

## GROUP-1

1) General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc.- **(Weightage 20%)**

2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc. - **(Weightage 10%)**

3) **Subject related syllabus-**

**(Weightage 70%)**

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### **Anatomy**

Introduction of Bones of the Human Body of : • Upper Limb : clavicle, scapula, humerus, radius, ulna, carpus, metacarpus & phalanges • Lower Limb : hipbone, femur, tibia, fibula, tarsus, metatarsus & phalanges • Skull : name the bone of skull and sutures between them • Thorax : ribs and their articulations • Vertebral Column : Cervical, thoracic, lumber, sacral and cocasial vertebrae

1) **Surface Markings of the Body:**• Nine regions of the abdomen • Four quadrants of the Hip

2) **Introduction of different Vital Organs:**

A) **Respiratory Organs:**• Nasopharynx • Oropharynx • Larynx • Trachea • Bronchi • Lungs (and their lobular segments) • Thoracic cavity • Pleura and Pleural cavity.

B) **Circulatory Organs:**• Anatomical position of the heart • Pericardium of the heart • Chambers of the heart, • Great vessels of the heart • Valves of the heart.

C) **Digestive Organs:**• Tongue • Teeth • Oral cavity • Pharynx • Oesophagus • Stomach • Small intestine • Large intestine and its colons.

### **Physiology**

1) **The Cell in health and disease**

a. Introduction of pathology b. Cellular structure and metabolism c. Inflammation - Acute and Chronic d. Derangement of Body Fluids and Electrolytes • Types of shocks • Ischaemia • Infection e. Neoplasia - Etiology and Pathogenesis

2) **Introduction of haematology**

a. Formation of Blood b. Erythropoiesis c. Leucopoiesis d. Thrombopoiesis e. Collection of Blood f. Anticoagulants g. red cell count - Haemocytometer, Methods and Calculation h. WBC Count -- Methods i. Differential Leucocytes Count (DLC)-- Morphology of White Cells, Normal Values Rananocostry Stains: Staining procedures Counting Methods, Principle of staining j. Hb estimation - Method Colorimetric Method Chemical Method Gasmetric Method S.G. Method Clinical Importance

**I. Haematology:**• ESR • Methods • Factors - Affecting ESR • Normal Values • Importance • RBC - Indices v WBC • Platelets

**II. Body Fluids:** (a) Urine: • Method of Collection • Normal Constituents • Physical Examination • Chemical Examination (b) Stool Examination: • Method of Collection • Normal Constituents and appearance • Abnormal Constituents (Ova, Cyst) (c) C.S.F. Examination • Physical Examination • Chemical Examination • Microscopy • Cell 1 Count • Staining (d) Semen Analysis • Collection • Examination • Special Tests.

## **Microbiology**

- I. Introduction of brief history of Microbiology • Historical Aspect • Relationship of Micro-organism to men • Micro-organism in Disease and Health
- II. Requirement and uses of common Laboratory Equipment • Incubator, Hot Air Oven, Water Bath • Anaerobic Jar, Centrifuge, Autoclave • Microscope • Glassware – Description of Glassware, its use, handling and care
- III. Sterilization: • Definition • Classification and General Principal of Sterilization • Autoclave – its structure, functioning, control and indicator
- IV. Antiseptics & Disinfectants • Definition • Types • Mode of Action • Uses V. Collection, Transportation and processing of clinical samples for Microbiological Investigations

## **Bacteriology**

- Definition • Bacteria – General characteristics of Bacteria • Classification and morphology of Bacteria • Structure of Cell, Capsule, Flagella, and Spore • Growth of Bacteria • Nutrition of Bacteria.

## **Virology:**

- Definition • General Introduction of Virus • Physiochemical characteristic of Viruses • Diseases caused by different Virus and mode of infection.

## **Parasitology:**

- Definition • General Characteristics of Parasite • Classification of Parasite • Mode of transmission

## **Fungus:**

- Definition • Structure • Classification

## **Health & Hygiene**

Definition of Health, Responsibility of Health, Nutrition, Environmental sanitation, Concept of Health & Diseases, Factors influencing Health, Healthful Living, Health Habits & Practices, Maternal Health, Equipment & supplies for Maternal Health Work, School Health Service, National Health Programme, Community Resources for health education, Communication Skills for health worker, Audio Visual aids in health education, Dietary needs of the patient.

## **Public Health**

### **Introduction of Public Health:**

Concept of health, nursing, community, community health and development. Responsibilities of health workers. Ethics and behaviour of health worker. Health team. Organisation of health and nursing and nursing services, principles of organizing care, in the home, health agencies, clinics, school and hospitals., principles of organizing care according to the needs and priorities, health and medical problems.

### **Public Health and problems in India: -**

Factors related to family health, integrating family services (MCH services), family life education for parents, nutrition of the family, introduction of nutrition relation of nutrition of health ,foods

nutrients and function of food ,vitamins minerals, vitamins minerals deficiencies ,applied nutrition Programme, nutrition education.

#### **Dietary needs of the patient:**

Healthful environment in the home care of Sick, aged person handicapped, home visiting and domiciliary health service, in home Understanding and learning about community, family structure and activities, Urban and rural administrative pattern, social processes, social control (traditional, customs and habits).

### **First aid and Emergency Care**

#### **Life saving measures**

Management of emergency situation, general rules for first aid, observations, examinations, tests, temperature, pulse, respirations, blood pressure, weight and height, history taking physical examination, urine analysis, collection of specimens, X-ray and special tests, dressing and bandages. First aid in the injuries of the skin (wounds, burns and scalds, bites and stings), first aid in injuries to bones, joint and muscles(fracture), transport of casualties, first aid in loss of consciousness, first aid in convulsions and hysteria, first aid in shock, first aid for foreign bodies in the ear, eye, nose and throat, artificial respiration, first aid in asphyxia, first aid in poison.

#### **Mental Health: -**

Introduction to psychology, mental hygiene and health, self-understanding and growth, mental hygiene and health in various stages of life. Mental illness: normal and abnormal behaviour, education.

### **Health Information Education & Communication**

Child health, growth and development of a child, tags of child life a basic need, teaching mother about child health needs and priorities, assessment of growth and development, new born observation and assessment, care of the normal new born at home, management of minor disorders, care of premature baby at home, feeding of infants and children prevention and treatment of common childhood diseases and ailments, agencies for child care and welfare.

Health of mother: - principles of care during the maternity cycle, ante-natal care, action in case of abnormalities of pregnancy, intra-natal care, post. Natal care, health education: diet, exercise, hygiene and family planning, organization of maternal health care services, training of dais. Immunization: Immunity immunization, care and storage of vaccines, immunization schedule, methods of immunization, immunization reaction, treatment, and prevention, responsibilities of health workers in immunization campaigns.

Family Planning & family welfare including population duration: -introduction importance of family planning to the family and community, aspects of family health and welfare services, contraception and family planning methods, methods requiring medical attention and supervision, national family welfare programme, organizing family welfare work, records and reports, supervision of dais and community level workers.

### **Communication Skill**

Communicating with the community (Introduction to communication, what are the barriers to communication, traditional and modern channels of communication), types of communication, motivation in communication, basic skill for communication, evaluating the effects of communication, health education-communication in health work, principles of teaching, teaching methods ,audio-visual and other teaching aids, preparation of low cost A. V. Aids and their use, planning health education activities, identifying community resources for health education, the process of planning and implementing health education, community resources and organization for health education. Assessing needs and priorities, referral maintenance of supplies, equipment and other facilities, records and reports, patient retained records, admission and discharge of a patient, vital statistics and event, gathering information about our communities, registration of vital statistics and making use of information statistics and local resources.

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## GROUP-2

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3) **Subject related syllabus-** **(Weightage 70%)**

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### **Anatomy**

Introduction to Anatomical terms organization of the human body, The Skeletal System, The Muscular System, The Nervous System, The Sensory System, Circulatory and lymphatic system, The Respiratory System, The Digestive System, The Excretory System (Urinary), The Endocrine System, The Reproductive System including breast.

### **Physiology**

Cell Physiology, Skeletal System, Muscular System, Nervous System, Circulatory System, The Respiratory System, The Digestive System, The Excretory System, The Sensory Organs, The Endocrine System, The Reproductive System, Lymphatic and Immunological System.

### **Nutrition**

Introduction, Carbohydrates, Fats, Proteins, Energy, Vitamins, Mineral, Water & electrolytes, Cookery rules and preservation of nutrients, Balanced Diet, Role of nurse in nutritional programmes.

### **Biochemistry**

Introduction, Structure and functions of Cell membrane, Composition and metabolism of Carbohydrates, Composition and metabolism of Lipids, Composition and metabolism of amino acids and Protein, Composition and metabolism of vitamins and minerals, Immunochemistry.

### **Nursing Foundations**

Introduction, Hospital admission and discharge, Communication and Nurse patient relationship, The Nursing Process, Documentation and Reporting, Vital signs, Health assessment, Machinery, Equipment and linen, Meeting needs of patient, Basic needs (Activities of daily living), Physiological needs, Fluid, electrolyte, and Acid-Base Balances, Psychosocial Needs, Infection control in Clinical settings, Administration of Medications, Meeting needs of Perioperative patients, Meeting special needs of the patient, Care of Terminally ill patient, Hospital management system.

### **Psychology**

Introduction, Biology of behaviour, Cognitive Processes, Motivation and Emotional Processes, Personality, Developmental Psychology, Mental hygiene and mental Health, Psychological assessment & tests.

### **Microbiology**

Introduction, General characteristics of Microbes, Infection Control, Pathogenic organisms, Immunity.

### **Sociology**

Introduction, Individual & Society, Culture, Biodiversity and its conservation, social groups and processes, Population, Family and Marriage, Social Stratification, Types of Communities in India (Rural, Urban and Regional), Social Change, Social organization and social system, Social Control, Social Problems.

### **Pharmacology, Pathology and Genetics**

Introduction, Chemotherapy, Pharmacology of commonly used antiseptics, disinfectants and insecticides, Drugs acting on G.I system, Drugs used on Respiratory Systems, Drugs used on Urinary System, Miscellaneous, Drugs used on skin and mucous membranes, Drugs acting on Nervous system, Cardiovascular drugs, Drugs used for hormonal disorders and supplementation, contraception and medical termination of pregnancy, Introduction to Drugs used in alternative system of medicine.

## **Pathology**

Introduction, Special Pathology, Clinical Pathology, Examination of body cavity fluids, transudates and exudates, Urine and faeces.

## **Genetics**

Introduction, Maternal, Prenatal and genetic influences on development of defects and diseases, Genetic testing in the neonates and children, Genetic conditions of adolescents and adults, Services related to Genetics.

## **Medical Surgical Nursing(Adult including Geriatrics)**

Introduction, Introduction to Medical Surgical asepsis, Common signs and symptoms and management, Nursing management of patients(adults including elderly)with respiratory problems, Nursing management of patient(adults including elderly)with disorders of digestive system, Nursing management of patient(adults including elderly)with blood and cardio vascular problems, Nursing management of patient(adults including elderly)with Genito-urinary problems, Nursing management of disorder of male (adults including elderly) reproductive system, Nursing management of patient(adults including elderly)with disorder of endocrine system, Nursing management of patient(adults including elderly)with disorder of integumentary system, Nursing management of patient(adults including elderly)with musculoskeletal problems, Nursing management of patient(adults including elderly)with Immunological problems, Nursing management of patient(adults including elderly)with Communicable Diseases, Peri operative nursing, Nursing management of patient with disorders of Ear Nose and throat, Nursing management of patient with disorders of eye, Nursing management of patient with Neurological disorders, Nursing management of patient with disorders of female reproductive system, Nursing management of patient with Burns, reconstructive and cosmetic surgery, Nursing management of patient with oncological conditions, Nursing management of patients in EMERGENCY & DISASTER situations, Emergency Nursing, Nursing care of the elderly, Nursing management of patient in critical care units, Nursing management of patients adults including elderly with occupational and Industrial disorders.

