

Madhya Pradesh Professional Examination Board
SYLLABUS

Subject- AGRICULTURE
Standard- Graduation

Max Marks-100

1. Agro- climate zones and geographical distribution of major field crop.
2. Major field crops of M.P and India cereals, pulses, sugarcane, fiber and forage crops and their package of practices; different cropping system ; mixed cropping and inter cultivation.
3. Soil structure classification, soil aggregates (mineral & organic components) their significance in crop production; soil types of M.P; physical chemical and microbiological properties of soil; essential and beneficial elements of soil their functions and deficiency symptoms.
4. Types of fertilizers ; organic manures; integrated nutrient management; causes and reclamation of acid, salt affected calcareous soils.
5. Land and water management; method of irrigation; Types, causes and control of soil erosion; rain water harvesting ; watershed management principles of rainfed farming.
6. Organic farming - importance, relevance and methods.
7. Preparation of compost, NADP, vermicompost,

B. AGRICULTURAL ECONOMICS AND EXTENSION;

1. Definition and importance of Agriculture economics; farm planning ; its meaning and importance; farm management factors affecting farm production ; agricultural marketing system in M.P meaning and need for agricultural price policy.
2. Objectives and principles of agricultural extension; extension network at block, district and state level, its structure and responsibilities of extension workers; meaning importance and method of communication role of farmers' group in extension

C. PLANT PROTECTION:

1. Different insect pests, diseases and weeds of major field crops and their management; principles of crop protection; integrated pest and disease management; classification of pesticides and their use.
2. Importance and method of seed treatment.

D. PLANT PHYSIOLOGY & PLANT BREEDING:

1. Crop physiology and its importance in agriculture; mechanism of mineral salt absorption, transportation and metabolism; photosynthesis and respiration; growth and development; types of plant growth regulators with their commercial use in agriculture.
2. Importance of plant breeding and genetics in crop improvement; development of hybrid & composite varieties of major field crops; methods of seed production, objectives and principles of seed production : seed act

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Subject-AGRICULTURE ENGINEERING
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Max Marks-100

Surveying and Levelling : Objectives and principles of surveying ; Methods of Surveying, contour and contour survey; Levelling : Dumpy level and its use.

Farm machines and equipment- Field preparation implements, sowing machines, inter culture and plant protection equipment, threshers and winnowers, maintenance of farm implements and machine. Internal combustion Engines. Operation and maintenance of Tractors.

Soil erosion and its control. Water harvesting techniques: pond percolation tanks farm pond- objectives and designing; calculation of raw material (cement, sand, gravels) used to construct irrigation and water storage structures.

Irrigation : Methods of Irrigation: Surface and pressurized methods, Irrigation Pumps

Rainfall measurement. Runoff and its estimation Peak rate of runoff.

Watershed :- Concepts and characteristics. Watershed planning and management.



Subject-FORESTRY
Standard- Graduation

Max Marks-100

1. SILVICULTURE & AGROFORESTRY

Silviculture, climatic factors, Edaphic factors, . Biotic factors, Plant succession, Forest types of India. Regeneration methods, silvicultural systems of broad leaved species. Classification of agroforestry system -architecture, canopy management, Nutrient cycling, site selection, planting methods, Plantation maintenance, Thinning , Energy and industrial plantation. silvicultural systems, Tending operations, Types of nursery, Methods of seed sowing ,Vegetative propagation techniques. Forests and their classification in different regions of the world, Crown measurements, Volume estimation ,Tree growth measurements, Environmental pollution, Air, water, food, soil, noise pollution, control of pollution, Production and practices for fruit, vegetable and floriculture crops,

2. FOREST BIOLOGY AND TREE IMPROVEMENT

Ecosystem- classification distribution, Biodiversity and conservation, classification of plants, Study of families, Reproduction in forest trees, genetic advance, Plus tree selection, hybridization, Seed Collection, Seed testing, seed dormancy, wildlife conservation, wildlife in India, Wildlife ecology, characteristics of fungi, bacteria, viruses. Diseases of important tree. wildlife management ,Habitat management, Wildlife census, Reproduction in insects, Methods and principles of pest control

3. FOREST PRODUCTS AND UTILIZATION

sapwood, Physical properties of wood, Abnormalities in wood, logging operation, Means of transport, Marking of trees for logging operation, Pulp and paper industry, Composite wood-plywood, physical features of wood, Wood seasoning, Wood working, tools, Important plants and their folk uses, (NTPF), Fodder, bamboos, Gums and resins, Katha , Drugs, wild fruits, harvesting and processing of Medicinal Plants, aromatic plants of India

