ANNEXURE – II

NOTIFICATION NO.*19/2021, Dt.16/11/2021*

SCHEME AND SYLLABUS

P.C N.o: 01 FISHERIES DEVELOPMENT OFFICERS IN A.P. FISHERIES SERVICE

SCHEME

WRITTEN EXAMINATION (OBJECTIVE) Degree Standard				
Paper	**Subject**	**No. Of Questions**	**Duration (Minutes)**	**Maximum Marks**
Paper - I	General Studies & Mental Ability	150	150	150
Paper - II	Fisheries Science - I	150	150	150
Paper - III	Fisheries Science - II	150	150	150
			Total	450
N.B: As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question in all Objective type papers.				

SYLLABUS

PAPER-I: GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology.
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

PAPER-II Fisheries Science-I

1. General principles of Taxonomy, outline classification and General characters on Non-Chordates and Chordates
2. General study of Parasitic and Pathogenic Protozoans, Helminthes and Arthopods with reference to Fish and Prawn culture
3. Phylum chordata – class – pisces – taxonomy – classification – general Morphology and Anatomy of chondricthyes and osteich-thyes and osteichthyes – general distribution of fish
4. Fish growth – Morphometric and Meristic characters
5. Food and feeding habits with special reference to Digestion in Fish
6. Respiration and osmo-regulation in fishes
7. Endocrine system of fishes
8. Reproductive system and breeding habit in fishes
9. Adaptations – migration of fishes
10. Parental care of fishes

PAPER-III Fisheries Science-II

1. Culturable varieties of fish (indigenous and exotic) and Prawns
2. Breeding methods – Natural – bundh – induced breeding.
3. Fresh water aqua culture – fresh water fishery resources preparation and management of ponds – Aquatic weeds and control.
4. Brackish water aquaculture – Brackish water fishery resources – management of brackish water ponds.
5. General aspects of marine biology and mariculture – Mussel culture – Oyster culture – Fish and Crab culture and sea-weed culture
6. Study of major group of plankton and their importance in aquaculture
7. General account of fish and prawn diseases and their control.
8. General principles of Ecology – aquatic ecosystem with reference to fresh water brackish water and marine environment
9. General methods of preservation and processing of fishes and prawns
10. Economic importance of fisheries – Fish by-products.

P.C.No:02 SCHEME AND SYLLABUS FOR THE POST OF *SERICULTURE OFFICER IN A.P SERICULTURE SERVICE*

SCHEME
(DEGREE STANDARD)

Written Examination (Objective Type)				
PAPER	**Subject**	**No.of Questions**	**Durations (Minutes)**	**Maximum Marks**
Paper - I	General Studied & Mental Ability	150	150	150
Paper - II	Sericulture - I	150	150	150
Paper - III	Sericulture – II (Agriculture and Biosciences)	150	150	150
Total				450
N.B: As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.				

Syllabus

PAPER-I: GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology.
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
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8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data

b) Visual representation of data

c) Basic data analysis (Summary Statistics such as mean, median, mode,variance and coefficient of variation) and Interpretation

12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

PAPER-II
SERICULTURE – I

1. **GENERAL INTRODUCTION TO SERICULTURE AND ITS DISTRIBUTION IN INDIA**.

Types of silk produced in India- Status of mulberry and non-mulberry Sericulture in India and at Global level- Economic importance - Scope of Sericulture in India- Employment potential and income generation of sericulture industry- History of Sericulture

2. MULBERRY CULTIVATION

Taxonomy and morphology of mulberry - Mulberry classification -Varieties and their distribution.

Mulberry cultivation practices under irrigated and rainfed conditions and schedule of package of practices

Suitable soils- Location and climate for mulberry cultivation

Mulberry propagation: Sexual and Vegetative propagation

Cuttings: Preparation of Cuttings - Raising of nurseries

Grafting: Stem - Root - Bud grafting techniques

Layering: Ground- Air- Trench layering methods

Planting systems: Row system- Pit system -Paired row system

Fertilizer schedules for irrigated and raifed mulberry gardens

Pruning: Objectives and methods

Harvesting- Transportation - Preservation of mulberry leaves.

3. DISEASES AND PESTS OF MULBERRY

Diseases: General account of mulberry diseases - Foliar diseases - Root diseases - Stem diseases –Causes – Symptoms-Preventive and control measures

Deficiency diseases – Causes – Symptoms-Preventive and control measures

Nematodes infesting mulberry- Occurrence- Distribution- Crop loss- Preventive and control measures

Pests: Leaf hoppers- Scale insects- Mealy bugs- White flies- Hairy caterpillars- Leaf cutters- Termites- Distribution- Signs of attack- Crop losses –Preventive and control measures - Integrated pest management (IPM)

4. SILKWORM BIOLOGY AND PHYSIOLOGY

Systematic position of mulberry silkworm- External morphology of silkworm-Egg, Larva, Pupa and Adult - Embryology-Structure of Egg-Fertilization-Cleavage-Blastoderm-Germ band formation-Blastokinesis-Involution of the embryo

Physiology of Digestion-Respiration-Circulation-Excretion-Glandular system-Reproduction

5. PREPARATION FOR SILKWORM REARING

Number of cocoon crops per year – Silkworm races - Model rearing house – Different types of rearing houses – Rearing appliances - Sanitation – Importance and methods of disinfection – Different disinfectants – Bed disinfectants

6. REARING TECHNOLOGIES

Chawki Rearing Concept: Procurement silkworm eggs – Incubation – Black Boxing - Brushing of silkworms – Young age silkworm rearing technology - Late age silkworm rearing technology - Cleaning - Spacing -Objectives of spacing – Optimum spacing for different ages – Care during molting - Feeding behavior –Frequency- Preservation and quantity of mulberry leaf – Artificial diet - Environmental factors – Optimum conditions – Devices to control temperature and humidity.

Mounting and spinning: Methods of mounting – Types of mountages – Population Density – Care during mounting spinning process – Harvesting of Cocoons – Time of Harvest – Cocoon sorting – Assessment – Transportation and Marketing.

7. SILK WORM EGG PRODUCTION

Marketing of seed cocoons and price fixing- Silkworm seed organization and its significance (bivoltine and multivoltine).

