorentz- Drude Theory of Conductivity, Charging and discharging of Condenser through resistance, Growth and decay of current in L-C-R circuit.

2.3 Alternating Current: I-V relations in case of resistance, inductance and capacitance, phasor algebra, Theory of Choke Coil, L-C-R circuits, Power in a.c. circuits, Series and Parallel resonance.

2.4 Electro-magnetism: Ampere's circuital law, Curl and Div. of Magnetic Flux, Torque on a current loop in a uniform magnetic field, Universal law of inductance (VxE=-dB/dt), Mutual Induction, Reciprocity Theorem ($M_{12}=M_{21}$), Magnetic Properties of materials, J = Curl M, Ferro, para, and dia-materials, antiferro magnetism and Ferro magnetism, Ferrites, Hysteresis and practical applications.

2.5 Electronics: Semi-conductors, n, p type on the basis of Band Theory, Semi conductor diodes, characteristics, diode equations, applications to rectification, Concept of Zener Diodes, pnp, npn transistors and their characteristics, current relationships, application as an Amplifier, Operational Amplifier, concept of feed-back, open/closed loop gain, inverting, non-inverting amplifier.

Unit 3: OPTICS

3.1 Geometrical Optics: Cardinal points of a Coaxial lens system, Nodal points, Newton's formula, Eye-pieces: Huygens and Ramsden's eyepieces.

3.2 Interference: Coherent Sources, analytical theory of interference fringes, Fresnel's Biprism, Interference by reflected and transmitted light in a thin film, colours of thin films, Interference in a wedge shaped film, Newton's Rings, Michelson's interferometer.

3.3 Diffraction: Half period zones, zone plate, diffraction at a Circular aperture, half period strips, diffraction at a straight edge, Fraunhofer's class-Composition of n simple harmonic waves of equal amplitude, Single Slit, Double Slit, Plane Diffraction grating, Dispersive Power of Grating.

3.4 Polarisation of Light: Production of Plane polarised light, Brewster's law, law of Malus, Uniaxial and Biaxial crystals, Double Refraction, Nicol prism.

3.5 Production and Analysis of Polarised light: Plane, circularly and elliptically polarised light, production and analysis, quarter-and Half-wave plates and their uses, Fresnel's Theory of optical rotation, specific rotation, and molecular rotation, Rotatory dispersion polarimeters.

Unit 4: ATOMIC AND NUCLEAR PHYSICS

4.1 Quantum Nature of Radiation and Atomic Models, Photo electric effect, Einstein's Theory, Compton effect and its experimental verification, Matter waves, Davisson and Germer experiment, Schrodinger wave equation, Uncertainty principle, Bohr's Atomic Model, Bohr's quantum conditions from de Broglie's Hypothesis, Resonance, Excitation and Ionisation potentials, Sommerfeld's relativistic model.

4.2 Vector Atom Model: Electronic structures in spectra of Hydrogen, deuteron and alkali atoms spectral terms, Doublet Fine structure, Screening constants for alkali spectra for s, p, d, f states, selection rules.

4.3 X-rays and Scattering: Continuous x-ray spectra and its dependence on voltage, Moeley's law, Doublet structure of x-ray spectra, x-ray absorption spectra, Duane & Hunt's law, Bragg's Law, Rayleigh's scattering, Raman scattering, Raman-Nath formula.

4.4 General Properties of Nuclei and Radio activity: Nuclear spin, parity, iso-spin, angular momentum, Binding Energy, Packing Fraction, Semi-empirical Mass formula, Alpha-rays, range-energy relation, Geiger-Nuttal relation, Beta and Gamma spectra, age of rocks and Carbon dating.

4.5 Neutron, Detectors, and Nuclear Fission: Neutrons, discovery and detection, accelerators, Detectors, Ionisation Chambers, Solid state Detectors, GM counter, nuclear Fission-liquid drop model, nuclear reactors, reactors in India, Cosmic rays-origin and Cosmic ray showers.

Unit 5: SOLID STATE PHYSICS

5.1 Crystal structure: Crystalline and amorphous materials, crystal classes and systems, lattice translation vectors, Bravais' lattice, Unit cell, Miller indices, Interplanar spacing between lattice planes for cubic lattice, Density of lattice points in lattice plane, liquid crystals and glasses, x-ray diffraction techniques.

5.2 Elementary Lattice Dynamics: Lattice Vibrations, linear monoatomic and diatomic chains, acoustical and optical phonons, phonon spectra in solids, Brillouin Zones, cut-off frequency, phase and group velocity, density of states, transverse waves.

5.3 Thermal Properties: Lattice specific heats, classical Theory, Einstein's, Debye's Theory of specific heat, thermal expansion.

5.4 Free Electron Theory of Metals: Mobility, thermal conductivity, Drude model, electrical

conductivity, Weidemann-Franz-Lorentz relation, Hall effect.

5.5 Semi-conductors: Elementary Band Theory of Solids (Qualitative), metals, insulators, semi-conductors, Intrinsic and Extrinsic Semi conductors, Carrier concentration, Expression for Fermi Level, quantitative discussion of variation of Fermi levels with n_d and n_T, conduction in Semi-conductors, electrons and holes, mobility, intrinsic and extrinsic semi-conductors, donor and acceptor impurity levels, Fermi function and Fermi energy.

COMPUTER SCIENCE

UNIT 1: C PROGRAMMING

1.1 Introduction: Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Input-output statements, statements and blocks, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels.

1.2 Functions: Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor.

13. Arrays: concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays. pointers-concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments.

1.4 Derived types: structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bitfields.

1.5 Input and output: concept of a file, text files and binary files, streams, standard I/o, Formatted I/o, file I/o operations, error handling.

UNIT 2: DATA STRUCTURES

2.1 Introduction: Arrays and Strings, Introduction to Algorithm Development, Introduction to Complex Analysis, recursion, sequential representation, lists

2.2 Stacks, queues, Linked Lists and Tress: Stack, queue, linked representation, circular and doubly linked lists, binary trees: representation, insertion, and deletion, traversal

2.3 Graphs: Representation and traversal, minimum spanning tree, shortest path, all pairs shortest path and transitive closure, string algorithms

2.4 Searching and Sorting: Searching and internal sorting, binary search trees

2.5 Height Balanced Tress and Hashing: AVL tree, hashing, sets: Representation, union and find, program specification, pre and post conditions, program testing.

UNIT 3: COMPUTER NETWORKS

3.1 Introduction to computer networks: internet, telephone network. Network edge, core, access and physical media. Transmission media: twisted pair, coaxial cables, optical fiber, terrestrial and satellite microwave radio. Concepts of data transmission, delay and loss, protocol layers and service models.

3.2 Application Layer: Principles of application layer, Web, HTTP, FTP, Email (SMTP), DNS, etc. Socket programming with TCP/UDP, client-server Implementation, simple web server implementation.

3.3 Transport Layer: Transport layer services, multiplexing/demultiplexing, UDP. Principles of reliable data transfer (stop and wait, sliding window: go-back-N, selective repeat.). TCP: Connection management, segment structure, flow control, RTT estimation. Congestion control: Causes and approaches to control, TCP congestion control. Numerical examples.

3.4 Network Layer: Network service models, routing principles (distance vector, link state), hierarchical routing, IP, fragmentation, ICMP, routing in the Internet (RIP, OSPF, BGP), IPv6.

3.5 Link Layer & Security: services, error detection and correction, multiple access protocols, LAN, ARP, ethernet, bridging, wireless LAN. Security issues in networks, tunneling VPNs, IPSec.

UNIT 4: OPERATING SYSTEMS

4.1 Functions of Operating Systems, Computer Hardware Review: Processor and model of execution, interrupts and interrupt processing, storage structure,I/O structure, dual mode operation, clocks and timers. Evolution of operating systems, components. System calls, types of system calls,(LINUX system calls as examples). Operating system design and implementation.

4.2 CPU Scheduling and process Synchronization: Process, Threads, IPC with shared memory and message passing, CPU Scheduling: scheduling criteria, algorithms. Synchronization: critical section problem, Peterson's solution, synchronization hardware, semaphores. Solving classic synchronization problems with semaphores. Monitors. Case study: Windows XP and LINUX.

4.3 Deadlocks and Memory Management: Characterization, prevention and avoidance of deadlocks. Memory Management: contiguous allocation, paging, segmentation, demand paging, page replacement, frame allocation. Case study-Windows XP and LINUX.

4.4 File and I/O Management: Files, directory structure, protection, file system structure, implementation, allocation methods, disk scheduling. I/O Management: Hardware, Principles of I/O software.

4.5 Shell Programming: Shell and shell programming, signals and signal handling, pthreads, IPC: shared memory and pipes.

UNIT 5: DATA BASE MANAGEMENT SYSTEMS

5.1 Basic Concepts: Databases, database systems, data models, schemas, database systems architecture, data independence, database languages and interfaces, DBMS system environment, classification, record storage and primary file organization, index structures.

5.2 Data entry and report generation: creation, Introduction to Microsoft Access , Microsoft SQL server, Table creation, forms, data entry, creating and printing reports.

5.3 SQL: Domains, relations, keys, relational algebra, calculus; SQL: data definition, queries, update statements, views; relational support for queries with MS Access/ MS SQL Server

5.4 Database Design: ER modeling, normalization, relations and relational algebra

5.5 System Implementation: Transaction processing system, concurrency, recovery, security, integrity, distributed databases, client-server architectures.

ZOOLOGY

Unit 1: CLASSIFICATION AND INVERTEBRATA

1.1 Introduction to animal kingdom, Modern, classification of animals upto orders, Protozoa-Paramecium, Euglena, Trypanosoma (structure, reproduction and life history).

1.2 Porifera-Sycon-structure, physiology, canal system and life history, Coelenterata: Obelia-structure and life history.

1.3 Platyhelminthes: Life history, biology and bionomics of (a) Fasciola (b) Taenia. Aschelminthes: Ascaris.

1.4 Annelida: structure and reproduction, Arthropoda: Life history and bionomics of (a) Mosquito (b) House fly (c) Honey bee.