## **Community Health Nursing**

Introduction, Determinants of health, Epidemiology, Epidemiology and Nursing management of common communicable diseases, Epidemiology and Nursing management of common non-Communicable diseases, Demography, Population and its Control, Health planning and policies and problems, Delivery of community health services, Community health nursing approaches, concepts and roles and responsibilities of nursing personnel, Assisting individuals and groups to promote and maintain their health, National health and family welfare programmes and the role of a nurse, Health Agencies.

## **Communication & Education Technology**

Review of Communication Process, Interpersonal relations, Human Relations, Guidance and Counselling, Principles of Education & Teaching Learning Process, Methods of teaching, educational media, Assessment, Information, Education & Communication for health (IEC).

## **Child Health Nursing**

Introduction Modern concepts of childcare, The healthy child, Nursing care of a neonate, Integrated management of neonatal and childhood illnesses (IMNCI), Nursing management in common childhood diseases, Management of behavioural & social problems in children.

## **Mental Health Nursing**

Introduction, Principles and Concepts of Mental Health Nursing, Assessment of Mental health status, Therapeutic communication and nurse - patient relationship, Treatment modalities and therapies used in mental disorders, Nursing management of patients with Schizophrenia, and other psychotic disorders, Nursing management of patients with mood disorders, Nursing management of patients with neurotic, stress related and somatization disorders, Nursing management of patients with substance use disorders, Nursing management of patients with Personality, Sexual and eating disorders, Nursing management of Childhood and adolescent disorders including mental deficiency, Nursing management of patients with Organic brain disorders, Psychiatric emergencies and crisis intervention, Legal issues in mental health nursing, Community Mental Health Nursing.

## **Nursing Research and Statistics**

Research and research process, Research Problem/Question, Review of Literature, Research approaches and designs, Sampling and data collection, Analysis of data, Introduction to statistics, Communication and utilization of Research.

## **Midwifery and Obstetrical Nursing**

Introduction to midwifery and obstetrical Nursing, Review of anatomy and physiology of female reproductive system and foetal development, Assessment and management of pregnancy (ante-natal) : Normal pregnancy, Assessment and management of intra-natal period, Assessment and management of women during post-natal period: Normal puerperium, Assessment and management of normal neonates, High-risk pregnancy - assessment & management, Abnormal Labour - assessment and management, Abnormalities during Postnatal Periods, Assessment and management of High risk new-born, Pharmaco-therapeutics in obstetrics, Family Welfare Programme.

## **Management of Nursing Services and Education**

Introduction to Management in Nursing, Management Process, Management of Nursing Services in the Hospital & Community, Organizational Behaviour and Human Relations, In service Education, Management of Nursing educational institutions, Nursing as a Profession, Professional Advancement.

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3) **Subject related syllabus-** **(Weightage 70%)**

### **Human Anatomy - & Physiology**

Scope of Anatomy and Physiology - Definitions and Terms in Anatomy and Physiology-

Structure and function of human cell - Elementary tissues of human body- Brief account

on Composition of Blood - functions of blood elements - Blood Group and coagulation of blood.

1. Cardio Vascular System (Structure and functions of various parts of the heart, arterial and venous system, brief account on common cardiovascular disorders).

2. Respiratory System (Various parts of respiratory system and their functions, Physiology of Respiration).

3. Digestive System (Names and various parts of digestive system-Liver, Spleen, Gall Bladder, Pancreas, Buccal Cavity, Pharynx, Oesophagus, Stomach, intestine etc.-physiology of digestion and absorption)

4. Urinary System (various parts of urinary system and its function-structure and function of kidneys-physiology of urine formation - pathophysiology of renal disease and oedema.)

5. Reproductive System (Physiology and anatomy of Male & Female reproductive system-Prostate & Uterus & Ovaries etc.)

6. Musculoskeletal System (Classification of bones & joints, structure of skeleton -structure of skeletal muscle - physiology of muscle contraction)

7. Nervous System (various parts of nervous system- Brain and its parts -functions of nervous system - Spinal Cord & Nerves).

8. Ear, Nose, Throat and Eye (Elementary knowledge of structure and functions of organs of taste, smell, hearing, vision.)

9. Endocrine System (Endocrine glands, their hormones and functions-Thyroid, Parathyroid, Suprarenal, Pituitary, pituitary and Thymus)

10. Haemopoietic and Lymphatic System (Name of the blood vessels & lymph gland locations).

11. Surface Anatomy & Surface Markings of Human Body.

### **Radiology Physics, Radiation Physics & Physics of Diagnostic Radiology**

Basic concepts of power, work, force, energy, electricity, magnetism and their units and measurements- Einstein's formula - electromagnetic induction - Atomic structure - radioactivity- ionization and excitation - electromagnetic waves - X-rays production and properties - X-ray tube - quality of x-rays - factors affecting quality and intensity of x-rays. X-ray circuits - interaction of X and gamma rays - X-radiation measurements etc. Principles of Radiation detection and measurements - TLD, Pocket Dosimeter, Radiation Survey meter and radiation zone monitor.

### **X-Ray Machines & Accessories and their Maintenance**

X-ray machines - Anode & Cathode - Thermionic diode - X-ray valves and tubes - principle and practical aspects - semiconductors - triode valves - cathode ray oscilloscopes - X-ray circuits - self rectifying circuits - half wave pulsating voltage circuits - full valve pulsating voltage circuits - measurement of high voltage - control of KV circuit - mA circuit. X-ray beam quality.

## **X-ray Film / Image processing Techniques**

X-ray Films- X-ray cassettes - Intensifying screens X-ray films types - basic film structure & quality - choosing films for different studies - basics on hard copies of radiographic images - dry & wet processing - Fixer -Developer -film processing methods - manual and automatic processing - conventional & modern image processing rooms - image processing equipment - types & maintenance - day light systems advantages & disadvantages - processing faults -- glossy prints, paper prints etc - production of best quality images. Intensifying screen- Fluorescence - structure of Intensifying screens - Cassette types - screen un-sharpness etc.

## **Clinical Radiography-Positioning**

Radiological Equipment - X-ray machine - transformers, x-ray units, fluoroscopy, grids and filters - Positional Radiography - Radiographic views of different parts of the body - Chest, Abdomen, Upper Limb, Cervical & Thoracic Spine, Lumbar Spine, Sacrum & Coccyx, Bony thorax - Sternum & Ribs, Skull and cranial bones, facial bones, paranasal sinuses, Mastoids & Temporal bones etc. Upper & Lower GIT, Gall Bladder & Biliary duct, GUT etc.

## **Equipment, basic Techniques of modern Imaging Modalities**

C.R (principle, equipment & imaging) Digital Radiography (principle, equipment & imaging) Mammography (basic principle, equipment & image acquisition) CT (Basic physics - Tomography principle - basics of plain studies, contrast studies, special procedures) MRI (basic principle - imaging methods - slice section- plain & contrast studies - image contrast - factors affecting image quality) USG (Basic acoustics - ultrasound terminologies - Interaction of US with matter - Ultrasound display modes etc).

## **Contrast & Special Radiography procedures**

Barium swallow - barium meal - barium enema (single and double contrast), Enterocolitis PTBD, Sinograms, Fistula-grams, IVU, AUG, MCU, HSG, Sialo-gram, T-tube Cholangiogram -Fluoroscopy, Image intensifiers - Tomography basics, etc.

## **Quality Control in Radiology & Radiation Safety**

Quality control procedure in Radiology as per NABH. Biological effects of Radiation - Radiation dose -Effects of time, distance and shielding - personnel and area monitoring - Planning of X-ray rooms, dark rooms - Evaluation of workload versus radiation factors - Radiation safety instruments - ICRP / AERB recommendations.

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**3) Subject related syllabus-**

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### आयुर्वेद परिचय एवं स्वास्थ्य शिक्षा

1. आयुर्वेद परिचय, लक्षण, आयुर्वेद का प्रयोजन।
2. अश्टांग आयुर्वेद एवं लधुत्रयी, वृहत्रयी तथा प्रत्येक विभाग के ख्यातिप्राप्त ग्रंथ।
3. स्वास्थ्य की परिभाषा, त्रिसूत्र, चतुश्पाद, त्रिस्तंभ, त्रिउपस्तम्भ।
4. दोष, धातु, मल, अग्नि, का सामान्य परिचय, परिभाषा, प्रकार एवं लक्षण।
5. विभिन्न वैज्ञानिक शब्दों का परिचय।

द्रव्य (स्थावर, जांगम, पार्थिव) विविध औषध (दैवव्यपाश्रम सत्त्वावजय) प्रकोप, प्रशमन, द्विविध औषधि (शोधन शमन), (ऋतु) आदान काल एवं विसर्गकाल, हंसोदक, देश (जागल आनूपसाधारण) सामान्य, विषेश सिद्धान्त, पंचमहाभूत, देह प्रकृति एवं मानस प्रकृतिपथ्य एवं अपथ्य।

6. औषधि सेवनकाल, अनुपान एवं इसका महत्व।
7. आयुर्वेद का पत्र-पत्रिकायें।
8. स्वास्थ्य की परिभाषा, एवं अवधारणा।
9. स्वास्थ्य एवं आहार।
10. व्याधि उत्पत्तिकर भाव।
11. स्वस्थवृत्त।
12. संकामकरोग एवं उनकी रोकथाम।
13. आर्दग्रह, जल आपूर्ति एवं स्वच्छता का सामान्य ज्ञान।
14. मातृ एवं शिशु कल्याण, प्रसवपूर्व एवं प्रसवोत्तरकर्म, टीकाकरण, परिवार कल्याण एवं परिवार नियोजन।
15. मांसपेशियों एवं अस्थियों का परिचयात्मक एवं व्यावहारिक ज्ञान।

मंसपेशियों :-डेल्टॉयड, बाइसेप्स एवं ट्राइसेप्स अस्थियोंफीमर, टीबियाफिबुला, हूयूमरस, रेडियसअलना।

शिरायें:-जुगलरवेन, फीमोरलवेन, सुपीरियर अस्थिया वेनाकावा, इन्फीरियर वेनाकेवा

धमनियां:-रेडियल एवं कोरोनरी आर्टरी

16. श्वसन संस्थान, रक्तवह संस्थान, पाचन/मूत्रवह एवं प्रजनन संस्थान एवं वातबह संस्थान नवर्स सिस्टम का सामान्य परिचय व ज्ञान।

17. नाड़ी, रक्तचाप, श्वसन, श्वसनगति, तापमान एवं शलाका से मत्र निर्गमन, इन्टेक एवं आउटपुट चार्ट की व्यवस्था का सामान्य परिचय एवं ज्ञान।