Grainage operations: Procurement and preservation of seed cocoons- Sex separation- Moth emergence- Mating- Oviposition – Sheet and loose egg preparation - Packing and sale of eggs - Mother moth examination- Surface sterilization of eggs- Acid treatment of hibernating eggs - Embryonic growth - Hibernating (Diapausing) eggs - Techniques of cold storage of eggs - Artificial hatching

8. SILKWORM DISEASES

Types of diseases – Etiology – Viral diseases : Nuclear polyhedrosis – Cytoplasmic polyhedrosis – Infectious flacherie – Densonucleosis – Causative agents – Symptomology-Prophylactic measures

Bacterial diseases: Bacterial diseases of digestive tract-Bacterial septicemia – Toxicosis – Causative agents- Symptomology- Prophylactic measures

Fungal diseases: White muscardine – Types – Causative agents – Life Cycle – Symptomology- Prophylactic measures

Protozoan diseases: Pebrine – History Causative agent – Life Cycle – Mode of Transmission – Symptomology- Prophylactic measures

9. PESTS OF SILKWORM

Pests of Silkworm: Uzi fly – Classification - Morphology and life cycle of the parasitoid – Extent of crop loss – Management of Uzi fly menace – Dermested beetles – Life Cycle and control

10. COCOON ASSESSMENT AND PROCESSING TECHNOLOGIES

Cocoon properties-Assessment –Types of defective cocoon - Shell percentage -Shell ratio - Filament length - Denier - Renditta- Raw silk percentage. Cocoon stifling /drying- Objectives - Cocoon storage and preservation of cocoon in silk reeling units- Cocoon boiling/cooking- Different methods

11. SILK REELING TECHNOLOGY

Silk reeling: Country charakha- Improved charakha - Cottage basin – Multiend- Semi automatic - Automatic reeling machines - Passage of thread in various reeling machines- Functions of components of reeling machines- Reeling basin- Jettebout- Porcelein button- Croissure- Chambon type and tavellette type- Guide pulley -Tension pulley- Traverse mechanism- Reel- Swift- Reel stop motion- Denier control device-Re reeling

12. SILK TESTING AND SPUN SILK PROCESSING

Raw silk testing- Visual and mechanical tests - Winding test- Size test- Tenacity- Elongation test-Evenness, cleanness and neatness tests- Cohesion, Testing and grading -Spun silk industry- Raw materials- Processing at different stages of spun silk fibers

13. NON-MULBERRY SERICULTURE

Introduction to Eri, Tasar and Muga culture- Distribution – Classification and Life cycle of Eri, Tasar and Muga- Primary and secondary food plants of Eri, Tasar and Muga silkworms- Geographical distribution - Cocoon production technology – Disinfection – Incubation-Young age silkworm rearing -Late age silkworm rearing– Spinning- Harvesting

14. VALUE ADDED PRODUCTS OF MULBERRY AND SILKWORM

Value-adding Potentials in mulberry: Chemical composition of mulberry leaf and fruit - Nutritional and medicinal values of mulberry –Other uses- value-adding potentials in seed and cocoon production –Nutritional value of Silkworm and silkmoth- Cocoon and silk art craft application - Silkworm as biotechnological and laboratory tool.

15. VALUE ADDED PRODUCTS OF SILK

Types of silk wastes – Spun silk- Noil yarn and its utility - Silkworm pupae as food material and its nutritional value - Pupal oil extraction and its uses-Defective and double cocoons for production of dupion silk- Application of silk protein- Fibroin and sericin as biomaterials- Pharmaceutical- Biomedical application- Cosmetic application

PAPER-III
SERICULTURE - II

(AGRICULTURE AND BIOSCIENCES)

1. PRINCIPLES OF AGRONOMY

Agriculture in India - Indian economy – National income – Per capita income – Agricultural income in GDP -Different agro climatic Zones of India and Andhra Pradesh - Crops and major soils - Classification – Economic and agricultural importance in India and Andhra Pradesh

2. PRINCIPLES OF SOIL SCIENCE

Soils of Andhra Pradesh - Major soil types- Characteristics and their distribution Problematic soils and their management: Acid and saline soils and methods of reclamation

3. MANURES AND FERTILIZERS

Organic manures and their applications: Farm yard manure-Compost-Vermicompost-Oil cakes, Methods of compost and vermicompost preparations.
Green manuring: Green manure crops and their relevance in soil productivity.
Chemical fertilizers: Classification- Composition - Properties of major Nitrogenous, Phosphatic and potassic fertilizers, Secondary and micronutrient fertilizers, Complex fertilizers, Nano fertilizers.
Foliar nutrition: Foliar nutrient formulations- Mode of applications- Merits and demerits.
Bio fertilizers: Types: Nitrogen- Phosphate -Cellulolytic- Biological nitrogen fixation Importance- Applications and limitations

4. IRRIGATION AND WATER MANAGEMENT

Importance of water - Water resources in India-Water sources- Water quality- Area under irrigation in Andhra Pradesh
Crop water requirements - Water management practices - Methods of irrigation-Suitability -Limitations.

5. WEED MANAGEMENT

Harmful effects of weeds - Herbicides - Advantages and limitations of herbicide usage in India - Selectivity of herbicides - Herbicides and their interaction with fertilizer
Preventive and control methods: Physical-Chemical- Biological weed management techniques, Integrated weed management

6. STRUCTURAL ORGANIZATION OF PLANT CELLS

Ultra structure of plant cell- Structure of cell organelles and function
Tissue systems in plants – Origin- Structure, and function of simple and complex tissues, Cell cycle- Mitosis and Meiosis.

7. PHOTOSYNTHESIS

Structure and function of Chloroplast- Photosynthetic pigments and their characteristics - Photosynthetic carbon assimilation in C_3, C_4 and CAM Plants-Photorespiration- Mechanism and regulation.

8. RESPIRATION

Glycolysis- Tricarboxylic Acid Cycle (TCA cycle) - Electron transport- Pentose phosphate pathway- Mechanism and Significance

9. PLANT DEVELOPMENT AND GROWTH REGULATORS

Pattern of plant growth and development- Growth kinetics- Morphogenesis- Principles

of differentiation
Natural and Synthetic growth regulators: Auxins- Gibberelins- Cytokinins- Abscisic acid- Ethylene- Brassino steroids- Polyamines-Jasmonic acid -Salicylic acid.

10. PLANT TISSUE CULTURE

Preparatory techniques–Cleaning- Sterilization - Media –Types and Composition, Callus - Growth pattern/characteristics, Organogenesis and plant regeneration, Acclimatization Somatic embryogenesis-Anther- Endosperm- Pollen cultures - Significance and advantages of haploid plants- Production of virus-free plants.

11. STRUCTURAL ORGANIZATION OF ANIMAL CELLS

Cell Membrane structure and function - Structural organization and function of intracellular organelles: Cytoplasm - Nucleus - Mitochondria- Endoplasmic reticulum - Golgi apparatus- Ribosomes - Lysosomes - Peroxisomes -Vacuoles - Structure and function of cytoskeleton and its role in motility Cell division and cell cycle

12. ANIMAL PHYSIOLOGY

Digestion: Functional anatomy of digestive system - Digestion and digestive secretions - Absorption – Assimilation

Respiratory system - Transport of gases- Exchange of gases - Respiratory quotient - Respiratory Pigments - Waste elimination.