4. NATURAL RESOURCE MANAGEMENT

Wasteland Management, Afforestation and forest management in wasteland, Aerial photography, Photogrammetry, Remote sensing, classification-soil , Problem soils, Characteristics of rangelands, rangeland management, grazing, Carrying capacity, Fire, Yield regulation , Forest Policy , National Forest Policies, Indian Forest Act. Evaporation and transpiration, Agriculture weather forecasting, Forest business Management, Agro forest based and forest based industries , Marketing Management, Classification of market, Marketing channels, WTO, IPRS, economic analysis of forestry production, project planning, Valuation of timber. Essential nutrient elements, Nitrogen fixation Mycorrhizae, Engineering survey, chain surveying and instruments for surveying, Forest roads , concept, Soil improvement and amendments

5. BASIC SCIENCES AND HUMANITIES


Carbohydrates-occurrence , Protein, Enzyme, tissue culture , Micropropagation, heredity, Chromosome theory of inheritance, Concept of entrepreneurship, Export and Import Policies, Tests of Significance, Correlation, Experimental Designs. absorption of water, Photosynthesis, Respiration, ascent of sap, canopy architecture; Source sink relationship in plants. Theory of consumption, Factors of production, Law of diminishing return, Tribal Economy, Demography, Tribal Law and Justice, Socio-cultural ,(TARP) , Audio - visual aids, (PRA) ,(HRD), Morphology , Structure and types of plant tissues, Importance of plants

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Subject-HORTICULTURE
Standard- Graduation

Max Marks-100

1. Principles of Landscape Gardening
2. Fundamentals of Horticulture Economic importance and classification of horticultural crops, Production and practices for fruit, vegetable and floriculture crops, nursery techniques and their management.
3. Tropical and Sub-Tropical Fruits Horticultural classification of fruits including genome classification, Horticultural zones of India, Physiological disorders. Post-harvest technology, Production problems, Rainfed horticulture, importance and scope of arid and semi-arid zones of India.
4. Tropical and Sub-Tropical Vegetables Area, production, economic importance and export potential of tropical and sub-tropical vegetable crops. Description of varieties and hybrid, climate and soil requirements, seed rate, preparation of field; nursery practices; transplanting of vegetable crops and planting for directly sown/transplanted vegetable crops.
5. Water Management in Horticultural Crops Importance of water, water resources in India, Available and unavailable soil moisture, Water requirement of horticultural crops – lysimeter studies, sprinkler and drip irrigation, their suitability, merits and limitations, fertigation, economic use of irrigation water.
6. Plant Propagation and Nursery Management Propagation: Need and potentialities for plant multiplication, sexual and asexual methods of propagation.
7. Growth and Development of Horticultural Crops Growth and development, canopy development, Plant bioregulators- auxin, gibberellin, cytokinin, ethylene inhibitors and retardants, Flowering-factors.
8. Temperate Vegetables Importance of cool season vegetable crops in nutrition and national economy. Area, production, export potential, description of varieties and hybrids, origin, climate and soil, production technologies, seed production, post-harvest technology.
9. Nematode Pests of Horticultural Crops and their Management History of development of nematology - definition, economic importance, Role of nematodes in plant disease complex.
10. Diseases of Fruits, Plantation and Medicinal and Aromatic Crops: Etiology, symptoms, mode of spread, epidemiology and integrated management of the diseases of fruits, plantation, medicinal and aromatic crops viz mango, banana, grape, citrus, guava, sapota etc.
11. Temperate Fruits Classification of temperate fruits, detailed study of areas, production, varieties, climate and soil requirements, propagation, planting density, cropping systems etc.
12. Weed Management in Horticultural Crops Weeds: Introduction, harmful and beneficial effects, classification, propagation and dissemination; Concepts of weed prevention, control and eradication.
13. Commercial Floriculture Scope and importance of commercial floriculture in India, production techniques of ornamental plants.
14. Spices and Condiments History, scope and importance, area and production, uses, export potential and role in national economy.