1.5 Mollusca: Pila and unio-structure and reproduction, Echinodermata, Star fish-morphology and water vascular system.

Unit 2: MORPHOLOGY AND ANATOMY

2.1 Protochordata: Balanoglossus, Urochordata: Herdmania, Cephalochordata: Branchiostoma.

2.2 Pisces: Scoliodon

2.3 Amphibia: Frog

2.4 Reptiles: Uromastix, Aves: Columba

2.5 Mammalia: Rabbit.

Unit 3: CELL & MOLECULAR BIOLOGY

3.1 Cytology: Cell structure and function.

3.2 Molecular Biology: Nucleic acid structure and function.

3.3 Microbiology: Bacteria-morphology and anatomy

3.4 Bacterial reproduction: Transformation, transduction and conjugation.

3.5 Viruses: Morphology, bacteriophage

Unit 4: PHYSIOLOGY

4.1 Digestion and vitamins 4.2 Nervous system 4.3 Circulatory system

4.4 Excretion 4.5 Endocrine system.

Unit 5: EVOLUTION, GENETICS AND ECOLOGY

5.1 Evolutionary biology: Chemical evolution theory, Darwinism, Lamarckism and Speciation.

5.2 Genetics: Mendel's laws, linkage, crossing over, sex-determination, mutation and human syndromes.

5.3 Genetic engineering.

5.4 Biotic and abiotic factors, ecosystems.

5.5 (a) Population (b) Community (c) Adaptations.

SYLLABUS (GRADUATE LEVEL): COMMERCE

ACCOUNTANCY & LAW

Unit 1:

1.1 Royalty Accounts

1.2 Hire Purchase & Instalment Payment System
1.3 Insolvency Accounts, Branch Accounts
1.4 Partnership Accounts, Company Accounts
1.5 Accounts of Banking Companies & General Insurance Companies

Unit 2:

2.1 Amalgamation, Absorption and Reconstruction
2.2 Liquidation of Companies
2.3 Holding & Subsidiary Companies
2.4 Valuation of Shares & Goodwill
2.5 Accounts of Electric & Water Supply Companies

Unit 3:

3.1 Residential Status under Income tax
3.2 Incidence of Tax & Exemptions from tax
3.3 Income under different heads
3.4 Assessment of an Individual
3.5 Tax liability of an Individual

Unit 4:

4.1 Contract Act 1872,
4.2 Sale of Goods Act, 1930
4.3 Indian Partnership Act, 1932
4.4 Negotiable Instrument Act, 1881
4.5 Arbitration Act, 1940

Unit 5:

5.1 Elements & Classification of Cost
5.2 Inventory Control, Wage Payment Systems, Classification of Overheads
5.3 Unit Costing, Contract Account, Process Accounts, Reconciliation Statement
5.4 Marginal Costing, Cost Reduction & Cost Control
5.5 Cost Audit & Reporting, Audit of Company Accounts

APPLIED BUSINESS ECONOMICS

Unit 1:

1.1 Definition, Scope, Limitation, Functions & Importance of Statistics
1.2 Collection, Classification & Tabulation of Data
1.3 Statistical Errors, Law of Statistics, Regularity & Statistical Inquiry
1.4 Diagrammatic & Graphic Representation of Data
1.5 Measure of Central Tendency & Dispersion, Correlation, Index Numbers

Unit 2:

2.1 Interpolation & Extrapolation 2.2 Simple Linear Regression
2.3 Analysis of Time Series, Forecasting 2.4 Association of Attributes, Chi-Square Test
2.5 Probability

Unit 3:

3.1 Definition, Scope of Economics, Methods of Economic Study, Micro & Macro Analysis, Economic Laws, Law of Marginal & Equilibrium
3.2 Marginal Utility, Consumer Surplus, Indifference Curve, Law of Demand & Supply, Elasticity of Demand & Supply
3.3 Theory of Production: Efficiency of Land, Labour & Capital, Law of Returns

3.4 Theories of Population, Economic System: Capitalism, Socialism, Mixed Economy, Theory of Product Pricing-Different Market Situations, Equilibrium of Demand & Supply, Effect of Change in Demand & Supply & Time element in the theory of value

3.5 Pricing Decisions: Cost & Revenue Analysis, Equilibrium of Firm, Pricing under perfect, monopoly & monopolistic competition, Price discrimination, National Income & its measurement, Theories of Distribution, Theories of Rent, Wages, Interest & Profit, Employment & Trade Cycle

Unit 4:

4.1 Scope, Significance, Object & Pre-requisite of Successful Plan

4.2 Types of Planning, Planned and Unplanned Economies

4.3 Importance & Problem of Planning in under developed Countries

4.4 Economic Planning in India, Five Year Plans-Aims, Resources, Target & Achievement.

4.5 Scope, Role and Responsibility of Managerial Economist, Demand Analysis & Demand Forecasting

Unit 5:

5.1 Cost Analysis, Economies & Diseconomies of the Scale

5.2 Pricing & Output Decisions Under Monopoly, Monopolistic and Oligopoly

5.3 Pricing Methods & Price Discrimination, Measurement of Profit

5.4 Profit Policy & BEP Analysis, Capital Budgeting.Financial function, Responsibility of Financial Manager

5.5 Capitalisation-Over & Under Capitalization, Capital Structure-Qualities & Determinants, Sources of Long Term Finance-Ownership & Creditorship Securities, Sources of Long Term & Short Term Finance in India, Working Capital-Importance, Determinants & Adequacy of Working Capital.

BUSINESS ADMINISTRATION

Unit 1:

1.1 Definition, Nature, Importance, Objectives, Social Responsibilities, Universality of Management

1.2 Professional Management in India

1.3 Planning, Organizing

1.4 Directing

1.5 Management Control

Unit 2:

2.1 Concept, Scope, Objectives, Importance, Functions, Developments of Personnel Management in India

2.2 Personal Policies & Programme

2.3 Employment & Development of Personnel

2.4 Wages & Salary, Administration

2.5 Human Relation

Unit 3:

3.1 Nature, Scope, Concept, Importance & Functions of Marketing

3.2 Consumer Behaviour & Policies, Attitudes & Preferences

3.3 Product Planning-Product Line, Product Life Cycle

3.4 Product Development, Branding & Packaging

3.5 Channels of Distribution, Marketing Research

Unit 4:

4.1 Sales Organization-Meaning, Principle, Forms, Functions, Importance

4.2 Sales Manager-Role, Qualities, Duties, Functions

4.3 Types & Relation with Consumer, Public Competition & Staff Salesman

4.4 Supervision, Sales Policies, Salesmanship
4.5 Factories Act 1948

Unit 5:

5.1 Trade Union Act 1926
5.2 Industrial Disputes Act 1947
5.3 Payment of Wages Act
5.4 Employees State Insurance Act
5.5 Workmen's Compensation Act

SYLLABUS (GRADUATE LEVEL): ARTS

चित्रकला

यूनिट 1 : प्रागैतिहासिक काल

1.1 प्रागैतिहासिक काल का प्रारम्भ 1.2 प्रागैतिहासिक शैल चित्र
1.3 मोहनजोदड़ो की सभ्यता 1.4 हड़प्पा की सभ्यता 1.5 जोगीमारा गुफा

यूनिट 2: बौद्ध काल

2.1 बौद्ध काल का प्रारम्भ 2.2 अजन्ता गुफा
2.3 सिगिरिया गुफा 2.4 बाघ गुफा 2.5 एलोरा गुफा

यूनिट 3: मध्यकाल व मुगलकाल

3.1 मध्यकाल का प्रारम्भ 3.2 पाल व अपभ्रंश
3.3 मुगल काल का प्रारम्भ व पतन 3.4 अकबर कालीन मुगल कला 3.5 जहाँगीर कालीन मुगल कला

यूनिट 4: राजपूत काल

4.1 राजपूत कला का प्रारम्भ 4.2 मेवाड़ – उदयपुर, नाथद्वारा
4.3 मारवाड़ – जोधपुर, बीकानेर, किशनगढ़ 4.4 हाड़ोती – कोटा, बूँदी
4.5 ढूढाँड़ – जयपुर, अलवर

यूनिट 5: पुनर्जागरण काल, अन्य स्कूल व अन्य भारतीय कलाकारों का जीवन परिचय

5.1 पुनर्जागरण काल का प्रारम्भ 5.2 राजा रवि वर्मा, पटना शैली
5.3 बंगाल स्कूल का प्रारम्भ, अवनीन्द्र नाथ ठाकुर, नन्दलाल बोस, असित कुमार हल्दर, क्षीतिन्द्र नाथ मजूमदार
5.4 रवीन्द्र नाथ ठाकुर, गगेन्द्र नाथ ठाकुर 5.5 अमृता शेरगिल, यामिनी राय

ECONOMICS

Unit 1: NATIONAL INCOME ACCOUNTING

1.1 National Income Analysis, Concepts of National Income.
1.2 Computation of National Incomes & its difficulties.
1.3 National Income at Current and Constant Prices.
1.4 Average & Marginal Propensity to Consume.
1.5 Theories of Consumption Function.

Unit 2: PRICE THEORY

2.1 Law of demand and elasticity of demand.
2.2 Utility analysis and Indifference curve techniques.
2.3 Cost curves & their relationships.
2.4 Equilibrium of a firm under different market conditions.

2.5 Pricing of factors of production.

Unit 3: MONEY, BANKING, INTERNATIONAL TRADE & PUBLIC FINANCE

3.1 Money-Definition, Functions, Demand for money and quantity theory of money.
3.2 Credit & Financial system, Control of Credit.
3.3 Comparative Cost theory of International Trade, Balance of Payments.
3.4 India's Tax Structure, Fiscal Policy & Latest Budget of India.
3.5 Export-lmport Policy of India.

Unit 4: STATISTICS & QUANTITATIVE TECHNIQUES STATISTICS

4.1 Measurement of Central Tendency-Mean, Median, Mode.
4.2 Correlation & Simple Regression.
4.3 Index Number.

Mathematics

4.4 Determinants & Matrices.
4.5 Linear & Differential Equations.

Unit 5: INDIAN ECONOMY

5.1 Indian Agriculture since Independence with reference to Food Problem.
5.2 Indian Poverty & Population, Population Policy, Employment programmes.
5.3 Strategy of lndian planning.
5.4 Problems of Industrialization in India.
5.5 New Economic Reforms.