## द्रव्यगुणविज्ञान

1. द्रव्यगुण का सामान्य परिचय एवं प्रमुख ग्रंथो (निघट्टुओं) का ज्ञान
2. द्रव्य,रस,गुणवीर्य,विपाक एवं प्रभाव का सामान्य परिचय ।
3. बृहत्तर्यी एवं आधुनिकमतानुसार द्रव्यों का वर्गीकरण ।
4. द्रव्यों का पाच्य भौतिकत्व,रसों का पड़विधित्व,मधुरादि षडरसों के गुणधर्म
5. निम्नलिखित वैज्ञानिक शब्दों का प्रारम्भिक ज्ञान:—  
दीपन,पादन,शमन,अनुलोमन,संसन,भेदन,रेचन,वमन,ग्राही,स्तम्भन,छेन,लेखन,बाजीकरण,रसायन,व्यावायी,विकाशी,मदकारी,प्रमाणी,अभिष्यन्दी,योगवाही ।
6. निम्नलिखित पारिभाषिक शब्दावली का ज्ञान:—  
दशमूल,पंचवल्कल,त्रिफला,त्रिकटु,त्रिपद,त्रिजात,चातुर्जार्त,पंचकोल,  
पंचगव्य,षष्ठुषण,तृणपच्चमूल,कण्टकपंचमूल,अष्टवर्ग,जीवनीयगण,दुर्घयर्ग,चतुर्विध,स्नेह,मूत्रवर्ग  
चतुराम्ल,पंचाम्ल,दशेमनि ।
7. ऋतुओं के अनुसार द्रव्यों का संग्रह,द्रव्यों का महत्व एवं प्रतिनिधि द्रव्य ।
8. द्रव्यों की संग्रह विधि, संग्रहित द्रव्यों से औषधि द्रव्य कोनिकालकर उनका शुष्कीकरण औषधि  
द्रव्यों की पहचान का उपद्रव्यों से अलगाव की विधि ।
9. औषधिय पौधों का संवर्धन
10. निम्नलिखित द्रव्यों का परिचय,पर्याय एवं औषधीय गुणकर्म:—
  - 1 कण्टकारीबृहती 3 शालपर्णी
  - 4 प्रशिनपर्णी 5 गोक्षुर 6 पाटला
  - 7 बिल्व 8 अग्निमथ 9 श्योनाक
  - 10 गंभारी 11 हरीतकी 12 आमलकी
  - 13 शुण्ठी 14 मरिच 15 पिप्पली
  - 16 चित्रक 17 पिप्पलीमुल 18 वट
  - 19 अश्वत्थ 20 पारसपीपल 21 उदुम्बर
  - 22 प्लक्ष 23 शिरीष 24 नीम
  - 25 तुलसी 26 कुमारी 27 शतावरी
  - 28 अपामार्ग 29 बलाचतुष्टय 30 अर्जुन
  - 31 शंखपुष्पी 32 शरपुंखा 33 आरम्भ
  - 34 एरण्ड 35 स्नुही 36 अर्क
  - 37 निंबु 38 निर्पुण्डी 39 भूनिम्ब
  - 40 भृंगराज 41 नागरमोथा 42 दूर्वा
  - 43 धान्यक 44 गुडूची 45 कुटज
  - 46 धातकी 47 मधूक 48 पुनर्नया
  - 49 अजमोदा 50 अतिविषा 51 अश्वगंधा
  - 52 अम्लिका 53 पर्पटक 54 पलाश

55 पाठा 56 प्रियाल 57 वचा  
 58 बदर 59 मेथिका 60 मूलक  
 61 मदनफल 62 कम्पिलक 63 वत्सनाम  
 64 विडंग 65 हरिदा 66 वकुल  
 67 शालमली 68 सर्पगंधा 69 शेफालिका  
 70 शोभांजन 71 सर्पगन्धा 72 शैफालिका  
 73 शिंशापा 74 कपित्थ 75 लज्जालु  
 76 काकमाची 77 मसूली 78 नारिकल  
 79 मजिस्ठा 80 मधुयष्टी 81 भंगा  
 82 ब्राह्मी 83 मण्डूकपर्णी 84 पुष्करमूल  
 85 एला 86 पारसीक यवानी 87 रवदिर  
 88 कटुकी 89 गोरखमुंडी 90 अहिफेन  
 91 पाषाणमेद 92 बाकुची 93 वासा  
 94 विदारी 95 भल्लातक 96 अशोक  
 97 चंदन 98 लवग 99 स्वर्णक्षीरी  
 100 जटामासी 101 त्यकृ 102 तालीसपत्र  
 103 दाढ़िम 104 द्राक्षा 105 घत्तुर  
 106 कुष्माण्ड 107 अलाबू 108 शिम्बी  
 109 वार्ताक 110 शूरण 111 किरातिक  
 112 शतपुष्पा 113 इन्द्रयव 114 ज्योतिषमति  
 115 काकाड़ाश्रंगी 116 रसोन 117 देवदारू  
 118 दारूहरिदा 119 गुगलु 120 जातिफल  
 121 करवीर 122 कपीकच्छु 123 दुष्ठिका  
 124 भुम्यामलकी 125 कुपीलू 126 गुंजा  
 127 विजयसार

#### रसशास्त्र

1. रसशास्त्र का परिचय, रस एवंरस का पर्याय, रसशास्त्र मेंरस का महत्व रसोषधियां।
2. महारस,उपरस एवं साधारणरस का परिचय एवं स्वरूपरस का शोधन, अचुक्ष सेवनजन्य विकार, धान्याभ्रक।
3. धातु उपधातु एवंमण्डूर का परिचय एवं स्वरूपमण्डूर शोधन की सामान्य एवं विशिष्टविधियां।
4. निम्न द्रव्यों का परिचय एवं स्वरूप

मुक्ता,प्रवाल,शंख,गोदन्ती,बदराश्म,समुद्रफेन,कुकुटपिण्डित यकटंकण,मृगशृगदू।

5. निम्नलिखित यंत्रों का परिचय एवं उपयोग:—

तुला,स्वल्प,उलूखल,पालिका,स्थाली,डोला,डमरू,कुदुक,स्वेदनी,विद्याधर,  
 कच्छप,त्रिविधपातन,बालुका,भूधर,पाताल,संधिबंधन,कपड़मिटटी।

6. पुटपरिचय एवं उपयोग, सामान्य उपयोगविधि एवं पुटपाक में आधुनिक तकनीक का प्रयोग।

7. निम्नलिखित वैज्ञानिक शब्दों का सामान्य ज्ञानः  
स्वांगशीत, बहिशीत, ढालन, आवाप, निर्वाप, सत्त्व, वनौषधि  
सत्त्व, लवण, पंचक, क्षारत्रय, क्षारपंचक, पंचामृत, पंचगव्य, पंचाज, पंचमाहिष, पंचमृतिका, ककसास  
टक, द्रुति, द्रावणगण, दुर्घटवर्ग, मुषा, मूत्रवर्ग, मुद्रा, कोष्ठी ।
8. शोधन का परिचय एवं उद्देश्य ।
9. मारणपरिचय एवं उद्देश्य मृतलौहपरीक्षा ।
10. रस का ग्राह्य एवं अग्राह्य स्वरूप, अशुद्ध पारदजन्य विकार एवं शांति के उपाय, रसदोष, रस गति, पारद शोधन के समय द्रव्यगत एवं शरीरगत सावधानिया ।  
शोधन की सामान्य एवं विशेष विधियां, अष्ट संस्कारों का सामान्य परिचय, हिंगुलोत्थपारद एवं इसका महत्व ।
11. हिंग एवं गुणगतु के कुछ योगों का परिचय एवं निर्माण विधि ।
12. निम्नलिखित द्रव्यों के शोधन, मारणप्रायोग एवं प्रत्येक के कुछ योगों का परिचय  
प्रवाल, शंख, शुक्लित, कपर्दिका, स्फटिका, दुर्घटपाषाण, गोदन्ती, बदराशम, समुद्रफेन कुवयुटाण्डत वकमृगशृंग  
टंकण का शोधन एवं सामान्य प्रयोग ।
13. पिष्टीकल्पना—परिचय, निर्माण विधि, सामान्य प्रयोग एवं प्रत्येक के कुछ योगप्रवाल,  
मुक्ताशुक्ति, जहरमोहरा, अकीक ।
14. स्वल्वीय रसायन, कुपीपक्वरसायन, पर्पटीरसायन, पोटटलीरसायन ।
15. मर्घना, सगन्ध, निर्गन्ध, सारिननिरग्नि, अत्ताधूर्म्बालजारंणा ।
16. कज्जली, रसपर्टी, पंचामृतपर्पटी, बोलपर्पटी, श्वेतपर्पटी, रससिंदूर, ताम्रासिंदूर, मल्लसिंदूर  
समीरपन्नगतलस्थ स्वर्णबंग, रसकर्पूर। उपरोक्त सभी की निर्माणविधि एवं प्रयोग तथा कुछ योगों  
का परिचय ।
17. अध्रक, माशिक, कासीस, हरताल के मारण का वर्णन एवं सामान्य प्रयोग, कुछ योग एवं  
लोहितीकरण ।
18. निम्न द्रव्यों के मारण, सामान्य प्रयोग एवं कुछ योगों का वर्णन जैसे स्वर्ण,  
रजत, लौह, ताम्र, मण्डूर, अमृतीकरणभानूपाक, स्थालीपाक, पुटपाक, सोमनाथीताम्रभस्म का विवरण ।
19. नाग, वंश एवं यशद का जारण एवं मारण। इसके कुछ योगों का सामान्य प्रयोग ।
20. निम्न का परिचय, निर्माणविधि एवं सामान्य प्रयोग द्रावककल्प शंखद्राव, गंधकद्राव ।

#### भेषज्यकल्पना, भेषज्यकल्प पुष्ट वितरण, भेषज्य शालाप्रबंधन

1. भेषज्य कल्पना का परिचय, प्रशस्त भेषज, चतुष्पाद में भेषज का महत्व ।
2. कल्पना—संस्कार एवं उनकी सर्वीयताअवधि, निर्मित औषधियों का भंडारण एवं सरक्षण, अनुकृत की  
अवस्था में अर्थग्रहण, पुनरुक्ति, लैशक्ति ।
3. मान का महत्व, विभिन्न मानों का परिचय एवं उनका सीट्रिक पद्धति में रूपांतरण शुष्क एवं आद्र  
द्रव्य ग्रहणविधि, मात्रा एवं औषद मात्रा ।
4. स्वरस की परिभाषा, निर्माणविधि, पुटपक्वस्वरस विधि, आद्र द्रव्याभाव स्वरस निर्माणविधि सामान्य  
सेवन मात्रा, प्रक्षेप, द्रव्य, स्वरस, योगों के कुछ उदाहरण ।