Nervous system – Neurons- Action potential - Gross neuroanatomy of the brain and spinal cord- Central and peripheral nervous system- Neural control of muscle tone and posture - Sense organs.

Circulatory System: Physiology of heartbeat- Blood and circulation - Blood corpuscles- Haemopoiesis - Plasma function - Blood volume - Blood groups - Haemoglobin - Immunity - Haemostasis.

Excretory system - Physiology of excretion - Formation of nitrogenous excretory products -Ammonia - Urea - Uric acid - Waste elimination -Regulation of water balance

Endocrinology and reproduction - Endocrine glands and its secretion - Reproductive processes- Gametogenesis- Ovulation- Neuro-endocrine regulation.

13. BIOMOLECULES

Carbohydrates: Structure- Properties - Classification - Pathways of metabolism of glucose- Glycogenesis- Glycogenolysis- Glycolysis-Citric acid cycle- Gluconeogenesis- HMP pathway-Uronic acid pathway

Proteins: Structure- Classification and properties -Aminoacids- Structure- Classification and properties

Lipids: Structure-Chemical nature-Classification- Biological functions

Nucleic acids: Types - Functions - Structure of DNA and RNA - DNA synthesis RNA synthesis (Transcription) - Protein synthesis (Translation)

14. ENVIRONMENTAL BIOLOGY

General account on biomes and their environment

Fresh water: Classification and characteristics of freshwater bodies-Eutrophication- Seasonal changes

Marine: Classification and Characteristics- Shores and Estuaries

Terrestrial: Forests- Grasslands- Tundra- Mountains -Caves.

Ecology: Components of an Ecosystem - Tropic levels - Food chain and food web - Energy flow in ecosystem.

15. ENVIRONMENTAL POLLUTION

Kinds of pollution- Air pollution: Criteria and standards in India-Health hazards and toxicology-Green house effect-Acid rains-International conventions on ozone-Climate-

Water pollution: Criteria and standards-Waste - Water treatment – Microbial ecology of Activated Sludge-Modern methods of waste water treatment - Solid waste treatment -Noise Pollution-Radiation Pollution - Global environmental change - Ecological effects of pollution-Monitoring pollution - Remote Sensing as a tool for study and management of environment.

P.C.No: 03 SCHEME AND SYLLABUS FOR THE POST OF AGRICULTURE OFFICER IN A.P. AGRICULTURE SERVICE

SCHEME OF EXAMINATION (Degree Standard)

WRITTENEXAMINATION (Objective Type)			
SUBJECT	**No. of Questions**	**Duration (Minutes)**	**Maximum Marks**
Paper-I: General Studies and Mental Ability	150	150	150
Paper-II: Agriculture	150	150	300
		TOTAL	450
NEGATIVE MARKS: As per G.O.Ms. No.235, Finance (HR-I, Plg & Policy) Dept., Dt. 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.			

PAPER-I

GENERAL STUDIES AND MENTAL ABILITY

150 Questions **150 Marks**

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
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11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

PAPER-II: AGRICULTURE

150 Questions **300 Marks**

1. **Introductory Agriculture and Principles of Agronomy:** Basic elements of crop production; Factors affecting crop production; History of Agricultural Development; Chronological Agricultural Technology development in India. Indian Agriculture, balance sheet, liabilities; Assets and Contrasting trends (DATA), Agril. growth, contrasting food chains, Diversity in physiography, Soil groups, marine, livestock and water; Liabilities: Soil factors, weather factors, Economic ecology, dry and irrigation agriculture, Farming Systems approach,

value addition, requirements in new technology; Women in Agriculture: multifaceted roles and tasks, work stress factors, Nutritional and rural life standards, role in house hold design making, drudgery reduction for farm women, women friendly agricultural technology; Empowerment of women; Group dynamics for farm women, rural women; The nucleus of Agricultural Extension and Training. Meaning and scope of Agronomy: National and International Agricultural Research Institutes in India, Agro-climatic zones of India and Andhra Pradesh. Tillage, crops stand establishment, Planting geometry and its effect on growth and yield cropping systems, Harvesting.

2. **Field Crops (Kharif)** Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of kharif crops, Cereals – rice, maize, sorghum, pearl millet and minor millets; Pulses : pigeonpea, mungbean and urdbean; Oilseeds: groundnut, sesame and soybean; Fibre crops: cotton, jute and sunhemp; and Forage crops: sorghum, maize, cowpea, cluster bean and napier.

3. **Field Crops *(Rabi)*** Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi crops; Cereals: wheat, barley; Pulses: chickpea, lentil, peas, french bean; Oilseeds: rapeseed and mustard, sunflower, safflower and linseed; Sugar crops: sugarcane and sugarbeet, Medicinal and aromatic crops such as citronella, palma rosa and isabgol; Commercial crops: potato and tobacco, Forage crops: lucerne and oat.

4. **Weed Management Weeds**: Introduction, harmful and beneficial effects, classification, propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy. Concepts of weed prevention, control and eradication; Methods of weed control: physical, cultural, chemical and biological. Integrated weed management; Herbicides: advantages and limitation of herbicide usage in India, Herbicide classification, formulations, methods of application; Introduction to Adjuvants and their use in herbicides; Selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control. Herbicide resistant crops.

5. **Water Management Including Micro Irrigation** Irrigation: definition and objectives, water resources and irrigation development in India and Gujarat; Soil plant water relationships; Methods of soil moisture estimation, evapotranspiration and crop water requirement; effective rainfall, scheduling of irrigation; Methods of irrigation: surface, sprinkler and drip irrigation; Irrigation efficiency and water use efficiency, conjunctive use of water, irrigation water quality and its management. Water management of different crops (rice, wheat, maize, groundnut, sugarcane, mango, banana and tomato); Agricultural drainage.

6. **Organic Farming** Introduction, concept, relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil improvement and amendments; Integrated diseases and pest management – use of biocontrol agents, biopesticides pheromones, trap crops, bird perches; Weed management; Quality considerations, certification, labeling and accreditation processors, marketing, exports.

7. **Farming Systems and Sustainable Agriculture** Sustainable agriculture: Introduction, definition, goal and current concepts, factors affecting ecological balance and ameliorative measures; Land degradation and conservators of natural resources, LEIA & HEIA; Irrigation problems, waste lands and their development; Organic farming: definition, principles and components; Farming systems: definition, principles and components, IFS models for wetland, irrigated dryland and dryland situations.