ENGLISH

UNIT 1: GRAMMAR

1.1 Common Errors in English (Nouns, Pronouns, Determiners, Prepositions and Conjunctions)
1.2 Verbs and Verbals
1.3 Time and Tense
1.4 Voice- Active and Passive
1.5 Concord and Synthesis of sentences

UNIT 2: VOCABULARY, PROSODY AND FIGURES OF SPEECH

2.1 Synonyms, Antonyms and Homonyms
2.2 One-word substitutions and commonly used Foreign words
2.3 Idioms and Phrases 2.4 Figures of Speech 2.5 Stanza Forms and Metre

UNIT 3: REPRESENTATIVE LITERARY WORKS UPTO THE RENAISSANCE

3.1 Kalidasa: Abhijnana Shakuntalum 3.2 Bhavbhuti: *Malati and Madhav*
3.3 William Shakespeare: *Romeo & Juliet, Hennery IV Part I*
3.4 William Shakespeare: *Othello* 3.5 John Milton: *Paradise Lost- Book 1*

UNIT 4: REPRESENTATIVE LITERARY WORKS SINCE THE POST RENAISSANCE- PERIOD

4.1 Jonathan Swift: *The Battle of the Books*
4.2 (a) Alexander Pope: *The Rape of the Lock*
(b) William Collins: "Ode to Simplicity"; "Ode to Evening"
(c) Robert Burns- Tom O' Shanter, To A Mouse, Green
4.3 (a) William Wordsworth: "The Daffodils"; "To Milton"; "The Solitary Reaper"; "Ode to Duty"; "To the Cuckoo
(b) S.T Coleridge: "Kubla Khan"; "Dejection: An Ode"; "Youth and Age"
(c) P.B Shelley: "Ode to the West Wind"; "Mont Blanc"; "To a Skylark";"The Indian Adonais"
4.4. (a) Jane Austen: *Emma*
4.5 (a) Alfred Lord Tennyson: "Ulysses"; "Lotus Eaters"; "Crossing the Bar"
(b) Robert Browning: "My Last Duchess"; "Evelyn Hope"; "Prospice"; "The Last Ride Together"

(c) Matthew Arnold: "The Scholar Gipsy"; "Thyrsis"

UNIT 5: REPRESENTATIVE LITERARY WORKS SINCE 1900

5.1 (a) George Bernard Shaw: *Arms and The Man*

5.2 (a) Robert Frost: "The Road Not Taken", "Birches", "The Gift Outright", "Stopping By Woods on a Snowy Evening", "After Apple Picking"

(b) T.S. Eliot: "Potrait of a Lady", "The Hollow Man", "To My Wife", "A Song for Simeon."

(c) Keki N. Daruwalla: "Hawk", "The Unrest of Desire", "Wolf", "The Ghahgra in Spate"

5.3 (a) Mahatma Gandhi : *My First Experience in England Need for Religion"*

5.4 (a) R.K. Narayan: *The Vendor of Sweets*

5.5 (a) Girish Karnad: *Tughlaq*

हिन्दी

यूनिट 1: हिन्दी साहित्य का इतिहास (वीरगाथा काल, भक्तिकाल)

1.1 हिन्दी साहित्य के इतिहास लेखन की परम्परा, हिन्दी साहित्य का काल विभाजन

1.2 वीरगाथा काल – प्रवृत्तियाँ, प्रमुख कवि तथा रचनाएँ

1.3 भक्तिकाल की सामान्य प्रवृत्तियाँ

1.4 भक्तिकाल की निर्गुण काव्यधारा – प्रमुख कवि, रचनाएँ तथा प्रवृत्तियाँ

1.5 भक्तिकाल की सगुण काव्यधारा – प्रमुख कवि, रचनाएँ तथा प्रवृत्तियाँ।

यूनिट 2: हिन्दी साहित्य का इतिहास – रीतिकाल तथा आधुनिक काल

2.1 रीति काल – नामकरण, सीमांकन तथा साहित्य

2.2 रीति कालीन काव्य की प्रमुख प्रवृत्तियाँ, कवि तथा रचनाएँ

2.3 भारतेन्दु युग, द्विवेदी युग – प्रमुख कवि, रचनाएँ तथा प्रवृत्तियाँ

2.4 छायावाद, प्रगतिवाद– प्रमुख कवि, रचनाएँ तथा प्रवृत्तियाँ

2.5 प्रयोगवाद, नयी कविता – प्रमुख कवि रचनाएँ तथा प्रवृत्तियाँ ।

यूनिट 3: हिन्दी गद्य साहित्य का विकास

3.1 हिन्दी गद्य – उद्‌भव और विकास

3.2 निबंध और आलोचना

3.3 नाटक एवं एकांकी

3.4 उपन्यास एवं कहानी

3.5 गद्य की अन्य नवीन विधाएँ–रेखाचित्र, संस्मरण, आत्मकथा, रिपोर्ताज, भेंटवार्ता, यात्रा साहित्य ।

यूनिट 4: काव्य शास्त्र

4.1 रस – रस सामग्री, रसनिष्पत्ति एवं रस के भेद उदाहरण सहित

4.2 अलंकार – शब्दालंकार, अनुप्रास, यमक, 'लेष, वक्रोक्ति

अर्थालंकार– उपमा, रूपक, प्रतीप, व्यतिरेक, उत्प्रेक्षा, अपन्हुति, भ्रांतिमान, सन्देह, दीपक, अन्योक्ति, समासोक्ति, विभावना, विशेषोक्ति, दृष्टान्ते, अर्थान्तरन्यास, विरोधाभास

4.3 शब्दशक्ति

4.4 गुण और दोष

4.5 छन्द– दोहा, सोरठा, चौपाई, रोला, कुण्डलियाँ, छप्पय, कवित्त, सवैया ।

यूनिट 5: व्याकरण

5.1 सन्धि, समास, उपसर्ग, प्रत्यय

5.2 लोकोक्ति तथा मुहावरे

5.3 विपरीतार्थक शब्द, समानार्थक शब्द, वाक्यांश के लिए एक शब्द, युग्म
5.4 पद – संज्ञा, सर्वनाम, क्रिया, विशेषण
5.5 हिन्दी शब्द समूह – तत्सम्, तद्भव, देशज तथा विदेशी शब्द।

HOME SCIENCE

Unit 1: TEXTILES

1.1 Manufacture and properties of Fibres and Fabrics.
1.2 Techniques of fabric manufacture, types of weaves, special fabrics and their sewing.
1.3 Finishing of fabrics and value addition technique- fabric designing, dyeing, printing, embroidery and traditional textiles
1.4 Sewing terms, sewing machine and its variations, sewing techniques, seams, qualitites in trimmings, supporting fabrics, methods of garment making, judging sewing qualities, garment illumstrations.
1.5 Chemistry of fibres, fiber/yarn/fabric and garment testing, AQL and commercial production of garments.

Unit 2: FOODS & NUTRITION

2.1 Proximate principles of Food
2.2 Vitamins anad Minerals
2.3 Methods of Nutritional Assesment
2.4 Objectives and methods of improvement in nutritive quality of food
2.5 Functions of food, balanced diet and meal planning

Unit 3: HOME MANAGEMENT

3.1 Elements of Art, Principles of Design, Flower Arrangement, Interior Decoration.
3.2 Family life Cycle, Steps in Home Management Values, Goals and Decision Making.
3.3 Money, Energy, Time Management, Work Simplification, Household Equipment.
3.4 Housing.
3.5 Consumer Studies.

Unit 4: HUMAN DEVELOPMENT

4.1 General principles of Human Development, Prenatal Development, Birth process and neonatal characteristics.
4.2 Human Development 0-12 years-Physical, Motor, emotional, cognitive, Social Development.
4.3 Human Development Adolescence to old age-Physical, Motor, Emotiuonal, Cognitive and Social Development.
4.4 Children with special needs.
4.5 Family, School and Community influences on the child.

Unit 5: EXTENSION EDUCATION

5.1 Concept, Principle, Objective and philosophy of Extension Education.
5.2 Approaches and methods of extension education
5.3 Audio visual aids for teaching learning process and its classification
5.4 Communication: Meaning, Definition, Importance and Elements.
5.5 National welfare programmes.

संगीत (सितार व गायन)

यूनिट 1

1.1 संगीत की परिभाषा, भारतीय संगीत की विशेषताऐं, ध्वनि व कम्पन।

1.2 प्राचीन, मध्य व आधुनिक कालीन श्रुति–स्वर, विभाजन ।

1.3 निम्नाँकित पारिभाषिक शब्दों की व्याख्याः नाद, श्रुति, स्वर, हार्मनी, मैलॉडी, संवाद, विसंवाद, तारता, तीव्रता व गुण, लय, मात्र, ताल, लयकारी।

1.4 राग यमन कल्याण, बागेश्री, बिहाग, अल्हैया बिलाबल व रामकली का शास्त्रीय अध्ययन, राग पहिचान ।

1.5 तीन ताल, झपताल व चार ताल की दुगुन, तिगुन, चौगुन व आड़।

यूनिट 2

2.1 सौन्दर्य, कला एवं सौन्दर्य, संगीत एवं सौन्दर्य, देशी व मार्गी संगीत, ग्राम, मूर्च्छना, जाति गायन।

2.2 आलाप का स्वस्थान नियम, रागालाप, रूपकालाप, आलप्ति गान, राग लक्षण, शुद्ध, छायालग, संर्कीण राग, अल्पत्व–बहुत्व, आविर्भाव–तिरोभाव।

2.3 रागों का विकास एवं वर्गीकरण, जाति, ग्राम राग, राग–रागिनी, रागांग, थाट व मेल, तानों के प्रकार।

2.4 शंकरा, जैजैवंती, गौड़–सारंग व पूरियाधनाश्री रागों का 'ास्त्रीय अध्ययन व राग–पहिचान।

2.5 ताल रूपक व धमार की दुगुन, तिगुन, चौगुन व आड़।

यूनिट 3

3.1 संगीत की उत्पत्ति–भारतीय व विदेशी मत, वैदिक युगीन संगीत–वैदिक स्वरों का विकास, साम गायन विधि, साम–विकार।