5. कल्क की परिभाषा, निर्माणविधि, सामान्य सेवन मात्रा, प्रक्षेप एवं कल्क योगों के कुछ उदाहरण।
6. यथाथ की परिभाषा, निर्माणविधि, सामान्य सेवन मात्रा, प्रक्षेपद्रव्य, यवकृत एवं यवाथ योगों के कुछ उदाहरण। [प्रमथ्या, औषधि, सिद्ध पानीय, क्षीरपाक, लाक्षारस, उष्णोदक।]
7. हिम की परिभाषा, निर्माणविधि, सामान्य सेवन मात्रा, प्रक्षेपद्रव्य, हिम योगों के कुछ उदाहरण एवं तण्डूलोदक।
8. फाण्ट की परिभाषा, निर्माणविधि, सामान्य सेवन मात्रा, प्रक्षेपद्रव्य एवं फाण्ट योगों के कुछ उदाहरण।
9. विभिन्नपथ्य कल्पनाए—मण्ड, पेया, विलेपी, यवागूयूष, कुताकृत, औषधि सिद्ध यूष, मक्त, कृशरा, मन्थ पानक, रागषाड़व, काम्बलिका खण्ड, मासरस, वेशवार, घोल, मथित, तकचदरियत।
10. औषधि नामकरण।
11. फार्मेसी में प्रयुक्त आधुनिक मशीनों का ज्ञान।
12. चूर्ण परिचय, सामान्य चिकित्सोपयोगी मात्रा, चूर्ण निर्माण में प्रयुक्त प्राचीन एवं आधुनिक यन्त्रोपकरणों का ज्ञान।
13. वटिका, चकिका, वटक एवं मोदक की परिभाषा एवं इनकी निर्माण विधि।
14. गुग्गुलकल्प—परिचय, निर्माणविधि एवं इसके कुछ योग।
15. वर्तिकल्पना—विभिन्नवर्तियों का परिचय एवं इनका निर्माण।
16. अबलेहकल्पना—परिचय एवं निर्माणविधि, गुड शर्करापाक, पाकपरीक्षा, प्रक्षेपद्रव्य, घनसत्त्व एवं इसके कुछ योग।
17. खण्डपाक—परिचय एवं निर्माणविधि।
18. क्षारकल्पना—परिचय एवं निर्माणविधि, कुछ योग, क्षारसूत्र निर्माणविधि।
19. संधानकल्पना—परिचय, आसव, अरिष्ट, निर्माणविधि एवं सिद्धि परीक्षा, प्रक्षेप एवं कुछ योगकांजी का परिचय एवं निर्माणविधि तथा प्रयोग।
20. अंजन—त्रिरूप, रसाजन, चूर्णाजन एवं इनका महत्त्व।
21. स्नेहकल्पना का परिचय, स्नेहमूर्च्छना, स्नेहपाकविधि प्रकार, प्रयोजन एवं परीक्षा।
22. तैल—तैलविधि।
23. शर्कराकल्पना—परिचय, निर्माणविधि एवं शर्करा के कुछ योग।
24. अर्ककल्पना—परिचय, निर्माणविधि एवं अर्क के कुछ उदाहरण नेत्र बिन्दु का निर्माण।
25. लवणकल्पना—परिचय, निर्माणविधि एवं कुछ योग।
26. मसीकल्पना—परिचय, निर्माणविधि एवं कुछ योग।
27. लेप, उपनाह, एवं लहर का परिचय, निर्माणविधि एवं प्रत्यक्षे कल्पना कुछ उदाहरण।
28. औषधि संरक्षक खाद्य रसायन एवं उनके प्रयोग।
29. भारतवर्ष के प्रमुख औषधि संग्रह, रखरखाव, वितरण एवं मिश्रणविधि का ज्ञान व्यवस्थापनक में प्रयुक्त संकेतों का ज्ञान।
30. औषधि मिश्रणवितरण एवं उप स्थाता के कर्तव्यों का परिचयात्मक विवरण।
31. आयुर्वेद एवं आधुनिकमतानुसार औषधि मात्रा का ज्ञान।
32. एकल औषधि एवं मिश्रण औषधियों का ज्ञान एवं उनके मेद

33. वितरण की विधि।
34. व्यवस्थापत्रक का ज्ञान एवं आदर्श फार्मेसिस्ट द्वारा वितरण इकाई का रख रखाव।
35. ग्रण का निर्जीवाणुकरण डेसिंग सूचीवेधन, पंचकर्म, अंजन, विडालक, एवं आश्वोतन का तंकनीकी ज्ञान।
36. गॉज, बैन्डेज, कैची, चाकू फारसेप्स साधारण एवं दंतयुक्त का निर्जीवाणुकरण एवं यंत्रों का बहिरंग चिकित्सालय में प्रयोग का ज्ञान।
37. व्यवसायिक गणित, आय, व्यय का विवरण, मूल्य निर्धारण, एकाउंटेंसी एवं लेखा परीक्षण।
38. आधौगिक प्रबंधन एवं विपणन का संक्षिप्त ज्ञान।
39. रसशाला की कार्यविधि द्रव्यों का संग्रह संरक्षण एवं विधिवत वर्गीकरण औषधि का ज्ञान।
40. औषधि अनुज्ञानि प्राप्त करने की प्रक्रिया का ज्ञान।

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## GROUP-5

1) General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc. - **(Weightage 20%)**

2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc. - **(Weightage 10%)**

3) Subject related syllabus- **(Weightage 70%)**

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### **Nutrition Science**

1. Definition of Nutrition, nutrients, undernutrition, malnutrition and terms used in nutrition-recommended dietary allowance, balanced diet, health., reference man & reference womanEnergy: Units of energy, Food sources of energy, RDA of energy for sedentary, moderate & heavy worker (men & women), during pregnancy and lactation, BMR-Definition and factors affecting BMR, Water: Functions and sources of water for human body, effects of excess and low intake of water on human body, Carbohydrates: Classification, functions, sources, digestion & requirement, effects of deficiency and excess (in brief)
2. Protein: Classification, functions, sources, digestion & requirement, effects of deficiency and excess (in brief), Fats/ Lipids: Classification, functions, Sources & requirement, health problems associated with lipids, Dietary Fiber: Types of fiber, functions or role of dietary fiber in the human body, sources of fiber and effect of deficiency of fiber in human beings.
3. Vitamins: Definition and classification, Fat soluble vitamins: Functions, sources, recommended dietary allowances, effects of excess & deficiency (in brief) of Vitamin A, Vitamin D, Vitamin E and Vitamin K, Water soluble vitamins: Functions, sources, recommended dietary allowances, effects of excess & deficiency (in brief) of Vitamin C, Vitamin B1 (Thiamine), Vitamin B2, (Riboflavin), Vitamin B6 (Pyridoxin), Vitamin B12 (Cyanocobalamin), Niacin and Folic acid.
4. Minerals: Definition and Classification, Macro minerals: Functions, Sources, RDA, Effect of Excess and low intake of Calcium, Phosphorus, Magnesium, Sodium and Potassium, Micro Minerals: Iron, Iodine, Fluorine, Zinc

### **Biostatistics & research methodology**

Meaning & scope of statistics, Presentation of data - tabulation, graphic & diagrammatic presentation by graphs, bars, chartsetc. Measures of central tendency - mean, mode, median, Measures of dispersion - mean deviation, standard deviation, variance, range, skewness, ketosis, Correlation & regression interpretation, Ideas of probability, Hypothesis - null hypothesis - level of significance, Sampling techniques, Student's t test - its application, significance, confidence interval in normal population, for mean when variance is known & unknown, Design of experiments - Analysis of variance, completely randomized & random block designs, Non parametric inference: Sign, Median, Run test & X test, (as goodness of fit & independence of attributes in 2x2 & r x c contingency tables), Research design - Experimental & Descriptive, definition & identification of Research problem, selection of problem, basic assumption & limitation of problem, Data gathering instruments - Questionaries, interviews, measurements & scales, reliability & validity of measuring instruments, Methods of collecting information - Census & sampling, various sampling schemes, Methods of estimating population means, & its standard error in simple random sampling & stratified random sampling, planning, executing & analysis of large-scale surveys with special emphasis on surveys in Nutrition. Presentation & preparation of report for publication

### **Applied Nutrition & Food safety**

Assessment of nutritional status of different age groups, - Infants, preschoolers, children, adolescents, adults & elderly, - Pregnant & lactating females, Planning diet for different age groups as per their nutrient requirements & factors affecting their nutritional needs, - Infants, preschoolers, children, adolescents, adults & elderly, - Pregnant & lactating females, Methods of estimating requirements and

RDA of energy, Protein, minerals and vitamin for different age groups, Major nutrition related community health problems – PEM, anemia, iodine deficiency, vitamin A, deficiency, scurvy, Beri Beri, pellagra, fluorosis etc. Inborn errors of metabolism in brief, Management of diet in different types of institutional settings, 6. Quality Control - National & International food safety regulating agencies & organizations, FSSAI, FPO, ISI, Agmark, Codex and ISO. FSSAI & its rules & regulations to maintain food quality & holistic wellness, - Safe food practices as per FSSAI, nutrition labelling & carbon foot prints of food, Quality evaluation & Techniques, - Sensory evaluation – Color, texture, flavor & taste, different tests & methods of sensory evaluation of foods, - Bacteriological & nutritional quality evaluation for food products, - Statistical methods used in quality control, - Food adulteration & food toxicities including food borne illness, Food safety & contamination: Naturally occurring toxins & antinutritional factors, (Lathyris, Epidemic dropsy), contamination of food (Chemical, heavy metal & pesticide residue) fungal aflatoxic hepatitis, entero-ergotism & mycotoxicosis.

## **Molecular Nutrition**

The molecular nutrition paradigm, Nutritional physiology and biochemistry, Nutriepigenomics & metabolomics, Dietetics & molecular gastronomy, Molecular nutrients targeting with diet, Dietary supplements & nutraceuticals, Foodomics and its advantages, Metabolic syndrome in relation to different diseases, Solutions to implement Molecular Nutrition.

## **Therapeutic Nutrition**

Importance of diet therapy, Role of Dietician, Factors in patient care, counselling and coordinated nutritional services for the patient, feeding the patient, psychological aspects & assessment of patient's needs – Different nutritional assessment tools for patients (MUST, SGA, MNA etc.), RDAs & Dietary guidelines for Indians, food exchange, therapeutically modified diet in terms of nutrient consistency and composition, Physiological changes & diet for different types of infections (Fevers, TB etc.), Physiological changes & diet for GI disorders, Physiological changes & diet for Cardiac disorders, Physiological changes and dietary management for diabetes, Physiological changes & diet for pulmonary disorders, Physiological changes & diet for kidney disorders, Physiological changes & diet for liver disorders, Physiological changes & diet for neurological disorders, Physiological changes & diet for different types of cancers, burn, Nutritional care in pre & post-surgery patients including bariatrics, Physiological changes & diet for different types of autoimmune disorders, diet for celiac patients, diet for various deficiency disorders, Special feeding methods - Enteral & parenteral feeding, Drug nutrient interaction, Standard guidelines for clinical nutrition (ASPEN/ ESPEN/ IAP/ KDQOI etc.)

## **Advanced Nutrition**

Sports nutrition, energy balance, Weight management (Different types of diets in fashion), Nutrition in stress, Nutritional needs in extreme environmental conditions and Disaster (famine, drought, war), Space nutrition, Fermented food products, Antioxidants, Functional foods & Organic foods, Nutrigenomics, Prebiotics, probiotics, phytochemical & symbiotics, FODMAP

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## GROUP-6

**1)** General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc.  
- **(Weightage 20%)**

**2)** Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc.  
- **(Weightage 10%)**

**3) Subject related syllabus-** **(Weightage 70%)**

### A. General Awareness

Questions from the General Awareness section are designed to test the candidate's general knowledge of the environment around him and its applications to society. Questions are also designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspect as may be expected of an educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining to History, Culture, Geography, Economic Scene, General policy, Static Awareness, and scientific research.

**Introduction to Indian Constitution:** Preamble, Fundamental duties and fundamentals rights only, Traffic Rules, Traffic signs, Penalties for violating traffic rules, first aid, safety precautions and occupational health, Welfare Schemes run by Government of Haryana and provisions.

**FUNDAMENTALS OF INSURANCE:** Introduction to insurance, Contract of life insurance, Fire insurance, Marine insurance, Accident and motor insurance, Farm Crop Insurance, Insurance intermediaries – role of agents and procedure for becoming an agent; cancellation of license; revocation/suspension/termination of agent appointment; code of conduct; unfair practices.

