

**SYLLABUS FOR THE INDIAN FOREST SERVICE PROBATIONERS
FINAL EXAMINATION**

ELEMENTARY BIOLOGY

Theory:

Botany:

Morphology–classification of plant kingdom; parts of an angiospermic plant, the seed, germination, root, stem - their functions and modification; the leaf, inflorescence, flower and fruit. Histology - the cell, the tissues, cell division, histology of stems, root and leaf. Secondary growth, Physiology– absorption, and conduction of water and mineral salts, metabolism–photosynthesis, respiration, nitrogen fixation and reproduction. Tree Genetics–genetics and its application to plant improvement.

Zoology:

Classification of animal kingdom–economic importance and distinguishing features of different classes.

Practical: Laboratory work and excursions.

ELEMENTARY MATHEMATICS

Fundamentals of algebra, arithmetic, geometry, trigonometry, Mensuration, use of logarithms–graphs and introductory calculus.

STATISTICS

Role of statistics and definitions, Organization of data and its representation, Measures of central tendency, Measures of dispersion, Frequency distributions. Regression and Correlation. Simple examples of fitting of curves–least square method, Analysis of variance, Statistical inference–estimation and testing of hypothesis, Enumeration and sampling.

ECONOMICS

Basic concepts of economics, Features of traditional and modern economy, Micro and macro–economics, Forestry sector, relevance of economics to forestry, The law of scarcity, society's production possibility frontier and its uses, national income and product, Concept of demand, utility, supply, price and related laws, Factors affecting supply of forest products, production theory as applied to forestry; production function, marginal physical product theory of a single firm. Market–main features, different forms, types of competition, cost and revenue, various concepts, cost of production, marginal cost and marginal revenue, Determination of rent, interest and wages.

FOREST ECOLOGY

Basic principles and concepts, forest ecology and Silviculture, Ecological succession, plant formations, classification and ordination of communities, Ecological/environmental/site factors, Effect of vegetation/forests on environment, Measurement of environmental factors, Pollution, Autecology, ecological adaptations and population ecology.

The ecosystem: The concept, components and its functions. Forest ecosystems, production ecology/forest productivity: concept, phytogeographical and zoogeographical ecology: salient features of Indian flora and fauna, regions of the world/India. Classification of Indian vegetation. Eco–botanical regions of India. Classification of forest types with emphasis on Champion and Seth's classification.

GEOLOGY AND SOIL SCIENCE

Geology theory:

Topography and geomorphology as related to the forest. Rocks, minerals and fossils. Geological structures and their topographic expressions. Phytogeology in Indian context. Mineral constituents of various rocks and their effect on soil properties. Parent materials leading to different types of soils.

Soil Science Theory:

Physicochemical and biological properties of forest soil, classification and survey of forest soils. Improvement of problem soils.

Practicals

Geology–Identification of important rocks, minerals and fossils, simple geological maps and their reading.

Soil Science–Analysis in laboratory, study and description of forest soil profile. Collection of soils samples and analysis of important physico–chemical properties.

FOREST MENSURATION

Scope and objectives. Measurement of tree diameter, height, girth, bark thickness, weight, tree cross–sectional area, form crown width, empirical formulae, methods and instruments used. Calculation of log volume. Volume estimation of standing trees, stack of logs, bark and cull – methods, construction and application of tables, mathematical models. Determination of age, increment and growth of trees. Stump analysis and stem analysis.

Field exercises.

OVERVIEW OF FORESTRY–NATIONAL AND GLOBAL

Forest and forestry, history of management of forests, development of systems of forest management in recent years, emerging trends. Forest geography of the world – factors influencing the distribution of forest, critical analysis of forest resources, forest policies, wood based industries, forestry practices, forestry research and training. Trade patterns in forest products. International organizations related to forestry. Congresses, Commissions, Conferences and Conventions relevant to forestry on global basis. World forestry literature (periodicals, journals, etc) with display.

COMPUTER AWARENESS

Elementary ideas on computers, introduction to the computer hardware and software. Operating system, single user and multiuser–definition and functions. Word processing–components and feature. Data based management–definitions, create and edit database files. Report generation. Electronic spread sheet: definition and capabilities. Elementary ideas on Computer VIRUS.