3.2 रामायण व महाभारत कालीन संगीत।

3.3 मुगल कालीन व ब्रिटिश कालीन संगीत, स्वातंत्रयोतर काल में संगीत।

3.4 निम्नांकित ग्रन्थों का सामान्य अध्ययनः भरत का नाट्यशास्त्र, संगीतरत्नाकर, बृहदेशी, संगीत–दर्पण, संगीत पारिजात, अभिनव राग मंजरी।

3.5 जीवनियाँः अमीर खुसरो, मानसिंह तोमर, स्वामी हरिदास, तानसेन, सदारंग, अदारंग, शोरी मियाँ, सुल्तान हुसैन शर्की, विष्णु दिगम्बर भातखण्डे, त्यागराज, अलाउददीन खाँ।

यूनिट 4

4.1 हिन्दुस्तानी व कर्नाटक संगीत पद्धतियों का तुलनात्मक अध्ययन।

4.2 भातखण्डे व विष्णु दिगम्बर स्वर लिपि पद्धतियों का तुलनात्मक अध्ययन।

4.3 पाश्चात्य स्वर लिपि (स्टाफ) पद्धति का सामान्य अध्ययन।

4.4 गायन व वादन (सितार) के विभिन्न घरानों व उनकी विशेषताओं का अध्ययन ।

4.5 लोक संगीत व शास्त्रीय संगीत का तुलनात्मक अध्ययन।

यूनिट 5

5.1 अ– राग मियॉ मल्हार, गौड़ मल्हार, दरबारी कान्हड़ा व अड़ाना का शास्त्रीय अध्ययन।
ब– उक्त रागों की स्वरांकन से पहिचान ।

5.2 अ– राग कामोद, छायानट, रागेश्री व मालगुंजी का शास्त्रीय अध्ययन।
ब– उक्त रागों की स्वरांकन से पहिचान ।

5.3 अ– राग तोड़ी, मुल्तानी, सोहिनी व पूरिया का शास्त्रीय अध्ययन।
ब– उक्त रागों की स्वरांकन से पहिचान।

5.4 अ– राग बसन्त, परज, श्री व ललित का शास्त्रीय अध्ययन।
ब– उक्त रागों की स्वरांकन से पहिचान।

5.5 अ– निम्नांकित तालों का शास्त्रीय अध्ययन :–

आड़ा चारताल, तिलवाड़ा, दीपचंदी, तीव्रा, कहरवा, सूल ताल, झूमरा, सवारी व पंजाबी

ब– उक्त तालों को दुगुन, तिगुन, चौगुन व आड़ में लिखना।

स– अन्य तालों की पहिचान करना ।

संगीत (तबला)

यूनिट 1: ताल का विस्तृत अध्ययनः

1.1 ताल–परिभाषा उत्पत्ति एवं विकास
1.2 नाद– परिभाषा व उसकी विशेषताऐं
1.3 ताल के दस प्राण
1.4 ताल रचना के सिद्धांत
1.5 तबले के वर्ण

यूनिट 2: कला व सौंदर्य, लय–लयकारी, पारिभाषिक शब्दः

2.1 कला का अर्थ (भारतीय व पाश्चात्य दृष्टिकोण)
2.2 कलाओं का वर्गीकरण (ललित व उपयोगी कलाएं)
2.3 कला एवं सौन्दर्य (भारतीय व पाश्चात्य दृष्टिकोण)
2.4 लय व लयकारियाँ
2.5 निम्नलिखित पारिभाषिक शब्दों की व्याख्या– मुखड़ा, मोहरा, पेशकार, कायदा, पलटा, गत, परन, टुकड़ा, तिहाई, नवहक्का, लग्गी, लड़ी

यूनिट 3: तबला व मृदंग के घराने व कलाकारों का परिचयः

3.1 घराना– अर्थ व परिभाषा, तबले के घराने, घराने बनने के कारण
3.2 तबले के विभिन्न बाजों का विस्तृत व तुलनात्मक अध्ययन
3.3 तबले का अंग वर्णन
3.4 मृदंग के घराने
3.5 निम्नलिखित तबला वादकों का परिचय– उ0 अहमद जान थिरकवा, उ0 अल्लारखा पं0 सामता प्रसाद मिश्र, पं0 किशन महाराज

यूनिट 4: उत्तर भारतीय व कर्नाटक ताल पद्धति, वाद्यों का परिचय, संगीतः

4.1 उत्तर व कर्नाटक ताल पद्धतियों का तुलनात्मक अध्ययन
4.2 भातखण्डे व विष्णु दिगम्बर ताल लिपि पद्धति का तुलनात्मक अध्ययन
4.3 निम्नलिखित वाद्यों का परिचय– मृदंग, ढोलक, नक्कारा, ताशा, चंग, नाल, खंजरी, घटम्
4.4 निम्नलिखित का तुलनात्मक अध्ययन– मोहरा–मुखड़ा, तिहाई–नवहक्का, कायदा–गतकायदा, रेला–कायदा रेला, तिपल्ली– चौपल्ली
4.5 स्वतंत्र वादन एवं साथ संगत का अध्ययन

यूनिट 5: विभिन्न तालों के ठेके व नगमें

5.1 निम्नलिखित तालों का परिचय– तीनताल, झपताल, एकताल, आड़ा चारताल, सवारी (15 मात्रा), रूपक, दादरा, कहरवा, दीपचंदी, पंजाबी, तिलवाड़ा, झूमरा, जत
5.2 उपरोक्त तालों में नगमें बजाना
5.3 निम्नलिखित तालों का परिचय– चारताल, धमार, सूलताल, तीव्रा, मन्त ताल, फरोदस्त
5.4 उपरोक्त तालों में नगमें बजाना
5.5 तबला मिलाने की विधि

SOCIAL SCIENCES (POLITICAL SCIENCE)

Unit 1:

1.1 Meaning, Nature and Scope of Political Science.
1.2 Concept of State, Theories of origin of State.
1.3 Government-Parliamentary and Presidential, Unitary and Federal.
1.4 Individualism and ldealism.
1.5 Socialism-Marxism, State Socialism, Guild Socialism and Anarchism.

Unit 2:

2.1 Salient features of English, American and Swiss Constitution.
2.2 Legislature and Executive of England.
2.3 Legislature and Executive and Judiciary of America.
2.4 Legislature and Executive of Switzerland, Direct democracy in Switzerland.
2.5 Judiciary in England, America and Switzerland.

Unit 3:

3.1 Preamble and main characteristics of Indian Constitution.
3.2 Central Legislature (President, House of People or Lok Sabha and Council of States or Rajya Sabha)
3.3 Central Executive (President, Vice-President, Prime Minister and Council of Ministers).
3.4 Central Judiciary (Supreme Court)
3.5 State Government-Legislature, Executive and Judiciary.

Unit 4:

4.1 Political parties in India.
4.2 U.N.O.: Aims, its Organs and Functions.
4.3 Local Self Government.
4.4 National Movement from 1885-1905.
4.5 Social Reforms under British rule in India.

Unit 5: STRUGGLE FOR SWARAJ UNDER THE LEADERSHIP OF MAHATMA GANDHI

5.1 Non-Cooperation Movement.
5.2 Acts of 1919 and 1935.
5.3 Quit India Movement.
5.4 Jallian Wala Bagh Massacre.
5.5 Independence Act of 1947.

PSYCHOLOGY

Unit 1: Nature of Psychology

1.1 Psychology as a science of consciousness and as a science of behaviour
1.2 Experimental Method
1.3 Physiology of sense organs
1.4 Physiology of Nervous System
1.5 Psychophysics: Classical & Modern

Unit 2: Cognitive and Affective Psychology: Theories and Experimental studies of

2.1 Attention & Perception
2.2 Thinking & Problem Solving
2.3 Learning
2.4 Motives
2.5 Emotions

Unit 3: Psychological Tests

3.1 Tests of Intelligence, Creativity and Personality
3.2 Reliability
3.3 Validity
3.4 Norms of Psychological Tests
3.5 Measurement of attitude

Unit 4: Descriptive & Inferential Statistics

4.1 Measures of Central Tendency
4.2 Measures of Variability
4.3 Coefficient of Correlation
4.4 Normal Probability Curve, Graphs
4.5 t-test and chi square test

Unit 5: Abnormal Psychology and Developmental Psychology

5.1 Difference between normal & Abnormal
5.2 Difference between Neurosis and Psychosis
5.3 Ego Defence Mechanisms & Freudian Psycho analytic Theory
5.4 Causes of abnormal behavior
5.5 Life span development: Physical, Cognitive, Social & Emotional Development

संस्कृत

यूनिट 1: वैदिक एवं लौकिक साहित्य

1.1 वेद, ब्राह्मण, आरण्यक
1.2 उपनिषद्, वेदांग, पुराण
1.3 महाकाव्य, खण्ड काव्य
1.4 दृश्य–काव्य
1.5 गद्य–काव्य, चम्पू काव्य कथा–साहित्य

यूनिट 2: व्याकरण

2.1 अच् सन्धि
2.2 हल् और विसर्ग सन्धि
2.3 समास
2.4 तद्धित प्रत्यय
2.5 कृदन्त प्रत्यय

यूनिट 3: शब्द रूप एवं धातु रूप (दसों लकार)

3.1 स्वरान्त(अजन्त): पुल्लिंग, स्त्री0,नपुं0
3.2 व्यञ्जनान्त (हलन्त): पुल्लिंग, स्त्री0, नपुं0
3.3 सर्वनाम संख्या
3.4 परस्मैपदी
3.5 आत्मनेपदी, उभयपदी धातुएँ

यूनिट 4: अलंकार एवं छन्द

4.1 प्रमुख काव्यशास्त्री एवं उनके ग्रन्थ

4.2 अलंकार–शब्दालंकार 4.3 अर्थालंकार, उभयालंकार

4.4 छन्द–आर्या, अनुष्टुप्, इन्द्रवज्रा, वंशस्थ, मन्दाक्रान्ता, स्त्रग्धरा

4.5 छन्द–मालिनी, वसन्ततिलका, शिखरिणी शार्दूलविक्रीडितम्, उपजाति

यूनिट 5: अपठित

5.1 लोकोक्तियाँ 5.2 सूक्तियाँ

5.3 कारक–प्रथमा से तृतीया तक 5.4 कारक–चतुर्थी से सप्तमी तक 5.5 अनुवाद।

SOCIOLOGY

Unit 1:

1.1 Sociology-Nature and Scope, Relationship of Sociology with Economics & Political Science.
1.2 Primary Concepts-Society, Community, Institution, Association, Social Groups: Meaning & Classification.
1.3 Social Ecology: Concept, Environment and Society
1.4 Concepts: Social Structure and Social System
1.5 Concepts: Status and Role

Unit 2:

2.1 Social Values: Types of values and their importance in Society.
2.2 Concepts: Social Organization; Social Function-Latent and Manifest
2.3 Institutions: Marriage, Family, Kinship, Religion
2.4 Social Processes: Progress, Development, Evolution, Globalization
2.5 Social Disorganization

Unit 3:

3.1 Fertility, factors affecting fertility, methods of calculating fertility rates (CBR, GFR, ASFR, TFR)
3.2 Mortality, Meaning, Mortality rates (CDR, its merits and demerits, ASDR, Causes of death)
3.3 Calculation of Fertility and Mortality Rate
3.4 Population and Development
3.5 Population Policy of India

Unit 4:

4.1 August Comte-Law of Three Stages
4.2 Herbert Spencer-Social Evolution
4.3 Emile Durkheim – Social Fact
4.4 Max Weber- Ideal Type
4.5 Karl Marx- Class Conflict Theory

Unit 5:

5.1 Research Design-Meaning and Types
5.2 Hypothesis, Formulation and Testing of Hypothesis
5.3 Techniques of Data Collection- Interview, Questionnaire, Schedule, Observation
5.4 Types of Research- Quantitative and Qualitative
5.5 Measures of Central Tendency: Mean, Median and Mode, Meaning, usage and calculation

DIPLOMA IN ELEMENTARY EDUCATION (D.EL.ED)/BACHELOR OF EDUCATION (B.Ed.)

SECTION A: GENERAL KNOWLEDGE & CURRENT AFFAIRS

Unit 1: GEOGRAPHY

1.1 The Earth and its Solar System
1.2 Physical Geography (World)
1.3 Physical Geography (India)
1.4 Countries Capitals, Currencies
1.5 India - States, Capitals, Cities, Languages

Unit 2: SCIENCE/TECHNOLOGY

2.1 Physics
2.2 Chemistry
2.3 Life Sciences
2.4 Inventions & Discoveries
2.5 Diseases

Unit 3: BOOKS, AUTHORS, ABBREVIATION ETC.

3.1 Famous Books and Authors-Indian and Foreign
3.2 Abbreviation, Acronyms, Foreign words & Phrases
3.3 Sports and Games-Famous Trophies and Tournaments, Leading Sportsmen, Terms associated with different sports and games, Olympic and Asian Games.
3.4 Important Indian Awards–Civil and Military awards Important International Awards-Noble prizes, Magasaysay awards etc.
3.5 Art and Culture-Various Art Forms, Places and Artists associated with them, Sobriquets, Major Festivals.

Unit 4: SOCIAL SCIENCES

History-Indian Major Historical Periods and their Features:-

4.1 From the Indus Valley Civilization to the First Battle of Panipat in 1526 AD.
4.2 From 1526 A.D. to the Modern Period.
4.3 **Political Awareness**: Indian Constitution-Its main features- Fundamental Rights, Important personalities and major events in India since Independence.
4.4 **Economics**: Indian Economy
4.5 **Statistics-**Elementary Statistics-Meaning and Importance of Statistics, Statistical Average.

Unit 5: CURRENT AFFAIRS

SECTION B: LANGUAGE PROFICIENCY (HINDI & ENGLISH)

Unit 1: GRAMMAR, FIGURES OF SPEECH, IDIOMS AND PHRASES & VOCABULARY

1.1 Grammer- Articles, Tenses, Verbals, Modals, Connectives
1.2 Vocabulary- Antonyms, Synonyms, Affixes and One Word Substitutions
1.3 Identification and uses of the Figures of Speech
1.4 Idioms/Phrases in Common Usage
1.5 Punctuations and Capitalization

Unit 2: CREATIVE AND PROFESSIONAL WRITING

2.1 Application - Job Application, Resume, Leave Applications etc.
2.2 Different Types of Letter
2.3 E-Mail Correspondence
2.4 Transformation of sentences and synthesis
2.5 Correct usage in different parts of speech

यूनिट 3: काव्यशास्त्र/व्याकरण 1

3.1 रसों की परिभाषा तथा रस के भेद (हास्य, श्रृंगार, वीर, करूण, वात्सल्य) –
3.2 अलंकार – अनुप्रास, यमक, ष्लेष, उपमा, रूपक, सन्देह, भ्रान्तिमान
3.3 उपसर्ग, प्रत्यय
3.4 विराम चिह्न एवं उनका प्रयोग,
3.5 शुद्ध एवं अशुद्ध वाक्य

यूनिट 4: व्याकरण 2

4.1 सन्धि (स्वर, व्यंजन, विसर्ग), समास,
4.2 वर्तनी बोध
4.3 लोकोक्ति तथा मुहावरे
4.4 पद–संज्ञा, सर्वनाम, क्रिया, विशेषण
4.5 विपरीतार्थक शब्द, समानार्थक शब्द, वाक्यांश के लिए एक शब्द ।

Unit 5: READING COMPREHENSION (HINDI & ENGLISH)

SECTION C: TEACHING APTITUDE

Unit 1: Concept of Teaching, nature and characteristics of teaching, Principles of Teaching, Basic requirements of Good Teaching, Teaching Aids & Methods of Teaching, Factors Affecting Teaching.

Unit 2: Teaching Aptitude- Nature, Objectives, Characteristics, Teaching as Encounters, Teaching as a Communal Effort, Innovative approaches in teaching & Learning, various Assessment Method.

Unit 3: Desirable teacher traits- Personality traits, Personal qualities, teaching trait, intellectual trait, psychological traits, social traits. Creativity in teaching, dealing with all category of students like gifted and backward

Unit 4: Learner's Characteristics- personal, academic, social, emotional or cognitive in nature. Interest in learning and Intrinsic motivation in learner, Elements of Learning- (Motivation, Reinforcement, Retention, Transference), Classroom engagement and leadership

Unit5: General Classroom Management, Student & Faculty Initiated Activities, Faculty/student Interaction, managing student academic work, managing inappropriate behavior, promoting appropriate use of consequences.

SECTION D: SUBJECT KNOWLEDGE IN SCIENCE, SOCIAL SCIENCES AND MATHEMATICS UP TO SECONDARY LEVEL

GENERAL SCIENCE

Unit 1: PHYSICS

1.1 Newton's Law of Motion.
1.2 Work, Power and Energy.
1.3 Thermal Expansion of Solids & Liquids.
1.4 Structure of the Human Eye.
1.5 Thermal Radiation.

Unit 2: CHEMISTRY

2.1 Matter and its states.

2.2 Soap and Saponification
2.3 Chemical Bonds.
2.4 Metals and Non-Metals-Acids, Bases and Salts.
2.5 Introduction to some important organic and inorganic compounds.

Unit 3: BOTANY

3.1 Structure of Cell, Plant tissues.
3.2 Classification of Vegetation.
3.3 Reproduction in Plants.
3.4 Absorption and Movements of Fluid in Plants.
3.5 Photosynthesis process and Respiration in Plants.

Unit 4: ZOOLOGY

4.1 Blood and Lymph
4.2 Respiratory System
4.3 Nervous System
4.4 Digestive System
4.5 Excretory System.

Unit 5: HEALTH AND HYGIENE

5.1 Tobacco, Alcohol and Narcotic Drugs.
5.2 Environmental Pollution.
5.3 Communicable diseases and modes of spread.
5.4 Non communicable diseases.
5.5 Balanced diet.

SOCIAL SCIENCES

(GEOGRAPHY, HISTORY & POLITICAL SCIENCE)

UNIT - 1

1.1 Geography its meaning, Importance and scope.
1.2 Continents oceans and ocean current
1.3 Rivers and Various stages of Rivers
1.4 Volcanoes, Earthquakes, Vertical and Horizontal Earth Movements
1.5 Functions of winds

UNIT- 2

2.1 Regional Geography of India
2.2 Man and Environment
2.3 Eco System and Energy flow and Ecological balance
2.4 Stone Age and Sources of Indian History
2.5 River Valley Civilization - Sindhu

UNIT- 3

3.1 Religious Movement of 6^{th} Century B.C (Jainism & Buddhism)
3.2 Mauryan Period
3.3 Gupta Period
3.4 Mughal Period
3.5 British Period

UNIT-4

4.1 National Movements of India

4.2 Government - Parliamentary and Presidential, Unitary and Federal
4.3 Preamble and Main characteristic of Indian Constitution
4.4 Central Legislative (President, Lok Sabha and Rajya Sabha)
4.5 Central Executive (President, Vice President, Prime Minister and Council of Ministers)

UNIT -5

5.1 Central Judiciary (Supreme Court)
5.2 State Government - Legislative, Executive and Judiciary
5.3 Political Parties in India
5.4 U.N.O. - Aims, Organs and Functions
5.5 Independence Act of 1947

MATHEMATICS

UNIT-1: NUMBER SYSTEM

1.1 Properties of natural numbers, whole numbers, integers, rational numbers and whole numbers, prime and composite numbers
1.2 Law of rational numbers (commutative, associative, identity & distributive) in case of addition & multiplication.
1.3 Set theory- representation, elements & types of sets.
1.4 Venn diagram and its applications
1.5 Logarithm– meaning & laws, problem based on common logarithm (logarithm of any number at base 10)

UNIT-2: ARITHMETIC

2.1 Finding HCF and LCM
2.2 Percentage, ratio & proportion
2.3 Squares and square roots
2.4 Word problems based on profit & loss
2.5 Simple and compound interest

UNIT-3: ALGEBRA

3.1 Polynomials
3.2 Pair of linear equation in two variables
3.3 Situational problems based on quadratic equations related to day to day activity
3.4 Factorization of algebraic expression
3.5 Numerical problems based on time and work

UNIT-4: GEOMETRY & STATISTICS

4.1 Triangle: definition, types, properties & related problems
4.2 Circle: various parts, properties, tangent & related problems
4.3 Parallelogram: properties, types & related problems
4.4 Frequency distribution table
4.5 Mean, median & mode of data

UNIT-5: MENSURATION & TRIGONOMETRY

5.1 Problems based on area, perimeter and circumference of circle
5.2 Curved surface area, total surface area and volume of cube & cuboids
5.3 Curved surface area, total surface area and volume of cylinder & cone
5.4 Trigonometrical ratio of an acute angle of a right angled triangle
5.5 Simple problems based on Trigonometrical identities.