### B. General Intelligence

This section includes questions of both verbal and non-verbal reasoning. The questions will be asked from:

Semantic Analogy, Symbolic operations, Symbolic/ Number Analogy, Trends, Figural Analogy, Space Orientation, Semantic Classification, Venn Diagrams, Number Series, Embedded figures, Figural Series, Critical Thinking, Problem Solving, Symbolic/ Number Classification, Drawing inferences, Figural Classification, Punched hole/ pattern folding & unfolding, Semantic Series, Figural Pattern-folding and completion, Emotional Intelligence, Word Building, Social Intelligence, Coding and de-coding, Other sub-topics if any Numerical operations,

### C. English Language

The English Language questions will be asked from the following topics:

Spot the Error, fill in the Blanks, Synonyms/ Homonyms, Antonyms, Spellings/ Detecting misspelt words, Idioms & Phrases, One-word substitution, Improvement of Sentences, Active/ Passive Voice of Verbs, Conversion into Direct/Indirect narration, Shuffling of Sentence parts, Shuffling of Sentences in a passage, Cloze Passage, Comprehension Passage, English/Hindi words & terminology used in offices and their inter-translation.

## D. Quantitative Aptitude

**Number Systems:** Computation of Whole Number, Decimal and Fractions, Relationship between numbers.

**Fundamental arithmetical operations:** Percentages, Ratio and Proportion, Square roots, Averages, Interest (Simple and Compound), Profit and Loss, Discount, Partnership Business, Mixture and Allegation, Time and distance, Time and work.

**Mensuration:** Triangle, Quadrilaterals, Regular Polygons, Circle, Right Prism, Right Circular Cone, Right Circular Cylinder, Sphere, Hemispheres, Rectangular Parallelepiped, Regular Right Pyramid with triangular or square Base.

**Algebra:** Basic algebraic identities of School Algebra and Elementary surds (simple problems) and Graphs of Linear Equations.

**Geometry:** Familiarity with elementary geometric figures and facts: Triangle and its various kinds of centres, Congruence and similarity of triangles, Circle and its chords, tangents, angles subtended by chords of a circle, common tangents to two or more circles.

**Trigonometry:** Trigonometry, Trigonometric ratios, Complementary angles, Height and distances (simple problems only) Standard Identities like  $\sin^2 \theta + \cos^2 \theta = 1$  etc.

**Statistical Charts:** Use of Tables and Graphs: Histogram, Frequency polygon, Bar-diagram, Pie-chart.

## E. HINDI

### Hindi Language:

शब्द, अलंकार, विकारी शब्द, वाक्य, अविकारी शब्द, पद, पदबंध, मुहावरे, लोकोक्तियां, संधि, उपसर्ग, प्रत्यय, समास, पर्यायवाची, विलोम व अनेकार्थी शब्द, अयोगवाह, वाक्य शोधन, निपात (अवधारक), विरामचिन्ह, संबंधबोधक, अनेक शब्दों के लिए एक शब्द, एकार्थक शब्द, युग्म शब्द, वर्तनी (शब्द एंव वाक्य शुद्धिकरण), वर्ण, स्वर, व्यंजन, विदेशी ध्वनियाँ, संज्ञा, सर्वनाम, विशेषण, किया, किया विशेषण, समुच्चय बोधक, विस्मय बोधक, वचन, लिंग, कारक, काल, तदभव—तत्सम शब्द।

## F. Haryana economy:

nature, characteristics and problems; concept of economic development; State of the Haryana economy since its inception: Income; Population, Health & Nutrition and declining sex ratio, Haryana agriculture: nature, cropping pattern, role of agriculture in Haryana economy, Measures for development in agriculture, crop insurance, Agriculture credit: agriculture finance, types of agriculture finance; credit needs of farmers; sources of credit: institutional and non-institutional sources; NABARD; rural indebtedness: causes, consequences and debt relief measures, Micro, small & medium enterprises (MSME) in Haryana: meaning, role, performance and challenges; SEZ, Growth of MNCs in Haryana, Role of HSIIDC, HFC, HAFED, HKVIB, Haryana budget: objectives and policies, sources of revenues and its utilization.

## G. Rural Marketing:

Meaning, nature, characteristics; opportunities and challenges to rural markets in Haryana; Socio-cultural, economic, demographic, technological and other environmental factor affecting rural marketing; rural consumer behaviour; segmentation of rural market; strategies for rural marketing; rural marketing mix; difference in rural and urban market; problems in rural marketing; Strategies for rural marketing, Product planning, pricing, promotion and management of distribution channels for marketing of durables and non-durables in rural areas; Planning and organizing personnel selling in rural

markets; Innovation in rural market; E-commerce in rural markets, e-chaupal & other similar initiatives in rural markets.

## **H. Environmental Studies and Disaster Management**

Multidisciplinary nature of environmental studies, Natural Resources, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Ecosystems, Energy flow in the ecosystem, Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its conservation, Value of biodiversity, Hot-spots of biodiversity, Threats to biodiversity, Endangered and endemic species of India. Conservation of biodiversity, Environmental Pollution, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards. Solid Waste Management, Social Issues and the Environment, Environmental ethics, Wasteland reclamation, Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment, Environment and human health, Role of Information Technology in Environment and human health.

**DISASTER MANAGEMENT:** Natural Disasters, Climatic change, Man Made Disasters, Disaster Management, International strategy for disaster reduction, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## GROUP-7

**1) General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc.- (Weightage 20%)**

**2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc. - (Weightage 10%)**

**3) Subject related syllabus- (Weightage 70%)**

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### **A) FLUID MECHANICS**

1. Introduction: 2. Properties of Fluids 3. Hydrostatic Pressure: 4. Measurement of Pressure:
5. Fundamentals of Fluid Flow: 6. Flow Measurements 7. Flow through Pipes: 8. Flow through open channels: 9. Hydraulic Pumps

### **B) STRUCTURAL MECHANICS**

1. Properties of Materials 2. Simple Stresses and Strains
3. Shear Force and Bending Moment: 4. Moment of Inertia 5. Bending Stresses in Beams:
6. Combined Direct and Bending Stresses 7. Shear Stresses in Beams 8. Slope and Deflection: 9. Columns:
10. Analysis of Trusses:

### **C) SURVEYING**

1. Introduction: 2. Chain surveying 3. Compass surveying: 4. Levelling: 5. Plane Table Surveying 6. Contouring: 7. Theodolite Surveying: 8. Tacho-metric surveying 9. Curves:
10. Introduction to the use of Modern Surveying equipment and techniques 11. Minor Instruments

### **D) CONSTRUCTION MATERIALS**

1. Building Stones: 2. Bricks and Tiles: 3. Cement: 4. Lime 5. Timber and Wood Based Products:
6. Paints and Varnishes: 7. Metals: 8. Miscellaneous Materials:

### **E) BUILDING CONSTRUCTION**

1. Introduction: 2. Foundations: 3. Walls: 4. Masonry 5. Arches and Lintels: 6. Doors, Windows and Ventilators: 7. Damp Proofing and Water Proofing 8. Floors 9. Roofs 10. Stairs
12. Anti-Termite Measures (As per IS 6313 –I – III) 13. Building Planning 14. Building Services
15. Elementary idea of interior decoration, wall panelling, false ceiling, flooring etc

### **F) CONCRETE TECHNOLOGY**

Introduction: 2. Ingredients of Concrete: 3. Water Cement Ratio: 4. Workability: 5. Properties of Concrete:

6. Proportioning for Normal Concrete: 7. Introduction to Admixtures (chemicals and minerals) for improving performance of concrete 8. Special Concretes 9. Concreting Operations:
10. Importance and methods of non-destructive tests

### **G) WATER SUPPLY AND WASTE WATER ENGINEERING**

#### **a) WATER SUPPLY**

1. Introduction 2. Quantity of Water 3. Quality of Water 4. Water Treatment (brief introduction)
5. Conveyance of Water 6. Laying out Pipes 7. Building Water Supply

#### **b) WASTE WATER ENGINEERING**

8. Introduction 9. Sewerage System 10. Laying and Construction of Sewers: 11. Sewage characteristics:
12. Natural Methods of Sewerage Disposal 13. Sewage Treatment 14. Building Drainage

### **H) IRRIGATION ENGINEERING**

1. Introduction: 2. Water Requirement of Crops 3. Hydrological Cycle Catchment Area and Run-off
4. Methods of Irrigation 5. Canals 6. Tube Well Irrigation 7. Dams 8. Canal Head Works and Regulatory Works 9. Cross Drainage Works 10. Definitions Hydraulic Structures 11. River Training Works

12. Water Logging and Drainage and Ground Water Re-charge

## **I) HIGHWAY ENGINEERING**

1. Introduction
2. Road Geometrics
3. Highway Surveys and Plan
4. Road Materials
5. Road Pavements
6. Hill Roads:
7. Road Drainage:
8. Road Maintenance:
9. Road Construction Equipment:

## **J) SOIL AND FOUNDATION ENGINEERING**

1. Introduction:
2. Physical Properties of Soils:
3. Classification and Identification of Soils
4. Flow of Water Through Soils:
5. Effective Stress: (Concept only)
6. Deformation of Soils
7. Shear Strength Characteristics of Soils:
8. Compaction:
9. Soil Exploration:
10. Bearing Capacity of soil
11. Foundation Engineering:

## **K) ENVIRONMENTAL EDUCATION**

1. Definition, Scope and Importance of Environmental Education
2. Basics of ecology, biodiversity, eco system and sustainable development
3. Sources of pollution - natural and manmade, causes, effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear) and their units of measurement
4. Solid waste management – Causes, effects and control measures of urban and industrial waste
5. Mining and deforestation – Causes, effects and control measures
6. Environmental Legislation - Water (prevention and control of pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board, Environmental Impact Assessment (EIA)
7. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio Energy, Hydro Energy)
8. Current Issues in Environmental Pollution – Global Warming, Green House Effect, Depletion of Ozone Layer, Recycling of Material, Environmental Ethics, Rain Water Harvesting, Maintenance of Groundwater, Acid Rain, Carbon Credits.

## **L) EARTHQUAKE RESISTANT BUILDING CONSTRUCTION**

1. Elements of Engineering Seismology
2. Seismic Behaviour of Traditionally-Built Constructions of India
3. Special construction method, tips and precautions to be observed while planning, designing and construction of earthquake resistant building.
4. Introduction to IS: 4326, IS: 13828, IS: 1893(Part 1), 154326 and IS: 13920 (latest edition)
5. Seismic Provision of Strengthening and Retrofitting Measures for Traditionally- Built Constructions, Brick and RCC Structures
6. Provision of reinforcement detailing in masonry and RC constructions
7. Disaster Management: Disaster rescue, psychology of rescue, rescue workers, rescue plan, rescue by steps, rescue equipment, safety in rescue operations, debris clearance and causality management.

## **M) REPAIR AND MAINTENANCE OF BUILDINGS**

1. Need for Maintenance
2. Agencies Causing Deterioration (Sources, Causes, Effects)
3. Investigation and Diagnosis of Defects
4. Defects and their root causes
5. Materials for Repair, maintenance and protection
6. Remedial Measures for Building Defects

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## GROUP-8

1) General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc.- **(Weightage 20%)**

2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc. - **(Weightage 10%)**

3) Subject related syllabus-

**(Weightage 70%)**

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### **Introductory Botany**

Introduction and characteristics of plant; Concept of plant cells, plant tissue and plant organs; Plant habits: annuals, biennials, perennials; Seed and seed germination; Morphology and Micro-morphology of flowering plants. Binomial nomenclature and classification of plants; Introduction to plant taxonomy and plant systematic.