SOIL CONSERVATION AND LAND MANAGEMENT

Soil Conservation and Land Reclamation–Introduction: historical review of land use pattern and land degradation, rational land use policy, soil conservation, its scope and role in national economy. Erosion–agencies, extent, causes, effects and controlling measures. Land reclamation– programmes and practices, land use classification.

Grazing and Fodder Management–Cattle and their fodder requirements. Grass lands in India–distribution, management & improvement and carrying capacity. Fodder resources of India, forest grazing and its management.

Watershed and its Management–Water resources of India. Watershed–definition, classification and characteristics. Watershed management planning–preparation and analysis or integrated watershed management project.

Field Study: Preparation of an integrated watershed development project for a micro–watershed.

SILVICULTURAL PRACTICES

Definition, Role of forests, Silviculture–foundation and practices. Regeneration: Natural and Artificial–object, principles, methods and alternatives. Basic principles of nursery and afforestation techniques, recent techniques of production and out planting of bare root & container seedlings, afforestation in problem sites, energy plantations, urban forestry, planning, costing & records of regeneration operations.

Silviculture of Indian tree–General description–dealing with distribution, phenology, growth characteristics, autecology, synecology, community environment, regeneration methods of Indian species of economic importance.

Demonstration and Field Exercises–Seed quality testing, nursery operations, regeneration techniques of important species and site treatment.

SILVICULTURAL SYSTEMS

Definition, scope, objectives and classification. Systems-Clear felling, Shelterwood, Selection, Coppice, Indian modifications and applications. Conversion from one system to other. Concept of Dauerwalda, Silvicultural systems for bamboos. Biodiversity—a silvicultural concern. Emerging trends and future strategy.

SYSTEMATIC BOTANY

Theory

Plant Nomenclature: Importance, brief history, taxonomy, classification systems.

Angiosperms: Origin and life history. Principles and systems of classification. Modern trends in taxonomy. Systematic Botany of Indian forest plants following Bentham and Hooker System. Their distribution, field characters and economic importance. Salient features of following families -

Magnoliaceae, Dipterocarpaceae, Meliaceae, Sterculiaceae, Leguminosae, Rosaceae, Lythraceae, Myrtaceae, Rhizophoraceae, Rubiaceae, Lauraceae. Anacardiaceae, Cupuliferae, Verbenaceae, Euphorbiaceae, Gramineae and Coniferae.

Ethnobotany and its importance in forest and protected area management.

Practicals

Floral parts, dissection and characteristics of one specimen each of 15 families with identification of species.

FOREST BIOMETRY

Measurement of forest crop—diameter, height, age and volume, Yield tables, Mathematical models. Stand structure— evenaged and unevenaged. Management of sample plots. Forest inventory—Planning, design, alternatives, sampling, execution, compilation and reporting. Forest Site— classification and evaluation, quality classes & site index models. Stand growth and its current estimation and production – various methods.

FOREST MANAGEMENT

Introduction, object and principles. Resource base—present and future demands, current practices. Valuation and Appraisal—methods for trees, stump age, evenaged and unevenaged stand, non—wood forest outputs. Concepts of normal forest, increment and yield. Sustained yield, sustainable forestry, rotation. Evaluating intensive management decisions—spacing and thinning. Classical approaches to forest yield regulation—principles and its application to Indian Forests. Working Plan

FOREST SURVEY

Theory:

Object, scope, principles and types of surveying in forestry. Scales and errors. Chain survey—equipments, field works, recording, plotting. Compass survey—procedure for traversing. Plane table survey—equipments, setting and methods. Types of levels, leveling and topographical survey—hand levels, clinometer, Ghat tracer & Dumpy level. Computation of area, maps—classification, reprography, indenting and map reading.

Practicals:

Drawing equipments and their uses. Practice of survey methods— chain, compass and plane table. Use of compass and map reading, computation of areas.