M.Voc. Apparel Design*

Unit 1: INTRODUCTION TO TEXTILES & FABRICS

1.1 Classification of textile fibres, Fibre identification & theory. General properties of fibres, their processing.
1.2 Yarn; its different structures, Fabric Production techniques, Identification of weaves, Features of different fabrics; their application & selection.
1.3 Fabrics & Laundry, cleaning auxiliaries, Care labels, Scouring and Bleaching procedures.
1.4 Dyeing of yarns with - direct, acid, reactive and vat dyes.
1.5 Techniques of Surface ornamentation: Printing, Embroidery, Appliqué, Quilting, Smocking.

Unit 2: DESIGNING GARMENTS & CAD

2.1 Basic design and drawing, Types of textures and design, Apparel illustration and appreciation.
2.2 Types of Pockets, Collars, Yokes, Sleeves, plackets, skirts; their application and designing details, Style reading.
2.3 Role of Computers in Apparel Industry, ERP program software's for Textile and Fashion Design.
2.4 Garment Grading System, Garment Marker System on CAD.
2.5 Development of the basic Blocks for Men's and Women's wear on CAD software, Developing production patterns.

Unit 3: PATTERN MAKING & APPAREL MANUFACTURING

3.1 Tools and equipments of Clothing construction, Figure types & body measurements, Pattern making and Layout, Trimmings and supporting fabrics.
3.2 Sewing machines; its types, components, automation, maintenance, applications.
3.3 Garment making methods, Designing garments by Drafting, Dart manipulation, Draping, Bespoke method and industrial method of basic block construction.
3.4 Principles of grading, Preparation of patterns & Garments for different age groups.
3.5 Production planning for apparel manufacturing, Production Processes.

Unit 4: MERCHANDISING & GARMENT PRODUCTION

4.1 Elements of fashion, Fashion cycle, Organizational structure of the fashion industry, Major segments of the industry supply chain, Fashion retailing, Fashion promotion.
4.2 Sourcing & Merchandising in Apparel Industry, Sampling.
4.3 Production control, Production pre planning, Process flow chart and production system.
4.4 Plant loading and production control forms, Work study for Apparel manufacturing.
4.5 Boutique Management.

Unit 5: TESTING & QUALITY IN APPAREL MANUFACTURE

5.1 Techniques of Fibre, Yarn & Fabric testing, Garment testing techniques.
5.2 Identification of Garment defects, Standardization: Quality control of textile products.
5.3 Apparel costing & compliance.
5.4 Testing parameters & standards for AQL, FTP, GTP, Methods of inspection, Fabric inspection systems-4 point, 10 point system, Graniteville 78, AQL Sampling Plans.
5.5 Quality in finishing & packaging, Garment analysis (using tech-pack standards), Garment fitting parameters

***A Practical Skill Based 3 hours examination will also be held.**

Syllabus for Skill based Practical examination

Designing a Garment (Men's wear/Women's wear/Kid's wear) by incorporating dart manipulation, grading of patterns & its stitching.

M.Voc. Food Processing & Preservation

Unit 1: TECHNOLOGY OF FOOD PROCESSING AND PRESERVATION

1.1. Principles of food processing and preservation. Scope of food processing; historical developments; Processing and preservation by heat, Processing and preservation by low-temperature and enzyme.
1.2. Processing and preservation by non-thermal methods, drying, concentration and evaporation.
1.3. Processing and preservation by low temperature, modified atmospheric packaging, and chemical preservation methods.
1.4. Food fermentations, pickling, smoking etc, thermal destruction time.
1.5. Food additives: definition, types and functions, permissible limits and safety aspects.

Unit 2: CEREALS, LEGUMES, OILSEEDS AND SPICES PROCESSING

2.1. General introduction to cereals, legumes oilseeds and spices and their production trends, Structure and nutrient distribution, wheat types, milling of wheat, corn, rice.
2.2. Technology of bread, biscuits, durum wheat, extruded products (pasta and noodles) parboiling of rice, and rice products. Production and utilization of minor cereals.
2.3. Dhal milling and processing of pulses, ant nutritional factors in legumes and methods of removal.
2.4. Processing of oilseeds and processing for production of edible oil, meal, flour, protein concentrates and isolates.
2.5. Extrusion cooking technology; snack foods; development of low cost protein foods. Processing of spices and trends in utilization of oilseeds and spices.

Unit 3: PROCESSING OF MILK AND DAIRY PRODUCTS

3.1. Sources, and composition of milk, processing of market milk, standardization, toning of milk.
3.2 Homogenization, pasteurization, sterilization, storage, transportation and distribution of milk.
3.3 Quality control test for milk, biochemistry of milk and Dairy engineering.
3.4. Indigenous milk products - Present status, method of manufacture of dahi, khoa, burfi, kalakand, gulabjamun, rosogolla, srikhand, chhana, paneer, ghee, lassi, butter, whole and skimmed milk powder etc.
3.5. Milk product processing-cream, ice cream condensed milk, evaporated milk, probiotic milk products.

Unit 4: FRUITS AND VEGETABLE PROCESSING

4.1. Principles and methods of fruit and vegetable preservation, Principles of storage of fruits and vegetables.
4.2. Types of storage, Fruit and vegetable juices, preparation of syrups, cordials and nectars, juice concentrates, pectin and related compounds, jams, jellies, marmalades, preserves.
4.3. Pickles, chutneys, tomato products.
4.4. Drying and dehydration of fruits and vegetables, problems related to storage of dehydrated products.
4.5. Canning of fruits and vegetables, aseptic canning technology.

Unit 5: BIOCHEMISTRY AND FOOD MICROBIOLOGY

5.1. Enzymes as biocatalysts – chemistry, classification, mode of action, specificity, assay techniques, isolation and purification, stabilization, enzyme kinetics.
5.2. Applications of enzymes. Classification, Structure and properties of carbohydrates, proteins and lipids.
5.3. History of microbiology of food.. Types of micro-organism normally associated with food-mold, yeast, and bacteria.
5.4. Microbial growth pattern, physical and chemical factors influencing destruction of micro-organisms.
5.5. Contaminants of foods-stuffs, vegetables, cereals, pulses, oilseeds, milk and meat during handling and processing. Food poisoning and microbial toxins, standards for different foods. Food borne intoxicants and my co-toxins.

M.Voc Textiles

Unit 1: TRADITIONAL TEXTILES, INDIA & INTERNATIONAL

1.1 Names of the places from where different Embroidered, painted, and Printed Textiles come
1.2 Name the places from where woven and resist dyed textiles are found.
1.3 Textile Industries/Export House
1.4 Specialities of different textiles
1.5 Inception of different crafts being used on textiles and their places of origin.

Unit 2: TEXTILE MATERIALS FIBER/FABRIC, NATURAL, MAN MADE

2.1 Cotton- Types, Kind, durability, functional use and procurement.
2.2 Silk- Types, Kind, durability, functional use and procurement.
2.3 Wool- Types, Kind, durability, functional use and procurement.
2.4 Synthetic- Types, Kind, durability, functional use and procurement
2.5 Jute- Procurement, functional use, Types, products made from it

Unit 3: ELEMENTS WITH PRODUCT DESIGNING

3.1 Standard sizes of Various textile products.
3.2 Types of design styles for different types of people
3.3 Standard size of fixtures for designing upholstery
3.4 Type of material required for designing
3.5 Design and colour coordination

Unit 4: GRAPHICS & COMPUTER AIDED TEXTILE DESIGN

4.1 Names of various Hardware & its use in computer.
4.2 Name of various Graphic Software
4.3 Use of different Scanners, Printers, Digitizer and Tablet
4.4 Various tools used in Corel & Photoshop
4.5 Usage of word, Excel & PowerPoint.

Unit 5: COLOUR, DYES

5.1 Results obtained from mixing different colours
5.2 Warm and cool colours and their names
5.3 Seasons associated with colour
5.4 Types of colours scheme
5.5 Styles and designs associated with colour

*** A Practical Skill Based 3 hours examination will also be held.**

Syllabus for Skill based Practical examination

Students would have to prepare a Theme board, Inspiration board, Idea origin on the given topic.

Portfolio presentation digital as well as physical.

Material to be brought for practical test: Water colours, Brushes, water countainer.

M.Voc. Dairy Technology

Unit 1: DAIRY FARMING & VETERINARY SCIENCE

Indian and exotic breeds of dairy animals, General dairy farm practices, Digestive system of ruminants, Structure and function of mammary system, Common disease problems in dairy animals, their prevention and control, Feed and Nutrition, Male and female reproductive system, Digestive system of ruminants.

Unit 2: BASIC CHEMISTRY & BIOCHEMISTRY

Carbohydrate - Classification, Structure and properties. Lipids – Classification, Structure and properties. Amino acids – Classification, structure and properties. Protein – Structure, organization and properties. Vitamins: Food source, consumption, absorption & metabolism, Minerals.

Unit 3: DAIRY PROCESSING & BIOTECHNOLOGY

Principles of food processing, Processing of fat rich dairy products, traditional dairy products, fermented milk products, Condensed and dried dairy products, Dairy microbiology, Biotechnology & dairy, Dairy waste management (effluent treatment).

Unit 4: QUALITY CONTROL & QUALITY ASSURANCE IN DAIRY

HACCP, ISO, BIS, FSSAI, Dairy products borne infections and intoxications. MMPO, Pesticide residue, Heavy metals, Antibiotic residue, Preservative, adulterants & neutralizers, Pathogen testing in dairy products, Chemical testing in dairy products, Platform testing.