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8. **Principles of Plant Breeding** Aims and objectives of Plant Breeding; Modes of reproduction, Sexual, Asexual, Apomixis and their classification; Significance in plant breeding; Modes of pollination, genetic consequences, differences between self and cross pollinated crops; Methods of breeding – introduction and acclimatization. Selection, Mass selection Johannson"s pure line theory, genetic basis, pure line selection; Hybridization, Aims and objectives, types of hybridization; Methods of handling of segregating generations, pedigree method, bulk method, back cross method and various modified methods; Incompatibility and male sterility and their utilization in crop improvement; Heterosis, inbreeding depression, various theories of Heterosis, exploitation of hybrid vigour development of inbred lines, single cross and double cross hybrids; Population improvement programmes, Hardy-Weinberg Law; recurrent selection, synthetics and composites; Methods of breeding for vegetatively propagated crops; Clonal selection;

Mutation breeding; Ploidy breeding; Wide hybridization, significance in crop improvement. Plant Genetic Resources, their conservation and utilization in crop improvement; ideotype concept in crop improvement; breeding resistance to biotic and abiotic stresses, variability in pathogens and pests; Mechanisms of resistance in plant pathogens and pests; Genetic basis of adaptability to unfavourable environments; definition of biometrics, assessment of variability i.e. additive, dominance and epistasis and their differentiation; genotype x environment interaction and influence on yield/ performance, IPR and its related issues.

9. **Principles of Seed Technology** Introduction to Seed Production, Importance of Seed Production, Seed policy, Seed demand forecasting and planning for certified, foundation and breeder seed production, Deterioration of crop varieties, Factors affecting deterioration and their control; Maintenance of genetic purity during seed production, Seed quality; Definition, Characters of good quality seed, Different classes of seed, Production of nucleus & breeder"s seed, Maintenance and multiplication of pre-release and newly released varieties in self and cross-pollinated crops; Seed Production, Foundation and certified seed production of various crops. Seed certification, phases of certification, procedure for seed certification, field inspection and field counts etc.; Seed Act and Seed Act enforcement.

10. **Principles of Plant Biotechnology** Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Nutritional requirements of in-vitro cultures; Techniques of In-vitro cultures, Micro propagation, Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture, Factors affecting above in-vitro culture; Applications and Achievements; Somaclonal variation, Types, Reasons: Somatic embryogenesis and synthetic seed production technology; Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes; Vectors for gene transfer – Gene cloning – Direct and indirect method of gene transfer – Transgenic plants and their applications. Blotting techniques – DNA finger printing – DNA based markers – RFLP, AFLP, RAPD, SSR and DNA
Probes – Mapping QTL – Future prospects. MAS, and its application in crop improvement.

11. **SOIL SCIENCE AND AGRICULTURAL CHEMISTRY:**

Introduction to Soil Science: Soil: Pedological and edaphological concepts, Origin of the earth, Earth"s crust; Composition: Rocks and minerals Weathering, Soil formation factors and processes Components of soils; Soil profile, Soil physical properties, Soil texture, Textural classes, Particle size analysis, Soil structure Classification, Soil aggregates, significance, Soil consistency, Soil crusting, Bulk density and particle density of soils & porosity, their significance and manipulation, Soil compaction, Soil Colour, Elementary knowledge of soil classification and soils of India; Soil water, Retention and potentials, Soil moisture constants, Movement of soil water, Infiltration, percolation, permeability, Drainage, Methods of determination of soil moisture Thermal properties of soils, Soil temperature, Soil air, Gaseous exchange, Influence of soil temperature and air on plant growth; Soil colloids, Properties, nature, types and significance; Layer silicate clays, their genesis and sources of charges, Adsorption of ions, Ion exchange, CEC & AEC Factors influencing ion exchange and its Significance. Soil organic matter, Composition, Decomposability, Humus, Fractionation of organic matter, Carbon cycle, C: N ratio. Soil biology, Biomass, Soil organisms and their beneficial and harmful roles.

12. **Soil Chemistry, Soil Fertility and Nutrient Management** Soil as a source of plant nutrients. Essential and beneficial elements, criteria of essentiality, forms of nutrients in soil , mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Measures to overcome deficiencies and toxicities. Problem soils – acid, salt affected and calcareous soils, characteristics, nutrient availabilities. Reclamation – mechanical, chemical and biological methods. Fertilizer and insecticides and their effect on soil water and air. Irrigations water – Quality of irrigation water and its appraisal. Indian standards for water quality. Use of saline water for agriculture. Soil fertility – Different approaches for soil fertility evaluation. Methods, Soil testing – Chemical methods, critical levels of different nutrients in soil. Plant analysis – DRIS methods, critical levels in plants. Rapid tissue tests. Indicator plants. Biological method of soil fertility evaluation. Soil test based fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers. Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions.

13. **Entomology Insect Morphology and Systematics** History of Entomology in India. Factors for insects abundance. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and moulting. Body segmentation. Structure of Head, thorax and abdomen.

Structure and modifications of insect antennae, mouth parts and legs. Wing venation, modifications and wing coupling apparatus. Structure male and female genetalia. Sensory organs. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive system in insects. Types of reproduction in insects. Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders. Orthoptera, Acrididae. Dictyoptera-Mantidae, Blatidae, Odonata, Isoptera, Termitidae, Thysanoptera, Thripidae, Hemiptera, Pentatomidae, Coreidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Aleurodidae, Pseudococcidae, Neuroptera, Chrysopidae Lepidoptera, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Coleoptera, Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae, Hymenoptera, Tenthridinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Diptera, Cecidomyiidae, Trypetidae, Tachinidae, Agromyziidae.

14. **Insect Ecology and Integrated Pest Management Including Beneficial Insects** Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance. Concepts of Balance of life in nature, biotic potential and environmental resistance and causes for outbreak of pests in agro-ecosystem. Pest surveillance and pest forecasting. Categories of pests. IPM; Introduction, importance, concepts principles and tools of IPM-Host plant resistance, Cultural, Mechanical, Physical, Legislative, Biological (parasites, predators & transgenic plant pathogens such as bacteria, fungi and viruses) methods of control. Chemical control – importance, hazards and limitations. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Study of important insecticides. Botanical insecticides – neem based products, Cyclodiens, Organophosphates, Carbamates, Synthetic pyrethroids, Novel insecticides, Pheromones, Nicotinyl insecticides, Chitin synthesis inhibitors, Phenyl pyrazoles, Avermectins, Macrocyclic lactones, Oxadiazimes, Thiourea derivaties, pyridine azomethines, pyrroles, etc. Nematicides, Rodenticides, Acaricides and fumigants. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation and genetic control. Practices, scope and limitations of IPM. Insecticides Act 1968 – Important provisions. Application techniques of spray fluids. Phytotoxicity of insecticides. Symptoms of poisoning, first aid and antidotes. Beneficial insects: parasites and predators used in pest control and their mass multiplication techniques. Important groups of microorganisms, bacteria, viruses and fungi used in pest control and their mass multiplication techniques. Important species of pollinators, weed killers and scavengers, their importance.