FOREST ENGINEERING

Theory:

Building construction, Quality of materials, specification & field checks. Preparation of estimate of a building, requirement of building material for construction, plinth area and cube rate estimates, analysis of rates, foundation design for load bearing walls. Forest roads - classification, geometric design, alignment and earth work estimation. Design of retaining wall and construction etc. Bridges – types of forest bridges with span upto 6 m, wooden bridges, small culverts.

Water harvesting structures for soil conservation works - check dams, anicuts, spill ways, design of river training works etc.

Practicals:

Drawing–Plan, elevation and section of buildings, check–dams, wooden bridge with span upto 6 m, estimating earth work from longitudinal section.

field exercises:

Alignment of fair weather truckable forest hill road. Reconnaissance survey, preliminary survey etc. Preparation of longitudinal sections, cross sections, site plan and estimating earth work etc.

**FOREST HARVESTING AND WOOD
BASED INDUSTRIES****Theory:**

Definition, scope, terminology. Basic logging hand tools and power chain saws-operation and maintenance. Felling operations, dragging, transporting–various methods and equipments. Loss in process. Management of departmental harvesting. Investment decisions and planning–road design, work study and costing of operations. Marketing.

Establishment of forest based industries. Policy on raw material supply and problems. Composite wood products and their manufacture. Paper industries. Saw milling–techniques and equipments. Wood based small and cottage industries in rural development. Wood for other uses. Grading of wood. Record keeping.

Practicals :

Maintenance of saws and hand tools. Work study methods. Visit to timber depot.

NON-WOOD FOREST PRODUCE

Introduction, different types of Non – Wood Forest Products (NWFP)– their changing role, availability, collection, processing, marketing and pricing. Credit, financing, training and extension on institutionalizing cultivation. Protection of biodiversity and conservation of genepool of Non– Wood Forest Produce.

WOOD TECHNOLOGY**Theory:**

Wood anatomy, scope, structure, physical features and strength properties of wood, evaluation of defects & abnormalities for various uses. Wood seasoning, preservation- concepts and practices, other improvement techniques of timber utilization.

Practicals:

Identification of timbers with key for 20 important timbers. Wood seasoning and wood preservation.

**BIODIVERSITY CONSERVATION AND
WILDLIFE MANAGEMENT**

Biodiversity and Wildlife. Objects of Conservation, life support systems. Principles of management, animal–habitat studies, conservation biology, wildlife behaviour studies, management of animal communities, habitat management. Conservation strategy–ex situ and in situ, protected area network, agencies for conservation, human dimension, wildlife in managed forests. Wildlife (Protection) Act, 1972.

FOREST PROTECTION

Agencies causing forest damage–fires, man, cattle, insects and pathogens. Nature and extent of damage. Fire damage–causes, character, control and protection. Shifting cultivation, illicit felling, encroachments– problems and remedial measures. Grazing regulations. Diseases of plants and trees–symptoms. Casual organisms, identification and control. Common forest insect pests and their control. Protection against damages by atmospheric agencies.

FOREST POLICY & LAW

Forest Policy:

Foundation, need and scope. Critical evaluation of National Forest Policies of 1894 and 1952. National Forest Policy 1988 and its objectives assessment.

Forest Law:

Legal definitions, application of penal code to forests, general principles of criminal law, legal principles of punishment, criminal procedure code, the law of evidence and the Indian Evidence Act, 1872 as applied to forestry matters.

Objects of special forest law: the Indian Forest Act, 1927 general provisions, detailed study. Code of Civil procedure, 1908. Forest (Conservation) Act, 1980.

ADVANCED FOREST MANAGEMENT

Forestry sector and national economy. Goods and services from forests. Demand estimation–non–timber product economics. Project formulation and appraisal management, NCT work analysis. MIS, monitoring and evaluation. Decision making in forest management–various techniques. Forestry planning and budgeting.

GENERAL MANAGEMENT

Organizational behaviour–structure & suitability, motivation, leadership, group dynamics, management of conflict & stress. Human resource management, man power planning, selection, placement, career development, management communication- types and skill. Production and operation management–forecasting, methods & work study, performance and productivity. Material management.