12-Jun-13

15. Ornamental Horticulture History, scope of gardening, aesthetic values, Gardens in India, types of gardens, Landscaping, historical background, definition, Floriculture industry, Landscaping.
16. Plantation Crops History and development, scope and importance, area and production.
17. Breeding of Fruit and Plantation Crops Fruit breeding, breeding strategies, clonal selection, bud mutations, mutagenesis.
18. Orchard Management Orchard management, importance, objectives, merits and demerits, clean cultivation, sod culture, Sod mulch, herbicides and inorganic and organic mulches.
19. Insect Pests of Fruit, Plantation, Medicinal and Aromatic Crops General economic classification of insects; ecology and insect-pest management with reference to fruit, plantation, medicinal and aromatic crops; pest surveillance.
20. Medicinal and Aromatic Crops History, scope, opportunities and constraints in the cultivation and maintenance of medicinal and aromatic plants in India.
21. Breeding of Vegetable, Tuber and Spice Crops Centers of origin, plant bio-diversity and its conservation, Models of reproduction, pollination systems and genetics of important vegetable, tuber and spice crops.
22. Diseases of Vegetable, Ornamental and Spice Crops Etiology, symptoms, mode of spread, epidemiology and integrated management of diseases.
23. Potato and Tuber Crops Origin, area, production, economic importance and export potential of potato and tropical, sub-tropical and temperate tuber crops; description of varieties and hybrids.
24. Insect Pests of Vegetable, Ornamental and Spice Crops Economic importance of insects in vegetable, ornamental and spice crops -ecology and pest management with reference to these crops.
25. 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 treatment and precooling, pre-storage treatments. Different systems of storage, 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.
26. Seed Production of Vegetable, Tuber and Spice Crops Introduction and history of seed industry in India, Principles of vegetable seed production, Methods of seed production of cole crops, root vegetables, solanaceous vegetables, cucurbits, leafy vegetables, bulb crops, leguminous vegetables and exotic vegetables, Seed legislation.
27. Breeding and Seed Production of Ornamental Crops History of improvements of ornamental plants, objectives and techniques in ornamental plant breeding, Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental plants. Breeding for disease resistance.
28. Processing of Horticultural Crops Importance and scope of fruit and vegetable preservation industry in India, food pipe line, losses in post-harvest operations, unit operations in food processing.



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Madhya Pradesh Professional Examination Board
SYLLABUS

Subject-CIVIL ENGINEERING
Standard- Graduation

Max Marks-100

1. Structural Analysis Determinate and Indeterminate Structures, Degrees of Freedom. Static and Kinematic indeterminacy, Principle of Superposition, Virtual Work, Energy theorem, Deflection of Trusses, Redundant Frames. Analysis of Determinate and Indeterminate Arches, their influence lines. Rolling loads, influence lines for Determinate Beams and Pin-jointed Frames. Mullar Breslau's Principle and influence lines for Indeterminate Beams and Frames. Slope Deflection, Moment Distribution and Kani's methods. Column Analogy, Energy Methods for analysis of indeterminate beams and frames. approximate methods for analysis of Rigid Frames. Matrix Methods of analysis, Stiffness and Flexibility Matrices of Beams. Frames & Trusses, Elements of Plastic analysis.

2. Structural Design (1) Steel Design Factors of Safety and Load Factors. Rivetted and Welded connections of Members, Design of Tension, Compression and Flexural members, built-up beams and Plate Girder Slab and Guesstetted Bases for Columns, Design of Roof Trusses. Purling and Coverings, Structural Steel tubes and their connections Industrial and Multi-Storyed Buildings Water tank and supporting tower's design. Plastic Design of Continuous Beams & Frames. (2) R.C. Design Working Stress and Limit State methods for design of Rectangular, T and L Beams, Slabs and Columns. Isolated and Combined footings, Raft Foundations. Overhead, Resting on ground and Underground Water Tanks. Design of Bunkers and Silos. Methods and Systems of Prestressing, Anchorages. Losses in Prestress, Design of Prestressed Concrete Beams.

3 Construction Planning and Management Detailed estimates, specifications, analysis and rates of various works in civil engineering . Construction activity , work break down structures , scheduling through CPM and PERT analysis , cost optimization through network construction, Float times, Bar charts , Project control and supervision , cost reduction measures, Cost analysis and resource allocation , Fundamentals of engineering economics , methods of appraisal , present work, annual costs , benefit cost analysis, Types of tenders and contract conditions .