### **Fundamentals of Genetics**

Introduction to genetics; Cell division: mitosis and meiosis; Mendelian principles of heredity; Study of chromosome structure; Multiple alleles, pleiotropism and pseudo alleles and blood group genetics; Linkage and its estimation, crossing over mechanisms, chromosome mapping; Sex determination and sex linkage, sex limited and sex influenced traits; Qualitative and quantitative traits, polygenes and continuous variations, multiple factor hypothesis; Cytoplasmic inheritance; Mutation- classification, Methods of inducing mutation and CIB technique, mutagenic agents and induction of mutation; Structural and numerical changes in chromosome; Nature, structure and replication of genetic material; Protein synthesis-transcription and translational mechanism of genetic material; Gene concept- gene structure and functions; Gene regulation- Lac and Trp operons.

### **Fundamentals of Plant Breeding**

Historical development, concept, nature and role of plant breeding, major achievements; Modes of reproduction and apomixes; Self- incompatibility and male sterility- genetic consequences and cultivar options. Domestication, acclimatization, introduction; Centre of origin/diversity, Genetic basis and breeding methods in self- pollinated crops- mass selection and pure line selection, hybridization techniques and handling of segregating population (pedigree, bulk, SSD and back cross methods); Multiline concept; Genetic basis and methods of breeding cross-pollinated crops; Heterosis and inbreeding depression; Development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops-clonal selection and hybridization; Wide hybridization and pre-breeding; Polyploidy in relation to plant breeding; Mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses.

### **Fundamentals of Crop Physiology**

Introduction to crop physiology and its importance in Agriculture; Plant cell, Mineral nutrition of Plants, Photosynthesis, Respiration, Plant growth regulators, Physiological aspects of growth and development of major crops, Photoperiodism and Vernalization. Translocation of solutes

### **Principles of Seed Technology**

Seed and seed technology, Different classes of seed, seed production in different field crops, Maintenance of genetic purity during seed production, Seed certification, Seed Act and Seed Act enforcement, Seeds control order 1983, Detection of genetically modified crops, Seed drying, Seed treatment, its importance, Seed storage, general principles, stages and factors affecting seed longevity during storage, measures for pest and disease control during storage; Seed marketing-structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, role of WTO and OECD in seed marketing.

### **Intellectual Property Rights**

Introduction and meaning of intellectual property, Treaties for IPR protection, Types of Intellectual Property and legislations covering IPR in India, Patents Act 1970 and patent system in India, compulsory licensing, Patent Cooperation Treaty, Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant

breeder's rights and farmer's rights. Registration of plant varieties under PPV&FR Act 2001, Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing. International treaty on plant genetic resources for food and agriculture (ITPGRFA).

## **Crop Improvement**

Botanical Name, family, chromosome number, centre of origin, nature of pollination, list of wild relatives, distributions of species of 18 selected crops (rice, maize, sorghum, pearl millet, pigeon pea, moong bean, soybean, groundnut, sesame, castor, cotton, tobacco, okra, bottle gourd, bitter gourd, ridge gourd, smooth gourd and cucumber); Floral biology as well as study of genetics of qualitative and quantitative characteristics, Breeding methods, Major breeding objectives (including quality parameters) Ideotype concepts, distributions of species of 14 selected crops (wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander); Floral biology as well as study of genetics of qualitative and quantitative characters, Major breeding objectives (including quality parameters) Ideotype concepts for wheat, mustard and tomato; Climate resilient crop varieties for future. e.g short duration crops and high temperature tolerance in wheat and chickpea; International, National and State level research station.

## **Introductory Biotechnology**

History of Biotechnology, Concepts and applications of plant biotechnology, Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance, cryo-preservation; Concept of central dogma; DNA replication, Transcription and Translation, Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

## **Commercial Plant Breeding**

Introduction to commercial plant breeding; Line development and maintenance breeding of hybrids and seed production; Genetic purity test of commercial hybrids; Advances in hybrid seed production of maize, rice, pigeon pea, castor, cotton, cucumber etc; Quality seed production of vegetable crops (cucumber, tomato, chilli and capsicum), Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture technique and biotechnology tools; Step to step procedure for variety testing, release and notification system in India; State level and national level trials i.e., SSVT, LSVT, MLT etc.; Participatory plant breeding.

## **Environmental Studies and Disaster Management**

Multidisciplinary nature of environmental studies, Natural Resources, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Ecosystems, Energy flow in the ecosystem, Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its conservation, Value of biodiversity, Hot-spots of biodiversity, Threats to biodiversity, Endangered and endemic species of India. Conservation of biodiversity, Environmental Pollution, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards. Solid Waste Management, Social Issues and the Environment, Environmental ethics, Wasteland reclamation, Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment, Environment and human health, Role of Information Technology in Environment and human health.

**DISASTER MANAGEMENT:** Natural Disasters, Climatic change, Man Made Disasters, Disaster Management, International strategy for disaster reduction, national disaster management framework; financial arrangements; role of NGOs, community -based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

## **Agricultural Heritage**

Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications; National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.

## **Introductory Agro-meteorology & Climate Change**

Meaning and scope of agricultural meteorology; Earth atmosphere its composition, extent and structure; weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, cyclone, anticyclone, Land breeze and sea breeze; Atmospheric temperature, Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification, Weather hazards, Agriculture and weather relations, causes of climate change and its impact on regional and national Agriculture.

## **Crop Production Technology**

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Kharif crops, cultural practices and yield of Rabi crops.

## **Weed Management**

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non-chemical methods of weed management. Herbicide Resistance and its management.

## **Farming System and Sustainable Agriculture**

Farming System, Cropping system and pattern, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

## **Geo-informatics and Precision Farming**

Precision agriculture, Geo-informatics, Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture.

## **Principles of Organic Farming**

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, levelling, economic considerations and viability, marketing and export potential of organic products.

## **Rainfed Agriculture and Watershed Management**

Rainfed agriculture, Drought, Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

## **Fundamentals of Plant Pathology**

Introduction, Causes and factors affecting disease development, Important plant pathogenic organisms (different groups): fungi, bacteria, phytoplasma, Spiro plasma, viruses, viroid's, algae, protozoa and phanerogamic plant parasites, Diseases and symptoms due to abiotic causes, Pathogenesis, Role of enzymes and toxins, Defence mechanism in plants. Epidemiology, Fungi, Bacteria and mollicutes, viruses, Growth and reproduction of plant pathogens. Liberation, dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens.

## **Agricultural Microbiology**

Introduction. Microbial world, Bacterial genetics, Role of microbes in soil fertility and crop production, biological nitrogen fixation, Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation.

## **Introductory Plant Nematology**

Introduction, History of Phyto nematology. Economic importance. General characteristics of plant pathogenic nematodes. Nematode general morphology and biology. Classification of nematodes, Classification of plant parasitic nematodes based on feeding habits. Identification of economically important plant nematodes, Symptoms caused by nematodes, Interaction between plant parasitic nematodes and disease-causing fungi, bacteria and viruses, Different methods of nematode management. Cultural methods chemical methods.

## **Principles of Integrated Disease Management**

Categories of diseases, IPM, Economic importance of diseases and pest risk analysis, Methods of detection and diagnosis of diseases. Calculation and dynamics of economic injury level and importance, Methods of control, Principles and methods of plant disease management, Ecological management of crop environment, Introduction to conventional pesticides for the disease management, Survey surveillance and forecasting of diseases, Development and validation of IPM module, Case histories of important IPM programmes. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

## **Diseases of Field and Horticultural Crops and Their Management**

Symptoms, aetiology, disease cycle and management of major diseases of, Field Crops: Rice, Maize, Sorghum, Bajra, Groundnut, Sesamum, Soybean, Pigeon pea, Finger millet, Black & green gram, Castor, Tobacco, Horticultural Crops, Banana, Papaya, Pomegranate, Brinjal, Tomato, Okra, Beans, Colocasia, Coconut, Tea, Cluster bean, disease cycle and management of following diseases: Field Crops: Wheat, Sugarcane, Sunflower, Mustard, Lentil, Pea, Horticultural Crops: Mango, Citrus, Grape vine, Guava, Ber, Apple, Peach, Sapota, Cucurbits, Onion and garlic, Chillies, Ginger, Turmeric, Fenugreek, Cumin, Fennel, Coriander, Cruciferous vegetables, Rose.

## **Fundamentals of Soil Science**

Soil as a natural body, Soil genesis, Soil physical properties: soil texture, Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; soil air, composition; source, amount and flow of heat in soil; soil temperature and plant growth; Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids - inorganic and organic; silicate clays, soil organic matter, soil organisms.

## **Manures, Fertilizers and Soil Fertility Management**

Classification and importance of organic manures, Chemical fertilizers, History of soil fertility and plant nutrition. Criteria of essentiality. Role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

## **Fundamentals of Plant Biochemistry**

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate, Structures of Monosaccharides, Proteins, Introduction to secondary metabolites, Enzymes, Vitamins and mineral nutrition for human health, Nucleic acids, RNA, Metabolism of carbohydrates, Substrate level and photo phosphoryl) reaction ion, Metabolism of lipids.

## **Problematic Soils and their Management**

Soil quality and health, their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, flooded soils, Polluted soils. Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different agro-climatic zones of Haryana.

## **Soil, Plant and Water Testing**

Soil analysis, Standardization of solutions and reagents, Estimation of pH, EC, organic carbon, available N, P, K, S & micronutrients in soil (Fe, Mn, Zn, Cu, B) and nutrient index, fertilizer recommendation Plant analysis, Sampling stages and plant part to be sampled, Estimation of N, P, K, S and micro nutrients (Fe, Mn, Zn, Cu and B) from plant sample, Rapid plant tissue test, Quantitative rating of plant analysis data and interpretation of results, critical nutrient concentration, critical nutrient ranges. Irrigation Water analysis, Quality criteria, classification and suitability of irrigation water and water quality index. Introduction of analytical instruments and their principles, calibration and applications

## **ENTOMOLOGY**

Part – I: History of Entomology in India, Part – II: Morphology, Part – III: Structure of male and female genital organs, Part – IV: Systematics

## **Principles of Integrated Pest Management**

Part I: Insect Ecology, Part-II: Categories of insect pests, IPM, Part III: Recent methods of pest control

Part IV: Economic importance of insect pests

## **Management of Beneficial Insects**

Part I: Importance of beneficial Insects, Part II: Honey bee species, seasonal management, hive products, diseases and enemies. Part III: Types of silkworms, voltinism and biology of silkworm, Part IV: Species of lac insect, morphology, biology, host plant, lac production, Part V: Identification of major parasitoids and predators commonly being used in biological control.

## **Pests of Field Crops and Stored Grains and their Management**

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, identification, biology and bionomics, nature of damage, and management of insect and non-insect pests of paddy, sorghum, maize, Pearl millet, ragi (*Eleucinecoracana*), wheat, sugarcane, cotton, sun hemp, pulses, groundnut, castor, gingelly, safflower, sunflower, mustard, soybean, cumin, fennel, Fenugreek, tobacco etc. Common phytophagous mites, rodents, snail, slug, crab and bird pests. Stored grain pests: Coleopteran and Lepidopteran pests, their biology and damage, preventive and curative methods.

## **Pests of Horticultural Crops and their Management**

Distribution, biology, nature and symptoms of damage, and management strategies of insect and non-insect pests of vegetable crops viz., brinjal, okra, tomato, potato, cruciferous and cucurbitaceous vegetables, pulse vegetable, leafy vegetables, sweet potato, elephant foot, yam, Colocasia, moringa; spices crops viz., chilies, onion, turmeric, garlic, ginger, coriander and curry neem leaf; fruit trees viz., mango, sapota, citrus, banana, cashew, pomegranate, custard apple, aonla, Ber, guava, papaya and grape vine and plantation crops viz., coconut, areca nut and date palm and ornamental plants. Plant protection in protected cultivation.