15. **Pests of Field Crops and Stored Grain and their Management** Stored grain pests: Coleopteran and Lepidopteran pests, their biology and damage, preventive and curative methods. Distribution, biology, nature and symptoms of damage, and management strategies of insect and non insect pests of rice, sorghum, maize, ragi (Eleucine coracana), wheat, sugarcane, cotton, sunhemp, pulses, groundnut, castor, gingerly, safflower, sunflower, mustard, cumin, fennel, spinch, amaranthus and tobacco,. Common phytophagous mites, rodents and bird pests.

16. **Principles of Agricultural Economics** Economics: Meaning, Definition, Subject matter, Divisions of Economics, Importance of Economics; Agricultural Economics: Meaning, Definition; Basic Concepts: Goods, Service, Utility, Value, Price, Wealth, Welfare. Wants: Meaning, Characteristics, Classifications of Wants, Importance. Theory of consumption: Law of Diminishing Marginal utility, Meaning, Definition, Assumption, Limitations, Importance. Consumer"s surplus: Meaning, Definition, Importance. Demand: Meaning, Definition, Kinds of Demand, Demand schedule, Demand Curve, Law of Demand, Extension and Contraction Vs Increase and Decrease in Demand. Elasticity of Demand: Types of Elasticity of Demand, Degrees of price elasticity of Demand, Methods of Measuring Elasticity, Factors influencing elasticity of Demand, Importance of Elasticity of Demand. Welfare Economics: Meaning. National Income: Concepts, Measurement. Public Resource: Meaning, Services Tax, Meaning, Classification of Taxes: Cannons of Taxation, Inflation: Meaning, Definition, Kinds of inflation.

17. **Agricultural Marketing, Trade and Prices** Agricultural Marketing: Concepts and Definition, Scope and subject matter, Market and Marketing: Meaning, Definitions, Components of a market, Classification. Market structure, Conduct, performance. Marketing structure, Market functionaries or agencies, Producer"s surplus: Meaning, Types of producers surplus, marketable surplus. Marketed surplus, importance, Factors affecting Marketable surplus. Marketing channels: Meaning, Definition, Channels for different products. Market

integration, Meaning, Definition, Types of Market Integration. Marketing efficiency: Meaning, Definition, Marketing costs, Margins and price spread, Factors affecting the cost of marketing, Reasons for higher marketing costs of farm commodities, Ways of reducing marketing costs. Theories of International Trade: Domestic Trade, Free trade, GATT, WTO. Cooperative Marketing. State Trading. Ware Housing Corporation; Central and State, Objectives, Functions, Advantages. Food Corporation of India: Objectives and Functions. Quality Control, Agricultural Products, AGMARK. Price Characteristics of agricultural product process, Meaning, Need for Agricultural Price Policy. Risk in Marketing: Meaning and importance, Types of Risk in Marketing. Speculations and Hedging, Futures trading, Contract farming National Agricultural Market – e-NAM.

P.C.N.o:04 SCHEME AND SYLLABUS FOR THE POST OF DIVISIONAL ACCOUNTS OFFICER (WORKS) GRADE-II IN A.P. WORKS ACCOUNTS SERVICE

WRITTEN EXAMINATION (OBJECTIVE TYPE)

Written Examination (Objective Type)				
PAPER	**Subject**	**No.of Questions**	**Durations (Minutes)**	**Maximum Marks**
Paper-1	General Studies & Mental Ability (Degree standard)	150	150	150
Paper-2	Arithmetic (SSC standard)	150	150	150
Paper-3	Mensuration (SSC standard)	150	150	150

1. NEGATIVE MARKS: As per G.O. Ms. No.235 Finance (HR-I, Plg & Policy) Dept., Dt.06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.

SYLLABUS FOR WRITTEN EXAMINATION (OBJECTIVE TYPE)

Paper - 1

GENERAL STUDIES& MENTAL ABILITY

(DEGREE STANDARD)

150 Questions **150 Marks**

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation

12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

Paper - 2
ARITHMETIC
(Upto S.S.C. STANDARD)

150 Questions **150 Marks**

1. Number systems – Rational and irrational numbers-decimal representations-real numbers-modulus of a real number – inequalities involving modulus- Prime and composite numbers – least common multiple and greatest common divisor-surds and logarithms.
2. Ratio and proportion-Averages-percentages-profit and loss-Discounts-Simple and compound interests-Partnerships-Time and distance – Time and work-clocks and calendar.
3. Polynomials - special products – factorization - Remainder theorem - Quadratic equations - Algebraic expressions - Binomial theorem for positive integral index.
4. Sets-fundamental operations on sets-Relations and functions-Types of functions-Matrices (utmost of type 3X3) – Matrix addition and multiplication – system of linear Equations in two variables.
5. Statistics – Frequency table - Mean, Median and mode.

Paper - 3
MENSURATION
(Upto S.S.C Standard)

150 Questions **150 Marks**

1. Areas of squares, rectangles, triangles quadrilaterals, parallelogram and trapezium.
2. Geometry of triangles and polygons-identical triangles similarity of triangles-Pythagoras theorem and applications.
3. Surface area and volumes of solids such as Sphere, Cylinder, Cone and Prism.
4. Geometry of Circles-Common tangents to two Circles and their properties-Chords and sectors of circle.
5. Coordinates in two-dimension plane-Distance formula-area of a triangle-Equation of a straight line in different forms-Applications -Trigonometric ratios and their values for special angles-simple trigonometric identities

P.C.No.05 SCHEME AND SYLLABUS FOR THE POST OF TECHNICAL ASSISTANT IN A.P. POLICE (TRANSPORT ORGANIZATION) SERVICE

SCHEME OF THE EXAMINATION

WRITTEN EXAMINATION (OBJECTIVE TYPE) Degree Standard				
PAPER	SUBJECT	No. Of Questions	Duration Minutes	Maximum Marks
Paper – I	General Studies & Mental Ability	150	150	150
Paper - II	Automobile Engineering	150	150	300
			Total	450
NEGATIVE MARKS: As per G.O.Ms. No.235, Finance (HR-I, Plg & Policy) Dept., Dt. 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.				

Syllabus
Paper – I GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology.

4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

Paper – II
AUTOMOBILE ENGINEERING

01. Thermodynamics: systems – Zeroth Law of thermodynamics – First law of thermodynamics – Second Law of thermodynamics – Entropy – Statistical thermodynamics – Air Compressors I.C. Engines cycles and Process – Combustion in I.C. Engines – Engine performance – Scavenging and supercharging of Engines – Modern development in I.C. Engines – I.C. Engine plant layout.