Unit 5: GENERAL, NUMERICAL & SCIENTIFIC APTITUDE, ENGLISH LANGUAGE PROFICIENCY

General aptitude, Scientific aptitude, Measurements & Units, Percentage & Average, Simple Interest, Profit & Loss, Grammer, Vocabulary, Antonyms, Synonyms.

*** Would be followed by practical Test in Dairy Plant**

M.Voc. Automobile

UNIT 1: AUTOMOTIVE ENGINE SYSTEMS

1.1 Automotive Engines: Fundamentals of Engine Operation, Engine Types & Classification, Engine Construction, Valves & Valves Trains.

1.2 Engine Fuels:Fuels, Combustion, Abnormal Combustion, Detonation, Pre-ignition, Other fuels like CNG, LPG, Blended Fuels, Hydrogen etc., Cetane Number and Octane Number.

1.3 Automobile Fuel Delivery: Electronic Petrol Fuel Injection Systems, Fuel Injection System in Diesel Engines, Carburetors.

1.4 Engine Sub Systems: Engine Lubricating System and Service, Engine Cooling System and Service, Superchargers and Turbochargers.

1.5 Automotive Electrical and Electronic Equipment: Automotive Battery, Starting System and Service, Charging System and Service, Contact Breaker Point Ignition System, Electronic Ignition System.

UNIT 2: AUTOMOTIVE DRIVE TRAINS AND CHASSIS

2.1 Automotive Clutches: Clutch Construction, Hydraulic & Electronic Controls, Clutch Noises, Diagnosis Adjustment and Service

2.2 Manual Transmission and Transaxles: Gears and Gearing, Gear shifting, Transmission and Transaxle, Construction and Operation.

2.3 Driveshafts and Drive Axles: Universal Joints, CV joints, Final Drive, Differentials, Drive Axles Diagnosis & Service, Viscous Couplings, Four wheel Drive and Transfer case Diagnosis and Service, Torque Converters, Planetary Gears, Continuously Variable and Automatic Transmissions.

2.4 Automotive Chassis: Automotive Suspension Systems, Automotive Steering Systems, Wheel Alignment, Steering and Suspension Service, Automotive Brakes and Service, Antilock Braking System, Tires and Wheels.

2.5 Automotive Heating & Air Conditioning: Vapour Comprehension System, Ventilation, Heating and Air Conditioning, Servicing R-12 and R-134a Systems.

M.Voc. Renewable Energy

Unit 1: SOLAR PV SYSTEMS

Charge Controller, MPPT, Solar irradiance, Tilt Angle, Latitude, Battery charging Discharging, Solar PV systems
Maintenance, Solar Power Generation, Solar Inverter

Unit 2: ENERGY STORAGE

Batteries, Flywheel, Pumped Hydro, Salt, Super capacitor, SMES etc

Unit 3: WIND ENERGY

Types of turbines, Drag & Lifts, Wind Energy Storage

Unit 3: BIO MASS SYSTEMS

Bio Mass Gasification and Gobar Gas Plant Systems

Unit 5: SOLAR THERMAL SYSTEMS

Steam Generation, Solar Cooking Systems, Solar Distillation

Fuel Cells

SYLLABUS: COMMON FOR ALL

GENERAL KNOWLEDGE

Unit 1: GEOGRAPHY

1.2 The Earth and its Solar System
1.2 Physical Geography (World)
1.3 Physical Geography (India)
1.4 Countries Capitals, Currencies
1.5 India - States, Capitals, Cities, Languages

Unit 2: SCIENCE/TECHNOLOGY

2.1 Physics
2.2 Chemistry
2.3 Life Sciences
2.4 Inventions & Discoveries
2.5 Diseases

Unit 3: BOOKS, AUTHORS, ABBREVIATION ETC.

3.1 Famous Books and Authors-Indian and Foreign

3.2 Abbreviation, Acronyms, Foreign words & Phrases

3.3 Sports and Games-Famous Trophies and Tournaments, Leading Sportsmen, Terms associated with different sports and games, Olympic and Asian Games.

3.4 Important Indian Awards–Civil and Military awards Important International Awards-Noble prizes, Magasaysay awards etc.

3.5 Art and Culture-Various Art Forms, Places and Artists associated with them, Sobriquets, Major Festivals.

Unit 4: SOCIAL SCIENCES

History-Indian Major Historical Periods and their Features:-

4.1 From the Indus Valley Civilization to the First Battle of Panipat in 1526 AD.

4.2 From 1526 A.D. to the Modern Period.

4.3 **Political Awareness**: Indian Constitution-Its main features- Fundamental Rights, Important personalities and major events in India since Independence.

4.4 **Economics**: Indian Economy

4.5 **Statistics-**Elementary Statistics-Meaning and Importance of Statistics, Statistical Average.

Unit 5: CURRENT AFFAIRS

5.1 Persons in News

5.2 Places in News

5.3 National Events

5.4 International Events

5.5 Sports

ENGLISH LANGUAGE, EXPRESSION AND COMPREHENSION

UNIT 1 & 2: GRAMMAR

1.1 Correct usage (Noun, Pronoun, Adjectives and Articles)

1.2 Correct usage (Verbs, Adverbs, Prepositions and Conjunctions)

1.3 Modal Auxiliaries, Verbals

1.4 Tenses and Tense Sequence

1.5 Conditionals and Question Tags, Voice- Active and Passive

UNIT 3 & 4: ENGLISH LANGUAGE STRUCTURES, VOCABULARY AND IDIOMS AND PHRASES

2.1 Concord

2.2 Various Types of Clauses & Sentences

2.3 Antonyms and Synonyms

2.4 One Word Substitutions

2.5 Commonly Used Idioms and Phrases

UNIT 5: COMPREHENSION

Candidate's ability of comprehension will be assessed through questions based on a given passage/ passages. (Questions may be based on both the denotative and the connotative meanings of the text of the passage(s) besides the use of the words given in the passage(s).

LOGIC & REASONING

(I) VERVBAL REASONING (Out of the following)

Number series, Analogy, Classifications, Blood relations, Coding-decoding, Puzzle test, Machine input, Inequalities, Decision making, Syllogism, Sitting arrangement, Sequential output tracing, Direction sense test, Logical Venn diagram, Alphabet test, Alpha-numerical sequence puzzle, Mathematical operations, Numbers, ranking & time sequence test, Logical sequence test, Arithmetical operations, Inserting the missing characters, Data Sufficiency, Eligibility test, Assertion and reason, Situation reaction test, Verification of truth of the statement etc. (other similar topics as may be relevant and applicable from time to time)

(II) NON VERBAL REASONING (Out of the following)

Series, Analytical reasoning, Mirror-image, Water-image, Spotting out the embedded figures, Completion of incomplete pattern, Figure matrix, Paper folding, Paper cutting, Rule detection, Grouping of identical figures, Cubes and dice, Dot situation, Construction of squares and triangles etc. (other similar topics as may be relevant and applicable from time to time)

QUANTITATIVE ABILITY

(i) Level A: (M.B.A., M.B.A. (Agricultural Management)/M.B.A. (General Management)/M.B.A. (Innovation), M.A. Soc. SC. (Bus. MGMT), B.Tech. (Part-Time)
Boats and Stream, Pipes and Cisterns, Problems on Trains, Square Root and Cube Roots, Surds and Indices, Volume and Surface Area, Allegation and Mixtures, Profit and Loss, Banker's Discount, Compound Interest, Time and Work, Partnership, Simple Probability, Mensuration and Measurement, Ratios and Proportions, Data Interpretation *(other similar topics as may be relevant and applicable from time to time)*

(ii) Level B: B.Com., B.B.A., B.B.A. (Logistics), B.B.A. (Retail) Programmes & B.Voc. Programmes (Syllabus of High School Mathematics) (see on Page 13 to 15)

(iii) Level C: B.Voc. Programmes (Syllabus of Class Eighth Mathematics)

Mathematics (Class Eighth)

Unit - 1

1.1 परिमेय संख्याओं पर संक्रियाएँ
2.2 वर्ग और वर्गमूल
3.3 घन और घनमूल
4.4 सर्व समिकाएँ

Unit - 2

2.1 बीजीय व्यंजकों का भाग एवं गुणनखण्ड
2.2 संख्याओं से खेल
2.3 रेखीय समीकरण (समीकरण)
2.4 दो अजात राशि वाले रेखीय समीकरण (युगपद समीकरण)

Unit - 3

3.1 समान्तर रेखाएँ
3.2 चतुर्भज की रचनाएँ
3.3 वाणिज्य गणित
3.4 बैंकिंग

Unit - 4

4.1 वृत्त और चक्रीय चतुर्भुज
4.2 वृत्त की स्पर्श रेखाएँ
4.3 सांख्यिकी
4.4 संभावनाओं की सांख्यिकी

Unit - 5

5.1 ग्राफ
5.2 क्षेत्रमिति

Mathematics (Class Eighth)

Unit - 1

1.1 Calculations in rational numbers
1.2 Square and Square Root
1.3 Cube and Cube Root
1.4 Algebraic Expressions

Unit - 2

2.1 Division and Factorization of Algebraic Expression
2.2 Number Games
2.3 Linear Equations (Simple Equations)
2.4 Linear Equations with two Variables

Unit - 3

3.1 Parallel Lines
3.2 Construction of Quadrilaterals
3.3 Commercial Mathematics
3.4 Banking

Unit - 4

4.1 Circle and Cyclic Quadrilateral
4.2 Tangent of a Circle
4.3 Statistics
4.4 Probability

Unit - 5

5.1 Graph
5.2 Mensuration

SYLLABUS : M.Ed. Test

SECTION A

SCHOOL MANAGEMENT

UNIT-I SCHOOL MANAGEMENT

1.1 Meaning and concept of School Management.
1.2 Meaning and concept of School Administration and Organisation.
1.3 Difference between School Management, Administration and Organisation .

1.4 Administration of School education at different levels-local, district, state and national.
1.5 Centralization/Decentralization and Role of Apex bodies in Educational Planning and Management in School Planning.