## **Production Technology for Fruit and Plantation Crops**

Importance and scope of fruit and plantation crop industry in India; High density planting; Use of rootstocks; Production technologies for the cultivation of major fruitsmango, banana, citrus, grape, guava, papaya, apple, pomegranate, Sapota, Custard apple minor fruits: jackfruit, strawberry, pineapple, Ber and Jamun plantation crops- major coconut, areca-nut, cashew minor :, tea, coffee & rubber.

## **Production Technology for Vegetable and Spices**

Importance of vegetables & spices in human nutrition and national economy, Major crops: Fruit vegetables, Cucurbits, Cole crops,Tuber, Spices, Minor crops: Cucurbits, Legumes, Root vegetables, Tuber, Leafy vegetables, Bulb crops.

## **Post-harvest Management and Value Addition of Fruits and Vegetables**

Importance of fruits and vegetables, extent and possible causes of post-harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Role of ethylene; Post harvest disease and disorders; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy - Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables - Concept and methods, osmotic drying. Canning — Concepts and Standards, packaging of products

## **AGRICULTURAL ECONOMICS**

Economics, Basic concepts, Demand, Elasticity of demand, Laws of returns, Distribution theory, National income, Population, Money, Economic systems.

## **Agricultural Finance and Co-Operation**

Agricultural Finance, Credit analysis, Sources of agricultural finance, An introduction to higher financing institutions, Preparation and analysis of financial statements, Basic guidelines for preparation of project reports,SWOT analysis, Agricultural Cooperation, Agricultural Cooperation in India, cooperative warehousing, Crop insurance, Pradhan-Mantri FasalBima Yojana.

## **Agricultural Marketing Trade and Prices**

Agricultural Marketing, classification and characteristics of agricultural markets, pricing and promotion strategies, marketing process and functions, Market functionaries and marketing channels, costs and price spread, Role of Govt. in agricultural marketing, Risk in marketing, Agricultural prices and policy, Trade.

## **Farm Management, Production and Resource Economics**

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms, Principles of farm management, Meaning and concept of cost, Importance of farm records and accounts in managing a farm,Meaning and importance of farm planning and budgeting,Concept of risk and uncertainty occurs in agriculture production,Concepts of resource economics,Positive and negative externalities in agriculture.

## **Renewable Energy and Green Technology**

Classification of energy sources, contribution of these of sources in agricultural sector, introduction of solar energy, application of solar energy, introduction of wind energy and their application, Availability of bio mass and their application in different places.

## **Protected Cultivation and Secondary Agriculture**

Green house technology, Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation, Drying and dehydration, Material handling equipment.

## **Rural Sociology & Educational Psychology**

Sociology and Rural sociology, educational psychology, Behaviour, Motivation, Teaching-Learning, Rural Leadership.

## **Human Value and Ethics**

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self-Exploration. Self-Awareness. Self-Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## Group - 9

1) General awareness, Reasoning, Quantitative Aptitude, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc. - **Weightage 20%**

2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc .-

**Weightage 10%**

3) Subject related syllabus-

**Weightage 70%**

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### **BASICS OF CONTROL SYSTEM**

Introduction: Basic elements of control system, open loop control system, closed loop control system, control system terminology, manually controlled closed loop systems, automatic controlled closed loop systems, basic elements of a servo mechanism, Examples of automatic control systems, use of equivalent systems for system analysis, linear systems, non-linear systems, control system examples from chemical systems, mechanical systems, electrical systems, introduction to laplace's transform.

Transfer function: Transfer function analysis of ac and dc servomotors synchro's, stepper motor, amplidyne. ac position control system, magnetic amplifier.

Control system representation: Transfer function, block diagram, reduction of block diagram, problems on block diagram, Mason's formula signal flow graph.

Time Response Analysis: Standard test signals, time response of first and second-order system, time constant, time response of second order system, time response specifications, steady-state errors and error constants, problems in first and second order system.

Stability: Routh Hurwitz Criterion, Root Locus, Bode Plotting using semi log graph paper.

### **ELECTRICAL AND ELECTRONICS MATERIALS AND COMPONENTS**

**Materials:** Classification of materials, Conducting, semi-conducting and insulating materials through a brief reference to their atomic structure and energy bands, Conducting Materials, - Resistors and factors affecting resistivity such as temperature, alloying and mechanical stressing, Classification of conducting materials as low resistivity and high resistivity materials, Applications of Copper, Aluminium, Steel, low resistivity copper alloys such as brass, bronze, copper, graphite etc in the field of electrical engineering. - Superconductivity and piezoelectric ceramic materials, Insulating Materials, Important relevant characteristics (electrical, mechanical and thermal) and applications of the following material: Mica, Glass, Copper, Sliver, PVC, Silicon, Rubber, Bakelite, Cotton, Ceramic, Polyester, Polythene and Varnish, Magnetic Materials, Different Magnetic materials; (Dia, Para, Ferro) and their properties. Ferro magnetism, Domains, permeability, Hysteresis loop. Soft and hard magnetic materials, their examples and typical applications Special Materials, Thermocouple, bimetals, lead soldering and fuse material, mention their applications, Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc.

**Components:** Capacitors a) Concept of capacitance and capacitors, units of capacitance, types of capacitors, constructional details and testing specifications b) Capacity of parallel plate capacitors, spherical capacitors, cylindrical capacitor. c) Energy stored in a capacitor. d) Concept of di-electric and its effects on capacitance, di-electric constant, break down voltage. e) Series and parallel combination of capacitor. Simple numerical problems of capacitor. f) Charging and discharging of capacitor with different resistances in circuit, concept of current growth and decay, time constant in R-C circuits, simple problems, Resistors: Carbon film, metal film, carbon composition, wound and variable types (pre-sets and Potentio-meters), Transformer, inductors and RF coils: Methods of manufacture, testing, need of shielding, application and troubleshooting, Surface Mounted Devices (SMDs): Constructional detail and specifications, Connectors, Relays, switches and cables: Different types of connectors, relays, switches and cables, their symbols, construction and characteristics, Semi-Conductors and Integrated Circuits (ICs) - Characteristics and testing, Basic characteristics of semiconductor materials, testing of diodes, transistors, FETs and SCRs. - Various processes in IC manufacturing. Hybrid IC technology.

## TEST AND MEASURING INSTRUMENTS

Classification, Absolute and secondary instruments, indicating recording and integrating, instruments, Review of units, dimensions and standards, Symbolic representation of circuits, Measurement of Resistance, Inductance and Capacitance, Measurement of resistance: Ohmmeters, Meggers, Wheatstone Bridge, Kelvin Bridge, Potentiometer method, Impedance Measurement: Measurement of inductance and capacitance: AC bridge method, Wagner earth devices, Detectors – classification and types, Vibration galvanometers, Ammeter, Voltmeter and Multi-meter, Zero error Moving Iron, Permanent Magnet Moving Coil Meters, Range Extension, Thermal type, electrostatic inductor, rectifier instruments, Electronic voltmeter, Digital Voltmeter (DVM)- ramp, type and integrating type digital voltmeters, D' Arson oval Galvanometer, dynamo galvanometer, equation of motion, damped, under damped and critical damped, Multi-meter: Principle of measurement, Measurement of d.c voltage and a.c voltage, a.c and d.c, sensitivity, Shunt and multiplier for range extension, Power and Energy Measurements, Watt meters – types, definition, classification, Wattmeter and Wattmeter methods, Energy, Measurement, Energy meters – types, definition, principle, Maximum demand indicators, 5. Frequency and Phase difference Measurement, Stroboscopes, synchro-scopes, Power factor meters, Digital frequency meters, phase sequence indicators, Illumination Instrument, Definition, Flicker, illumination photo meter, Cathode ray Oscilloscope, Block diagram, Construction of Circuit, Deflection sensitivity, Various controls, X-Y Section, delay, line, Horizontal sweep section, synchronization of sweep and triggered sweep, Measurement of voltage, current, phase angle, frequency, CRO probes, dual trace beam, high frequency beam, Digital Storage Oscilloscope (DSO), Construction, principle and operation of the following Meters and Instruments, Q-meter, transistor tester, LCR Bridge, function generator, Tong tester, flux meter, spectrumanalyser.

## PRINCIPLES OF INSTRUMENTATION

Basics of Instrumentation Systems, - Scope and necessity of instruments - Measurement, its significance and types - Building blocks of instrumentation systems - Various testing signals - Important process variables and their units, Performance Characteristics of Instruments, Static characteristics of instruments-accuracy, precision, linearity, resolution, sensitivity, hysteresis, drift, dead time, loading effects. - Dynamic inputs and dynamic characteristics-time constant, response time, natural frequency, damping coefficient. - Reliability, serviceability, cost effectiveness, and availability - Static and dynamic response (step response) - Order of Instruments - Environmental

Effects - Calibration tools, Display and recording devices - Operating mechanism in indicating and recording devices - Various indicating, integrating and recording methods and their combination - Merits and demerits of circular chart and strip chart recorder - Basics of printing devices - Scanning, data logging and field buses - Bar graph LCD, Seven segment display, X-Y recorder, scanners - Design experiments for display system, Errors - Calibration of instruments - Sources of errors - Classification of errors - Grounding/earthing – Precautions.

## FUNDAMENTALS OF DIGITAL ELECTRONICS

1. Introduction: a) Distinction between analog and digital signalb) Applications and advantages of digital signals.
2. Number System: a) Binary, octal and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa.b) Binary addition, subtraction, multiplication and division including binary points. 1's and 2's complement method of addition/subtraction, sign magnitude method of representation, floating point representation
3. Codes and Parity: a) Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and grey code.b) Concept of parity, single and double parity and error detectionc) Alpha numeric codes: ASCII and EBCDIC.
4. Logic Gates and Families: a) Concept of negative and positive logicb) Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates.(c) Logic family classification:- Definition of SSI, MSI, LSI, VLSI- TTL and CMOS families and their sub classification- Characteristics of TTL and CMOS digital gates. Delay, speed, noise margin, logic levels, power dissipation, fan-in, power supply requirement and comparison between TTL and CMOS families
5. Logic Simplification: a) Postulates of Boolean algebra, De Morgan's Theorems. Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gatesb) Karnaugh map (upto 4 variables) and simple application in developing combinational logic circuits.
6. Arithmetic circuits: a) Half adder and Full adder circuit, design and implementation.b) Half and Full subtracter circuit, design and implementation.c) 4-bit adder/subtractor.d) Adder and Subtractor IC (7484).
7. Decoders, Multi-plexers and De Multi-plexersa) Four-bit decoder circuits for 7 segment display and decoder/driver ICs.b) Multiplexers and De-Multiplexersc) Basic functions and block diagram of MUX and DEMUX. Different types and ICs.
8. Latches and flip flops: a) Concept and types of latches with their working and applicationsb) Operation using waveforms and truth tables of RS, T, D, Master/Slave JK flip flops.c) Difference between a latch and a flip flop.d) Flip flop ICs.
9. Counters: a) Introduction to Asynchronous and Synchronous countersb) Binary countersc) Divide by N ripple counters, Decade counter.d) Pre settable and programmable counterse) Up/down counterf) Ring counter with timing diagramg) Counter ICs.
10. Shift Register: Introduction and basic concepts including shift left and shift right.a) Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out.b) Universal shift registers c) Buffer register, Tristate Buffer registerd) IC 7495

11. A/D and D/A Converters: a) Working principle of A/D and D/A convertersb) Brief idea about different techniques A/D conversion and study of: Stair step Ramp A/D converter, Dual Slope A/D converter, Successive Approximation A/D Converterc) Detail study of Binary Weighted D/A converter R/2R ladder D/A converterd) Performance characteristics of A/D and D/A converter.e) Applications of A/D and D/A converter.