02. Heat Transfer: Conduction Convection – Thermal Radiation – Heat Exchangers.

03. Fluid Mechanics and Machinery: Fluid properties – Dimensional analysis – Fluid static's – Flow past immersed bodies – Centrifugal pumps – Axial flow pumps – Rotary pumps – Reciprocating pumps – Oil Hydraulic systems.

04. Instrumentation: Transducers – Flow measuring transducers – Temperature measurement – Strain gauges – Mechanical measuring devices – Slip gauges – Plug gauge – Micrometers in bars optical flat etc.

05. Automobile chasis & Systems: Chasis layout – Shock absorbers in dependent suspension – torsion bars – gear suspension – wheel balancing – tyres and tubes – constructional details of the engine – Ignition system – Fuel system – Lubrication system – Cooling system – Transmission system – Brakes steering mechanism – Electrical circuits and equipment's – Engine troubles – Air conditioning system – Modern trends in automobiles & Engines.

06. Material Science: Crystallography of metals – Binary alloys – Constitution and equilibrium diagram – methods of studying metal structure – Heat treatment – of steels – Casehardening and surface treatment of steels – Non Ferrous metals and alloys – Creep – Fatigue.

07. Kinematics of Machines: Kinematics – Velocity and Acceleration – Properties of instaneous centre – Gears – Gears trains – Oams – Governors – Brakes and dynamometers – Clutches – Power transmission – Chain drives.

08. Dynamics of Machines: Static force Analysis – Dynamic Force Analysis – Dynamics of Reciprocating Engines – Balancing – Vibration Analysis of Single degree freedom systems – Torsional Vibrations – Vibration isolation.

09. Design of Automobile Machine Parts: Design of welded joints Design of bolts & nuts – Shafts and Axles – Curved beams – Springs – Bearings – clutches – Brakes – Design of connecting rod – Crank shaft fly wheel.

10. Production Technology: Machine tools – Lathes – Shaper, planner and slotting machines – Drilling and boring machine – Milling – Lapping – Tool room – Electro machining – Welding – Brazing – Foundry.

11. Industrial Engineering: Industrial management – personnel function – Production facilities – Production Planning and control – Wages and incentives – Cost Control – Marketing and Sales Promotion.

P.C.N.o: 06 SCHEME AND SYLLABUS FOR THE POST OF *ASSISTANT COMMISSIONER OF ENDOWMENTS IN A.P. CHARITABLE AND HINDU RELIGIOUS INSTITUTIONS AND ENDOWMENT SERVICE*

WRITTEN EXAMINATION (OBJECTIVE TYPE) DEGREE STANDRADED				
PAPER	**SUBJECT**	**No.of Questions**	**Duration**	**Maximum Marks**
Paper - I	GENERAL STUDIES AND MENTAL ABILITY	150 Questions	150 Minutes	150 Marks
Paper - II	**SUBJECT (LAW)** Paper – 1. Hindu Law	150 Questions	150 Minutes	150 Marks
	Paper– 2. Hindu Religious Endowments Act	150 Questions	150 Minutes	150 Marks
			TOTAL	450

N.B: As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt:06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.

SYLLABUS

PAPER-I GENERAL STUDIES AND MENTAL ABILITY

Questions: 150 **Marks: 150**

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

PAPER –II - SUBJECT: LAW

Paper-I (Hindu Law)

Questions: 150 **Marks: 150**

1. ANCIENT HINDU LAW

a) SOURCES OF HINDU LAW: Ancient sources - Sruti, Smrities, Maimansakars, Digests and Commentaries, Custom - Modern Sources - Equity, Justice and Good Conscience, Precedent - Legilsation.

b) SCHOOL OF HINDU LAW: The Mitakshara and the Dayabhaga Schools . Nigration and change of Religion.

c) JOINT HINDU FAMILY: The Mitakshara Joint Family, the Dayabhaga Joint Family - Joint Hindu Family property - Co-pareenary - Alienations - Son's pious obligation to pay Father's debts - Partition - Women's property - Sthereedhana Enumeration of Women's property - Hindu women's right to property Act, Section-14, Hindu Succession Act, 1955.

2. MODERN HINDU LAW

THE HINDU MARRIAGE ACT, 1955: Requisities of Valid Marriage - Ceremonies - Judicial Separation - Restitutions of Conjugal Rights - Divorce - Grounds for judicial separation and divorce - Family Courts - Concept of Family Courts - Jurisdiction of Family Courts - Camera Proceedings and exclusion of Layer.

3. DOWRY

Definition of Dowry, Dowry off-enders - Trail of dowry offences - Dowry prohibition officers.

4. THE HINDU SUCCESSION ACT, 1955

Succession to property of Hindu Male dying intestate - Classification of Heirs - Abolition of Limits Ownership of Hindu Females - Section 14 - Changes made by 1985 A.P . Amendment to Act.

5. THE HINDU MINORITY AND GUARDIAN SHIP ACT 1956

Classification of Guardians - Rights and Duties of Guardians.

6. THE HINDU ADOPTION AND MAINTENANCE ACT 1956

Capacity to Adopt and to be adopted and Rights of Adopted - Effect of Adoption - Relationship of the Adopted child . Maintenance as a Personal Obligation - Maintenance of dependents - Maintenance of Members of Joint familty - Quantum of maintenance - Arrears of Maintenance, Maintenance as Charge Alteration of Maintenance.

7. Endowments in Ancient Hindu Law – and it status

PAPER- II - SUBJECT LAW

PAPER-2: HINDU RELIGIOUS ENDOWMENTS ACT:

Questions: 150 **Marks: 150**

Act, 30/87 which consists of 15 chapters with 162 sections including a separate chapter on Tirumala Tirupati Devasthanams.

P.C.No:07 SCHEME AND SYLLABUS FOR THE POST OF ASSISTANT DIRECTOR OF HORTICULTURE IN AP HORTICULTURE SERVICE

SCHEME OF THE EXAMINATION

WRITTEN EXAMINATION (OBJECTIVE TYPE) Degree Standard				
Paper	**Subject**	**No. Of Questions**	**Duration Minutes**	**Maximum Marks**
Paper - I	General Studies & Mental Ability	150	150	150
Paper - II	Horticulture - I	150	150	150
Paper - III	Horticulture – II	150	150	150
			Total	450
N.B: As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question in all Objective type papers.				