UNIT-II FUNCTIONAL ASPECT OF SCHOOL MANAGEMENT

2.1 Management of Physical Environment, School Building –light, ventilation and furniture arrangement.
2.2 Management of Human Resources
2.3 Time-table- Importance, Types and Principles of construction.
2.4 Supervision –Concept, Types, Importance and Techniques.
2.5 Co-curricular activities – Concept, Importance, Types and Organisation.

UNIT-III GUIDANCE AND COUNSELLING

3.1 Concept, Meaning, Nature and Principles of Guidance.
3.2 Concept, Meaning, Nature and Principles of counselling.
3.3 Difference between Guidance and counselling.
3.4 Counselling Approaches-Directive, Non-Directive and Eclectic.
3.5 Professional Ethics in Guidance and Counselling

UNIT-IV GUIDANCE AND COUNSELLING SERVICES

4.1 Foundations of Guidance Services.
4.2 Organisation of Guidance Programme at different levels.
4.3 Role of Teacher and Counsellor.
4.4 Techniques of Guidance.
4.5 Importance and characteristics of good psychological tests.

UNIT-V ECO-FRIENDLY ENVIRONMENT

5.1 Concept and meaning of Environment
5.2 Ecosystem, structure, function and components
5.3 Natural resources: Forest, water, mineral, food and energy
5.4 Environmental issues: pollution, solid waste, climate change and natural disaster
5.5 Environmental ethics and values: Eco Friendly environment.

SECTION B

HISTORY AND PERSPECTIVES OF MODERN INDIAN EDUCATION

UNIT I: EDUCATION FOR NATIONAL DEVELOPMENT

1.1 Concept of National Development : Meaning, Dimensions and Indicators – Education Commission, World Bank
1.2 National System of Education in India : Analytical Study of Its Basic Elements (NPE 1986)
1.3 Constitutional Mandates for Education in India
1.4 Right to Education (RTE) Act, 2009
1.5 Financial Provisions for Education in Five Year Plans and Budgets

UNIT II: CONTEMPORARY ISSUES AND POLICY IN SCHOOL EDUCATION IN INDIA

2.1 Pre-School Education : Issues of Commercialization, Curriculum, Government Control and Resources with Relevant Remedies and Initiatives
2.2 Elementary Education : Issues of Universalization, MLL and Quality Control

2.3 Elementary Education : Relevant Remedies and Government Initiatives - SSA
2.4 Secondary Education : Issues of Universalization, Vocationalization, Language Policy and Quality Control
2.5 Secondary Education : Relevant Remedies and Government Initiatives – RMSA, NIOS, NVS, KGBV

UNIT III: NATURE AND MODES OF EDUCATION

3.1 Nature of Education
3.2 Modes of Education
3.3 Views on Education
3.4 Culture and Education
3.5 Role of Education in socialization

UNIT IV- SOCIAL PERSPECTIVES OF EDUCATION

4.1 Industrialization and Modernization
4.2 Equity, Equality, Social Justice and dignity
4.3 Nationalism, Universalism and Secularism
4.4 Role of Education in promoting Peace
4.5 Integral role of Education

UNIT V - GENDER, SCHOOL AND SOCIETY

5.1 Gender inequality and Education
5.2 Education for Human Rights
5.3 Education for Democracy
5.4 Education for Global Peace and National Integration
5.5 Women Empowerment and Development

SECTION C

PEDAGOGY, EDUCATIONAL AND INFORMATION TECHNOLOGY

UNIT I: PEDAGOGY AND TEACHING SKILLS

1.1 Meaning & Aims of Pedagogy
1.2 Productive, Digital and Inter-cultural Pedagogy
1.3 Theories of Multicultural Pedagogy
1.4 Teaching skills, Skills of Classroom Management.
1.5 Observation of Classroom Behavior

UNIT II : PRINCIPLES, SRATEGIES, METHODS AND TECHNIQUES OF TEACHING–LEARNING

2.1 Audio-Visual Aids-Principles governing use of A V aids in classroom
2.2 Cooperative, Collaborative and Active Learning Strategies
2.3 Styles of Learning-Visual, Aural, Physical, Solitary, Interpersonal
2.4 Enquiry, Discovery and Inductive-Deductive Method
2.5 Techniques-Mind Mapping, Problem Solving, Brain Storming

UNIT III: LESSON PLANNING AND COMMUNICATION IN CLASSROOM

3.1 Bloom's Taxonomy and current prevailing Taxonomies
3.2 Traditional and Modern Approaches to Lesson Planning
3.3 Concept of Communication
3.4 Types of Communication

3.5 Models of Communication

UNIT IV: EDUCATIONALTECHNOLOGY

4.1 Teaching and Instructional Technology
4.2 Programmed Instruction and its Types
4.3 Computer Assisted Instruction (CAI) and Personalized System of Instruction (PSI)
4.4 Team Teaching and Simulated Teaching
4.5 Models of Teaching

UNIT V: INFORMATION TECHNOLOGY FOR TEACHING-LEARNING

5.1 Online Collaboration Tools
5.2 E-content Generation
5.3 ICT enabled learning infrastructure
5.4 Online Evaluation
5.5. Virtual Learning

SECTION –D

FOUNDATION OF TEACHING AND LEARNING

Unit I - Childhood and Growing Up

1.1 Perspectives in Development
1.2 Physical and Motor Development at Different stages
1.3 Cognitive and language Development at Different stages
1.4 Social and Emotional Development at Different stages
1.5 Personality and Adjustment

Unit II - Inclusive Education

2.1 Classroom as a Miniature Society; Divulging Diversities Existing In Students
2.2 Conceptual Framework of Children with Special Needs
2.3 Curricular Provision in Inclusive Schools
2.4 Supportive Services in an Inclusive School
2.5 New Approaches to Streamline Diversities in Inclusive Classrooms

Unit III - Assessment for Learning

3.1 Conceptual Orientation to Assessment for Learning (AFL)
3.2 Comparison among Assessment, Evaluation, Measurement, Testing, Examination and Types of Assessment
3.3 Exploring Practical Strategies for Implementing AFL in the Context of Holistic Development
3.4 Development of Effective Tools For Assessment For Learning
3.5 Issues and Concerns Related To Assessment For Learning

Unit IV - Learning and Teaching

4.1 Fundamentals of Learning
4.2 Fundamentals of Teaching
4.3 Models of Teaching
4.4 Individual Differences and Group Dynamics
4.5 Understanding Problems and Facilitating Development Of The Learner

UNIT V – Statistics

5.1 Concept and nature of statistics, Collection and Tabulation of data

5.2 Graphic representation of data, Frequency Polygon Curve, Smoothed Frequency Curve, Histogram, Cumulative Frequency Curve, Ogive
5.3 Measures of Central Tendency- Mean, Median and Mode (Meaning, computation & uses)
5.4 Measures of Dispersion-Range, Mean Deviation, Quartile Deviation and Standard Deviation (Meaning, computation & uses)
5.5 Correlation: (I) Meaning (II) Calculation of correlation (rank difference method)

SYLLABUS: FOR M.Tech. Test

MATHEMATICS

Unit 1: ALGEBRA

1.1 Convergence of Infinite Series with simple problems.
1.2 Matrices-Addition, substraction, multiplication, division, inverse and Rank with simple problems.
1.3 Linear Transformations.
1.4 Determinants, System of linear equations.
1.5 Modern Algebra-Binary operations, Definitions of Group, Ring, Integral domain, Field with simple problems.

Unit 2:

Laplace Transforms: Standard forms, Shifting and convolution theorems, Transforms of derivatives, Inverse Laplace Transforms, Laplace Transforms of error, Heaviside, Dirac-Delta functions, Application to the solution of linear and simultaneous differential equations in Electrical and Mechanical Systems.

Fourier Series: Drichtets' conditions, Half range series, Harmonic analysis.

Unit 3: NUMERICAL ANALYSIS

Algebraic and Transendental Equations: Numerical solution, Method of Bisection, Newton-Raphson iteration, acceleration of convergence by Aitken Triangle square process.

Linear Simultaneous Algebraic Equations: Solution, Cholesbys, Jacokis and Gauso-Serdel methods.

Numerical solution of ordinary differential equations: Methods of Taylor, Picard, Euler, Range-Kutta, Adams-Bachforth and Milve, Simultaneous differential equations.

Unit 4:

4.1 Methods for solving differential equations of first order and first degree (variable separable, linear, exact).
4.2 Simple second order differential equations.
4.3 Strings in two dimensions, Forces in three dimensions.
4.4 Kinematics, Rectilinear motion, Motion in a plane.
4.5 Moment of Inertia, D'Alembert's principle.

Unit 5: STATISTICS

5.1 Graphical representation of data, measures of central tendency.
5.2 Measure of variability.
5.3 Binomial distribution of Poisson, Normal distribution.
5.4 Correlation Probability.
5.5 Probability correlation and regression.

POST GRADUATE DIPLOMA IN THEOLOGY (PGDT)/MA Theology

Unit 1: Hinduism
- 1.1 Vedic Religion
- 1.2 Shaiva, Vaishnav & Shakta Religions
- 1.3 Srimad Bhagvad Gita
- 1.4 Rituals of Hinduism
- 1.5 Philosophy of Hinduism

Unit 2: Bhakti and Sant Mat
- 2.1 Bhakti-Sagun and Nirgun
- 2.2 Main Indian Saints of South & North
- 2.3 Kabir Panth
- 2.4 Sikhism
- 2.5 Radhasoami Mat

Unit 3: Jainism and Buddhism
- 3.1 Philosophies of Jainism
- 3.2 Tirthankaras
- 3.3 Philosophies of Buddhism
- 3.4 Life history of Gautam Buddha
- 3.5 Sects of Jainism and Buddhism

Unit 4: Semetic Religions
- 4.1 Judaism and its Philosophy
- 4.2 Chrishtianity and its Philosophy
- 4.3 Islam and its Philosophy
- 4.4 Sufism
- 4.5 Zoroastrianism

Unit 5: World Religions
- 5.1 Confucianism
- 5.2 Taoism
- 5.3 Shintoism
- 5.4 Role of religions in Better worldliness
- 5.5 Science and Religion