## **MICROPROCESSORS, MICROCONTROLLERS AND THEIR APPLICATIONS**

Microprocessors 1. Introduction – evolution, importance, and application. 2. Architecture of a Microprocessor- 8085 a) Concept of a bus and bus organization. b) Functional block diagram and function of each block. c) Pin details of 8085 and related signals. d) Demultiplexing of address/data bus and memory read/write cycles. 3. Programming (with respect to 8085 microprocessor) a) Brief idea of machine and assembly languages, Machines and Mnemonic codes. b) Instruction format and Addressing modes. Identification of instructions as to which addressing mode they belong. c) Concept of Instruction set. Explanation of the instructions of the following groups of instruction set d) Data transfer groups, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group. e) Programming exercises in assembly language. (Examples can be taken from the list of experiments). 4 Interfacing and Data Transfer Schemes a) Memory mapped I/O and I/O mapped schemes. b) Interrupts of 8085, maskable and non-maskable interrupts, software interrupts, marking of interrupts 5. I/O Chips a) 8255: pin configuration & block diagram b) 8259: pin configuration & block diagram c) 8257: pin configuration & block diagram, Micro controllers 6. Introduction Comparison of microcontroller and microprocessor, Architecture of 8051, hardware I/O pins, ports, connecting external memory, counters, timers serial port, I/O interrupts. 7. Instruction set and Addressing Modes - Addressing Modes and its types - Basic Instruction like: - Data Transfer, Conditional and Arithmetic) 8. Assembly Language Programming - Assemblers and Compilers - Programming based on basic instructions.

## **TRANSDUCERS AND SIGNAL CONDITIONING**

1. Basic concepts- Definition and classification of transducers, selection criteria, characteristics2. Variable Resistance TransducersConstruction, working principle, selection criteria and application ofPotentiometer, strain gauge, load cell, Hot wire anemometer, photo resistors, Resistive temperature transducers, Thermistors, Carbon Microphones, Accelerometer advantages, disadvantage, and limitation. 3. Variable Inductance transducerConstruction, working principles and application of Electromagnetic pick up, Induction potentiometer, Linear variable differential transformer, Synchronous transmitter and receivers, advantages, disadvantages, and limitations, 4. Variable capacitance Transducers (08 hrs)

Construction, basis principles of selection criteria and application ofCapacitance pick up, Condenser microphone, Differential capacitor pick up advantages, disadvantages, and limitations5. Piezoelectric Transducers, Construction, basic principle, selection criteria and application ofPiezoelectric Transducer, Seismic pick up, Ultrasonic Transducer, Advantage, disadvantages, and limitations6. Other types of transducers, Transducers based upon hall effect - Optical transducers-photo diode, photo transistor LDR and LED, Digital transducer-single shaft encoder, Techno generator, Advantage and disadvantage and limitations, - Magneto strictive transducers, 7. Principle of Analog Signal Conditioning, Linearization, Various types of conversions (from V to F, from F to V, V to I converters and I to V, converters), Filtering and impedance matching.

## **ADVANCED CONTROL SYSTEM**

1. Single and Multiloop Control System, Introduction to single and multiloop control system and its types like feedback, feedforward, cascade, ratio, split range, control system. Study of each of above control system with a suitable example, three element drum level control.
- 2 Non-Linear Control System, Introduction, behaviour of non-linear control system. Different types of non-linearities, saturation, backlash, hysteresis, dead zone, relay, fiction, characteristics of non-linear control system, limit cycles, jump resonance, jump phenomenon. Difference between linear and non-linear control system.
3. Introduction to Artificial Intelligence and Robotics, Fuzzy Logic and neuro fuzzy logic in control system, Artificial Neural Networks, Robotics, degree of freedom, the robot arm configuration.

## **PRINCIPLES OF TELEMETRY**

Land line telemetry - Pneumatic system - Flopper nozzle - Pilot relay - Non bleed type - Bleed types feedback - Limitations Electric system - Current system - Impulse system - Position system or Ratio system - Frequency system - Voltage system RF Communication - Amplitude modulation - Frequency modulation - Phase modulation - Pulse modulation - Pulse code modulation. Transmitters - Pneumatic Transmitter - PDPT bellow type - PDPT diaphragm type - Electric transmitters - Electronic force balance DPT - Hydraulic transmitter, Transmission Channels - Wireline channels - Radio Channels - Multiplexing channels - Time division multiplexing - Frequency division multiplexing, Data Communication, Modulation & demodulation of signals using - Amplitude shift keying - Frequency shift keying - Phase shift keying Errors and correction in above systems, Instrumentation Buses - General view of instrumentation buses - Field programmable buses, Inter-bus.

## **ANALYTICAL AND ENVIRONMENTAL INSTRUMENTS**

1. Introduction: Fundamental blocks of analytical instruments (brief details)
2. Spectroscopic analysis - Absorption spectroscopy- NMR spectroscopy- Mass spectroscopy(Brief concepts of all these methods)
3. Gas analysis- Infra-red gas analyser - Paramagnetic oxygen analysers - Thermal conductivity analysis(Principles of working of these analysers and block-diagram explanation only)
4. Gas Chromatography – Introduction- Related instruments like injectors, oven, column and detectors.
- Infra-red analysers.
5. Liquid Analysis- Principle of pH measurement - Electrodes for pH measurement - Electrochemical analyser
6. Environmental pollution monitoring instruments, Air quality standards, Types, and measurement of concentration of various gas pollutants in atmosphere, Dust measurement
7. Electrochemical instruments, Electrochemical cell - Types of electrodes, Conductivity meters- Aqua meters
8. Instrumentation used for water and noise pollution and their monitoring.

## **PROCESS INSTRUMENTATION**

1. Introduction, Measurement of length, angle, area, working principle of vernier callipers, micrometre, comparator. Least count of each instrument
2. Measurement of Pressure, Torque, Power, Speed and Force, Various methods
3. Measurement of Stress and Strain, Strain gauges, their types, gauge factor, load cells, temperature compensation.
4. Measurement of Motion, Displacement, velocity, acceleration; seismic pickups.
5. Thickness Measurement, Thickness measurement by using: - Resistive method - Inductive method - Capacitive method - Ultrasonic method
6. Measurement of Density, pH, Humidity and Viscosity.

## **PROCESS CONTROL**

1. Basic Control Loops and Characteristics, Basics of process control, process variables, single and multi-capacity processes, single capacity level, pressure, temperature, and flow loop systems.

Process lag, measurement lag, transmission lag and dead time. 2. Controller Modes and Characteristics Concept of on-off, proportional, integral, derivative, P, PI and PID controls, their examples, merits and demerits. 3. Electrical Control Elements, Construction, and principle of operation of solenoids, stepper motor, limit switches, relays, auto transformer and magnetic amplifier. 4. Pneumatic and Hydraulic Control Elements, Pneumatic pressure supply, pneumatic actuator, pneumatic relay, pneumatic amplifiers, electro-pneumatic actuators, flapper-nozzle system and bellows, air filter and regulator. Hydraulic actuators and valves, electro hydraulic actuators 5. Control Valves, Principle of operation and constructional details of solenoid valve, diaphragm operated valve, globe valve, ball valve, butterfly valve, valve positioners. Control valve characteristics, their sizing and selection of valves. 6. Switches, Temperature switches, Flow switches, Pressure switches, interlocking and sequencing circuits, need of interlocks, annunciations.

## **PLC, DCS and SCADA**

1. Introduction to PLC, what is PLC, concept of PLC, Building blocks of PLC, Functions of various blocks, limitations of relays. Advantages of PLCs over electromagnetic relays. Different programming languages, PLC manufacturer etc. 2. Working of PLC - Basic operation and principles of PLC - Scan Cycle - Memory structures, I/O structure - Programming terminal, power supply 3. Instruction Set - Basic instructions like latch, master control self-holding relays. - Timer instruction like retentive timers, resetting of timers. - Counter instructions like up counter, down counter, resetting of counters. - Arithmetic Instructions (ADD, SUB, DIV, MUL etc.) - MOV instruction - RTC (Real Time Clock Function) - Watch Dog Timer - Comparison instructions like equal, not equal, greater, greater than equal, less than, less than equal - Programming based on basic instructions, timer, counter, and comparison instructions using ladder program. 4. DCS Concepts, Concept of DDC, DCS I/O hardware, Remote Terminal Unit 5. SCADA, Block Diagram of SCADA, Difference between Open Architecture and Dedicated System. Difference between DCS and SCADA.

## **ADVANCED MEASUREMENT TECHNIQUES**

1. Review of Measurement System, Functional elements of a measuring system, Input – output configuration of instrumentation system 2. Measurement of Flow, Construction, working principle and application of flows with orifice, Magritte ultrasonic and rotameter 3. High Frequency Measurement, Resonance methods, Measurement of inductance and capacitance, Measurement of effective resistance by resistance variation method and reactance variation method, T networks – parallel T networks and bridge T networks, Radio frequency measurement – sensitivity and selectivity measurement of radio receiver 4. Opto-Electronic Measurement, Photo sensitive devices – light emitting diodes, photo diodes, photo conductors, Photo voltaic cell, photo thyristors, photo transistors Light modulating techniques – light suppression, light attenuation, photo-metric and radiometric fittings 5. Temperature Measurement, Construction, working principle and application of temperature sensors, Thermocouple RTD's, Thermistor, Radiation pyrometry, IR detectors 6. Measurement of Level, Construction, working principle and application of float, level gauges, optical level devices and thermal level sensors.

## **VIRTUAL INSTRUMENTATION**

1. Introduction to Virtual Instrumentation, Historical perspective, advantages of virtual instruments over conventional/traditional instruments, block diagram and architecture of virtual instruments. 2. Learning Lab view, Introduction, Front panel, Block diagram, Menus, Palettes, VI & Sub VI, Editing and Debugging VI, Structures, Arrays, clusters, charts & Graphs, Data acquisition, Instrument control, signal processing examples 3. Data Acquisition Basics, ADC, DAC, DIO, connectors and timers, PC

hardware structure, Introduction to various Data Acquisition Cards. 4. Common Instrumentation Interfaces, Introduction to RS232 / RS485, GPIB, USB, instrumentation buses (introduction such as inter bus). 5. Applications of VI in process control like pressure, temperature control etc.

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**

## GROUP-10

1) General awareness, Reasoning, Mathematics, Science, History including Haryana related history, current affairs, literature, Geography, Civics, Environment, Culture etc. - **(Weightage 20%)**

2) Computer terminology, Fundamentals, word software, excel software, Power point, internet, web browsing, Communication, emails, downloading and uploading data on websites etc. - **(Weightage 10%)**

3) **Subject related syllabus-** **(Weightage 70%)**

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Jurisprudence, Legal Aids, Law of Contract, Civil Procedure Code, Interpretation of Statutes, Legal Writing, Administrative Law, Code of Criminal Procedure, Company Law, Land Laws (including ceiling and other local laws), Labour Law, Family Law, Criminal Law

Professional Ethics, Law of Torts & Consumer Protection Act, Constitutional Law, Law of Evidence, Arbitration, Conciliation & Alternative, Human Rights & International Law, Environmental Law, Property Law, Investment & Securities Law, Law of Taxation, Co-operative Law, Banking Law including the Negotiable Instruments Act, Contract, Trust, Women & Law, Criminology, International Economics Law, Comparative Law, Law of Insurance, Conflict of Laws, Intellectual Prosperity Law & Cyber Law.

**Important Note: The Weightage as mentioned against the syllabus is tentative & may vary.**