4. Environmental Engineering Water Demand – Per capita Demand, Population Estimation methods Water Quality Criteria for various uses viz. Domestic & Non-Domestic, Irrigation effects & significance of important parameters and permissible concentration as per relevant standards. Transmission of Water- relative merits & demerits of various pipes viz C.I. G.I. Mild Steel. A.C. Pressure Pipes. Corrosion of Pipes- types & Methods of control System of distribution & layouts of distribution. Unit Processes & Operations for Water Treatment viz, Objectives and Design criteria of Sedimentation, Coagulation, Flocculation, Chemical Sedimentation. Filtration (slow sand & rapid sand), Disinfection, Softening. Quantity & Characterization of Domestic Sewage-significance of B.O.D., C.O.D., D.O. ,Solids. T.O.C. , N.O.D. Effluent Standards, River Standards. Sewage System-Design of Sewer & Storm Sewer, Sewage Pumps. Design of Screens, Grit Chamber. Design of Primary Sedimentation tank. Design of Biological Treatment Units viz Trickling filters, Activated Sludge Treatment and Secondary Sedimentation tank. Waste Stabilization Ponds- Aerobic, Anaerobic & Facultative Ponds, design criteria and principles. Sludge Treatment- Digestion & Sludge Disposal. Septic Tanks-design criteria & working Self Purification of Streams- oxygen sag Curve. Types of Pollution-Sources & effects of various pollution viz., Water, Air, Land & Noise, Relevant standards. Rural Sanitation, Solid Waste- collection & disposal.

5. Water Resources Engineering Water Resources in the Globe, Available Fresh Water. Need for Optimum use of Available water, Schemes for Drinking, Irrigation, Hydro Power, Multipurpose Schemes. Irrigation - Necessity, Scope, Benefits & Effects. Methods & Systems of Irrigation, their efficiencies. Water Distribuon & Scheduling techniques. Crop Water Requirements, Evapotranspiration, Consumptive Use, Duty, Delta, Base Period their relation, Crop Rotation, Quality of Irrigation Water. Hydrology - Hydrological Cycle, Precipitation - Types, Measurement, Gaingauge Network, Analysis of Precipitation Data, Dependability Analysis, Unit Hydrograph, Summation & Synthetic Hydrographs, Design Flood by UH & Frequency Studies. Ground Water - Class & Availability of Soil Moisture. Aquifers- Confined & Unconfined. Open & Tube Wells, Radial Flow in Wells, Deput's Theory. Darey's Law, Seepage Analysis using Flow Nets. Yield of Wells, determination. Storage Scheme - Reservoir Planning, Capacity, Yield, Life. Gravity & Earthen Dams. Forces Acing, Modes of Failure, Stability Criteria, Design. Galleries. Shafts. Joints in Gravity Dams. Foundation Treatment. Spillways, Types, Design of Ogee & Syphon Spillways. Energy Dissipating Devices, Design of Stilling Basins. Diversion Schemes - Structures on Pervious Formations, Bligh's & Khosla's Theory, Hydraulic Jump, Design of Vertical Drop Weir & Barrage. Distribution System - Canals - Classification, Layout, Alignment, Capacity, Design of Canals. Silt Theories, Canal Regulation Structures. Design of Head & Cross Regulators, Canal Falls, Cross Drainage Works, and Outlets, Escapes. Water Logging - Causes, Effects, Remedial Measures, Losses in Canals, Canal Lining, Types. Advantages, Conjunctive use of Surface & Ground Water. River Training - Objective & Methods, Concepts of Hydro Power Projects..