SYLLABUS

PAPER-I: GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology.
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    a) Tabulation of data
    b) Visual representation of data
    c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

PAPER-II HORTICULTURE-I

1. FRUIT CROPS

Area, production, importance, uses, origin, distribution, botany, classification of varieties, use of rootstocks, high density planting, climate, soils, planting methods, training and pruning, nutrition, bahar treatment, irrigation scheduling, intercrops, weed control, problems in orchard management, flowering, fruit set, seedlessness irregular bearing, problems in fruit set, harvesting indices, harvesting, preharvest treatments, use of growth regulators, yield, grading, packing for internal and export markets, ripening methods and storage in respect of mango, banana, citrus, grape, pineapple, guava, papaya and sapota. Physiological disorders in fruit crops.

2. VEGETABLE CROPS

Importance of vegetables in human diet and national economy. Detailed study regarding origin and distribution, area and production, importance, nutritive value, botany, varieties, soil and climatic requirements, seed treatment, seed sowing/nursery raising, transplanting, nutrition, irrigation, intercultural operations, physiological

disorders, harvest indices, harvesting, post harvest handling, curing, storage and usage of plant growth regulators in vegetable crops like tomato, brinjal, chillies, sweet pepper, potato, okra, cucurbitaceous crops like cucumber, pumpkin, ridge gourd, snake gourd, bitter gourd, bottle gourd, melons like water melon and must melon, leguminous vegetables like cluster bean, French bean, dolichos bean, pea and broad bean, cole crops like cabbage, cauliflower and knolkhol, root crops like radish, carrot, beetroot and turnip, bulb crops like onion and garlic, tuber crops like sweet potato, tapioca, amorphophallus, colacasia, dioscorea and yam, leafy vegetables like amaranthus, palak, Roselle, perennial vegetables like drumstick, coccinia and murraya.

3. COMMERCIAL FLORICULTURE, ORNAMENTAL GARDENING AND LANDSCAPE ARCHITECTURE

Area, production, importance, uses, origin, distribution, classification of varieties, propagation, environmental factors affecting growth and flowering, soils, nutrition, irrigation, weeding, special techniques of production such as controlling growth and production of flowers, use of growth regulators, harvesting, postharvest handling, extension of shelf life of flowers of commercial flower crops such as rose, chrysanthemum, jasmine, carnations, gladiolus, anthurium, tuberose, china aster, marigold, crossandra and gerbera.

Need for bioaesthetic planning, places suitable for bioaesthetic planning-towns, cities, villages, schools, temples, road side, parks, ghats of rivers and canals, platforms, railway lines, public and private buildings, institutes and places of worship. Ornamental trees, shrubs climbers, cacti, succulents used in bioaesthetic or landscape gardening. Principles of garden designs, types of gardens-japanese, English and Moghul gardens. Various features of gardens such as paths, garden walls, fencing, steps, edges, hedges, arches, pergolas, shrubbery, topiary, rockery, flower beds, lawns, fountains, statues, water garden, conservatory and glass or greenhouse. Indoor plants, and their management.

Flower arrangement – principles, styles, containers and holding solutions.

Bonsai – culture and art of making.

4. MEDICINAL, AROMATIC, SPICES, CONDIMENT AND PLANTATION CROPS

Origin, importance, export potential, varieties, climate, soil requirements, propagation and planting and after care, mulching, irrigation, training, pruning, harvesting, yield and post harvest handling, curing and processing practices, storage methods, and distillation of essential oils of the following crops.

Medicinal Plants
Aloe, amla(aonla), stevia, ashwagandha, dioscorea, opium poppy, sarpagandha, steroids bearing *solanum, Phyllanthus amarus, chakramani, madhunasaini, sweet flag, Catharanthus, roseus, isabgol, fox glove, belladona, senna, tinospora, annatto, coleus, safed musli and asparagus.*

Aromatic Crops
Citronella, lemon grass, palmarosa, vettiver, geranium, davana, mints, lavender and vanilla.

Spices and condiments
Turmeric, ginger, coriander, fenugreek, cardamom, pepper, cinnamon, clove, nutmeg and cumin.

Plantation Crops
Coconut, cashewnut, oil palm, betelvine, coffee, tea, cacao, arecanut and rubber.

5. DRYLAND HORTICULTURE AND WATERSHED MANAGEMENT

Dryland horticulture farming, introduction, definition, dry climate and their classifications with reference to India in general and Andhra Pradesh in particular. Importance of horticultural crops in dryland, yield potential of agriculture and horticultural crops in drylands. Fruits and vegetables crops suitable for dryland farming. Adaptive features of dryland fruit crops for drought and salinity.

Watershed management, objectives, approaches, steps in watershed development planning, land use capability, classification, soil and rain water conservation, water harvesting measures in watershed area. Problems and prospects under water shed. Alternate water use system.

Cultural practices like planting, training, pruning, nutrition and water management and harvesting of important dry land fruits viz., ber, pomegranate, custard apple, phalsa, fig, aonla, jamun and tamarind.

6. Post Harvest Management of Horticultural Crops

Importance of post harvest technology in Horticultural crops. Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and biochemical changes, hardening and delaying ripening process. Post harvest treatments of horticultural crops. Quality parameters and specifications. Structure of fruits, vegetables and cut flowers related to physiological changes after harvest. Methods of storage for local market and export, packaging methods and types of packages, recent advances in packaging. Types of containers and cushioning materials, vacuum packaging, cold storage, poly shrink packaging, grape guard packing treatments. Modes of transport.

7. PRESERVATION OF FRUITS AND VEGETABLES

Importance and scope of fruit and vegetable preservation in India. Principles of preservation by heat, low temperature, chemicals and various methods of preservation Selection of site for processing, processing unit layout and precautions for hygienic conditions of the unit. Preservation of fruits and vegetables through canning, bottling, freezing, dehydration, drying, suger, chemicals, salts, vinegar, ultraviolet and ionizing radiations.

Micro-organisms associated with spoilage of fruit and vegetable products. Spoilage of canned products-hydrogen swell, flipper, dent, leaker etc., Biochemical changes associated with spoilage of fruit and vegetable products. Preservatives and colours permitted and prohibited in India.

8. FARM POWER AND MACHINERY;

Farm power in A.P and India – Sources, I.C engines, classification, Tractors – Types and uses, selection of tractor and cost of tractor power. Electric motors – types,

Tillage implements – primary secondary tillage drawn implements. Seed cum fertilizer drills, planters. Grafting and pruning tools and equipment. Implements, tools and equipment for intercultural operations. Plants protection equipment – harvesting equipment – soil conservation equipment.

Different kinds of equipments used in processing. Preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits, preserves, chutneys, pickles, ketchup, sauce, puree, syrups, juices, squashes and cordials.

Government policy on import and export of processed fruits, food laws. Quality control of processed products.