6. Transportation Engineering - Permanent Way, Sleepers, Rail Fastenings, Ballast, Points and Crossings, different types of Turn Outs. Stations and Yards, Turn Tables, Signals and Interlocking, Level Crossing. Maintenance of Track, Super-elevation, Creep of Rails, Ruling Gradients, Track Resistance. Tractive Efforts, Curve Resistance . Highways & Airports - Principles of Highway Planning, Highway Alignments. Geometrical design, Cross-section. Camber, Super-elevation. Horizontal and Vertical curves. Classification of Roads. Design and Construction of Flexible and Rigid pavements for Highway and Airfields. Evaluation of Pavement Failure and Strengthening, Drainage of Roads. Traffic Engineering : Traffic Surveys, Highway Capacity, Intersections, Rotary Design Elements, Signs, Signals and Markings. Selection of Airport Sites, Windrose Diagram & Runway Orientation. Runway and Taxiway Geometric and Lighting. Bridge Engineering - Selection of Site, Design Data collection, Hydraulic Design, Scour Depth for Bridge Foundation, Economic Span. Type of Road and Railway Bridges, Design Loads and Forces, Impact Factor, Indian Loading Standards. Super Structure & Sub Structure, Abutments, Piers, Wing Walls, Return Approaches. 3. Geotechnical Engineering Index Properties of Soil, Classification of Soils. Clay Minerals. Capillary Water, Permeability, Factors Affecting Permeability, Lab and field methods. Permeability of stratified soil deposits. Seepage Pressure, Quick Sand Condition, Flow Net, its properties & uses. Stess distributioin in soils, Boussinesq's theory. Newmark's Chart. Consolidation and Settlement : Terzaghi's theory, Consolidation test. Settlement computation. Time Settlement cureve. Compaction tests & their significance, factors affecting compaction. Shear Strength Parameters, Shear Tests, Mohr Coulomb's failure theory, Skempton's Pore Pressure coefficients. Earth Pressure at rest, Active and Passive Pressures, Rankine's and Coulomb's theory. Bearing capacity, Terzaghi's analysis, factors affecting Bearing Capacity, Plate Load Test. Stability of Slopes, Sweedish Slip Circle method and Bishop's simplified method. Stability Number. Sub-surface exploration. Methods, sampling, SPT, DCPT

and Static Cone Penetration Test, Electrical Resistivity and Seismic method. Essential features of Foundation , types, design criteria, Rafts. Pile Foundation, Types of Piles, Pile Capacity, Pile Load Test. Group Action. Static/Dynamic formulae. Elements of Machine Foundation, Natural frequency, Amplification and Resonance. Ground Improvement Techniques, Sand Drains, Soil Stabilization, Geotextiles.



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Madhya Pradesh Professional Examination Board
SYLLABUS

Subject-MECHANICAL
Standard- Diploma

Max Marks-100

INTERNAL COMBUSTION ENGINES: Introduction, classification I.C. Engine Components and their function, working of two stroke and four-stroke cycle engines and their comparison. Indicator diagram, Calculation of IHP, BHP, thermal efficiency, Mechanical efficiency and relative efficiency, Governing, Cooling and lubrication of I.C. Engines.

HEAT TRANSFER: Modes of heat transfer: Conduction convection and Radiation. Fourier's law of heat conduction, temperature gradient, expression for determination of heat transfer across a flat plate, thermal conductivity and thermal resistance. Newton's law for heat transfer by convection, free and forced convection. Heat transfer by radiation Stefan-Boltzmann Law of thermal radiation. Define the terms- absorptivity, reflectivity and transmissivity, black body, emissive power, grey body. Heat exchanger; Shell and tube, Plate type and their applications

Thermodynamic principles of I.C. engines, I.C. engine cycles, engine components, fuels and combustion, lubricants and their properties, I.C. engine systems - fuel, cooling, lubrication, ignition, electrical, intake and exhaust, selection, operation, maintenance and repair of I.C. engines, power efficiencies and measurement, calculation of power, torque, fuel consumption, heat load and power losses.

Soil tillage, forces acting on a tillage tool, hitch systems and hitching of tillage implements, mechanics of animal traction, functional requirements, principles of working, construction and operation of manual, animal and power operated equipment for tillage, sowing, planting, fertilizer application, inter-cultivation, spraying, mowing, chaff cutting, harvesting, threshing and transport, testing of agricultural machinery and equipment, calculation of performance parameters, field capacity, efficiency, application rate and losses, cost analysis of implements and tractors

Tractors and power tillers - type, selection, maintenance and repair, tractor clutches and brakes, power transmission systems - gear trains, differential, final drives and power take-off, mechanics of tractor chassis, traction theory, three point hitches, free link and restrained link operations, mechanical steering and hydraulic control systems used in tractors, human engineering and safety in tractor design, tractor tests and performance

Terraces and bunds, vegetative waterways, gully control structures, drop, drop inlet and chute spillways, earthen dams, water harvesting structures, farm ponds, watershed management

Water requirement of crops, irrigation scheduling, irrigation efficiencies, design of irrigation channels, surface, sprinkler and drip methods of irrigation, design and evaluation of irrigation methods.

Classification of pumps; pump characteristics; pump selection and installation.

Cleaning and grading; Effectiveness of grain cleaners.

Controlled and modified atmosphere storage, Perishable food storage, godowns, bins and grain silos.