9. GREENHOUSE MANAGEMENT OF HORTICULTURAL CROPS

Importance, uses, scope and production of horticultural crops in greenhouse. Status and development of greenhouse production of horticultural crops in the world and India. Development, constraints, research needs and future of protected culture of horticultural crops in India and A.P. Points to be considered before establishing a greenhouse. Types of greenhouses, classification of greenhouses based on the shapes, material used, utility and cladding material used. Size and arrangement of greenhouses and characteristics of various greenhouse cladding materials, greenhouse benches etc.,

Management of light, temperature (greenhouse heating and cooling), CO_2 and relative humidity inside the greenhouse.

Various types of growing media used and their suitability for different horticultural crops. Preparation of growing media and its pasteurization. Management of nutrients through fertigation.

Detailed production technology in respect of tomato, cucumber, rose, carnation, gerbera, chrysanthemum and anthurium under greenhouse/polyhouse.

PAPER-III HORTICULTURE-II

1. FUNDAMENTALS OF HORTICULTURE :

Definition, importance of horticulture in terms of economy, production, and employment generation. Nutritional value of horticultural crops. Divisions of horticulture and their importance. Horticultural stations in Andhra Pradesh. Horticultural zones of India and Andhra Pradesh.

Temperature, light, humidity, rainfall and soil requirements for horticultural crops. Selection of site for establishing an orchard, orchard plan, systems of planting and establishment of an orchard. Importance, scope and practicing of organic farming in horticultural crop production. Soil and climate for horticultural crops. Vegetable gardens – nutrition and kitchen gardens and other types of gardens.

Nutrition of horticultural crops – assessment of nutritional requirements based on soil, tissue analysis, and field experiments. Identification of deficiency symptoms of various nutrients and methods of nutrient application. Assessment of irrigation requirements for different horticultural crops and different methods of irrigation. Pruning and training, their objectives and methods. Pollination and fruit set, problems and requirements, flower and fruit drop, stages, causes and remedial measures. Fruit thinning, objectives, advantages and disadvantages. Unfruitfulness, reasons and remedial measures. Use of growth regulators in horticulture. Cropping systems, intercropping, multi-tier cropping, mulching, bearing habits, factors influencing the

fruitfulness and unfruitfulness. Rejuvenation of old orchards, top working, frame working.

2. PLANT PROPAGATION AND NURSERY MANAGEMENT :

Introduction, principles and classification of plant propagation methods. Selection of site for commercial nursery. Ecological and economic factors. Plant propagation structures, containers and media.

Sexual propagation and its importance. Seed dormancy, Seed germination, process of seed germination. Factors affecting seed germination and pre-germination treatments and viability tests.

Asexual (vegetative) propagation and it's importance. Various methods of Asexual (vegetative) propagation like cuttage, layerage, budding, grafting and factors responsible for their success. Different types among cuttage, layerage, budding, grafting methods followed in propagation of different horticultural crops. Role of root stocks, selection and maintenance of mother trees (scion bank), scion – stock relationships, bud wood certification, propagation through specialized structures. Nursery registration act.

Importance of micro propagation of plants. Types of asceptic cultures. Types of media, preparation of media and inoculation of explants, establishment, sub culture and rooting of explants.

3. PLANT PHYSIOLOGY :

Physiological changes during seed development, germination and seed dormancy. Seed viability and seed vigour. Photosynthesis – importance, factors affecting photosynthesis. Light and dark reactions – C3, C4 and CAM pathways. Significance and differences. Photo-respiration and its significance. Respiration and its significance.

Nomenclature and classification of plant growth substances. History, occurrence, distribution, mode of action, movement, mechanism and function of auxins, gibberellins, cytokinins, ethylene, inhibitors, retardants, phenolic substances and morphactins.

Role of plant growth regulators in plant propagation, seed and bud dormancy, juvenility, maturity and senescence, flowering, pollination, fruitset including parthenocarpy, fruit growth, fruit drop and fruit ripening (climacteric and non-climacteric) and fruit colour development, tuber and bulb formation and sex expression and extension of shelf life in fruits, vegetables and flowers.

4. ENTOMOLOGY :

Commonly occurring pests in horticultural crops – distribution, host range, nature of damage, symptoms and control measures. Life cycle of insect pests, nematodes etc., Integrated pest management.

5. PATHOLOGY :

Commonly occurring diseases in horticultural crops – host range, etiology, symptoms and control measures. Life cycle of bacteria, fungal parasites, viruses etc., Integrated disease management.

6. SOIL SCIENCE:

Soil texture – classes. Soil structure – classification. Soil PH, importance of soil PH on nutrient availability. Soil organic matter – sources, humus formation, C:N ratio and its importance.

Soil fertility and productivity. Essential and beneficial elements, criteria of essentiality. Primary secondary, micronutrients and their functions, deficiency symptoms, occurrence in horticultural crops, corrective measures. Factors affecting their availability.

Classification of manures and fertilizers and their differences. Commercial fertilizers, simple, compound and complex fertilizers, fertilizers mixtures. Biofertilizers. Integrated nutrient management for horticultural crops. Fertilizer control order.

7. INTRODUCTORY AGROFORESTRY :

Agro forestry-introduction, status of Indian forests, role in Indian Farming Systems. Definition-Branches of Forestry. Principles and practices, classification of Agro forestry systems-inter cropping-Home garden-Types of coconut based cropping system-planning for Agro foresty-constraints, diagnosis and design methodology, selection of tree species for agro forestry. Agro forestry projects-national, overseas, MPTs – their management practices economics of cultivation – Sisso, Acacia catechu, A.nilotica (Babul),Bez(Z. mauritiana). Grewia, Subabul, Tamarind, Eucalyptus, Teak, Casuarina, Red sander, Neem, Soapnut, Aonla, Morus, Bamboo, bio diesel trees-Jatropha, Pongamia, Simarouba. Distinction between agro forestry and social forestry-objectives, scope of social forestry. Hortipastoral system – pastures suitable under dry land condition.

8. EXTENSION EDUCATION:

Formal and informal education. Teaching – learning process, principles of learning. Commutation – components. Classification of Audio – visual aids.

Transfer of technology programmers – KVK, TAR - IVLP, ATIC, NHM, APMIP, DWCRA, ANTWA, DAATC. Extension reforms – ATMA, SREP, PRA, different tools of PRA.

9. ORGANIC FARMING IN HORTICULTURAL CROPS :

Introduction, concept, relevance in present context, Organic production requirements, Biological intensive nutrient management-Organic manures, vermicomposting, green manuring, compost pits, recycling of organic residues, bio-fertilizers, soil improvement and amendments: Integrated diseases and pest management use of biocontrol agents, biopesticides, pheromones, trap crops bird perches, weed management. Quality considerations, certification, labelling and accreditation processors, marketing, exports. International and National Policies in promotion of Organic farming.

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