ENVIRONMENTAL CONSERVATION

Environment–Definitions, components and importance. Principles of environmental conservation. Impact of deforestation, forest fires, mining, development of civilization, population growth, industrial revolution and of various development projects on environment. Water–various water ecosystems, its uses and problems. Pollution–different types & effects & control measures, environmental monitoring. Global warming, ozone layer depletion and acid rains and strategy for sustainable energy use. Environmental Impact Assessment of projects. Concept of sustainable development, environment management, education, policy and legislation in India.

COMPUTER APPLICATION IN FORESTRY

Planning for computers, Selection of hardware system. Development of application software. Computer maintenance.

Introduction to Geographical Information System Package (GIS); Remote Sensing; project management system (PRISM); sensitivity and regression analysis; operation research package; expert system; data communication and networking (LAN). District Information System (DISNIC). Computer aided working plan exercise; MIS development.

REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS IN FORESTRY

Theory:

Basic principles, types and scope of remote sensing. Introduction to aerial photography and photo grammetry. Measurements from aerial photographs, photo-interpretation. Area determination and forest mapping. Use of aerial photographs in forest inventory and management. Introduction to various types of satellites and sensors–resolution and form of data available. Acquisition and interpretation of satellite data for forestry purpose. Thematic mapping, vegetation mapping. GIS and its use in Forest Management.

Practicals

Stereoscopic vision test, interpretation and measurements on aerial photographs, transference of details to base map. Vegetation mapping work. Identifying the objects. Digital and visual interpretation of satellite image. Field application of GIS.

SPECIAL PAPER

PEOPLE AND FOREST

Forest in rural development–Forests–People symbiotic linkage; Forests and tribals, forests and employment generation, forest dwellers-their tradition of forest conservation, rights and concession. People's participation in forest Management–concept to commissioning and review. Management of local community action, forest management strategy-social forestry programmes & Joint Forest Management programme (JFM). Various strategies, micro level planning & participatory rural appraisal. Monitoring and evaluation of JFM. Behavioural dimensions in people centered forest management. Forestry extension–communication, extension work; programme planning & methods. Management of extension organization.

EXERCISES AND TOURS

1. **Working Plan Exercise:** Preliminary Working Plan Report; field work– stock mapping, checking of maps, compartment description, collection of statistical data, collection of other data, and evaluation of management alternatives.
2. **Road Alignment Exercises:** Alignment, mapping and estimation of forest motor road through a hilly country.
3. **Integrated Watershed Management:** Selection of macro and micro watershed, data collection, socio-economic survey, formulation of an integrated watershed development project comprising various sectoral development plans.
4. **Tours :-**
 - (i) **Introductory Tour:** Familiarization with Forest and Forestry operation, field Botany, Forest Management, Study of Wildlife, Study of Forest Administrative and Management units. Locality factors, Silviculture, utilization, forest terminology.
 - (ii) **Hill Tour:** Study of working plans and management of conifers and temperate broad-leaved species, introduction of exotics, mechanized logging, stem analysis, stump analysis, increment boring, sample plot layout, enumeration.
 - (iii) **West India Tour:** Soil Conservation, grazing and fodder management, ravine reclamation, combating desertification, social forestry and other silvicultural practices for other problem sites.
 - (iv) **South India Tour:** Study of Working Plans and Management of teak, Bamboo, deciduous species, evergreen species; thinning research; utilization methods including visits to wood- based industries, industrial plantations.
 - (v) **East India Tour:** Study of ecological succession, natural and artificial regeneration, tending mechanized plantations of fast growing species, yield and volume tables, forest types, taungya technique, afforestation techniques in various types of areas, study of mangrove eco- system.

QUALIFYING TESTS

- i. **First Aid:** The probationers shall be trained and tested in civil defence, First Aid and St. John's Ambulance Drill.
- ii. **Weapon Training:** The probationers shall be trained and tested in the use of light machine gun, rifles, pistols, and revolvers.
- iii. **Equitation Training:** shall include the walk, trot, canter.
- iv. **Regional Language:** the test shall comprise of translation, free composition, set composition, conversation and dictation. The probationer's knowledge of grammar shall be tested chiefly by composition, conversation and passage for comment.
- v. **Hindi:** The test shall comprise of translation, free composition, set composition, conversation and dictation. The probationer's knowledge of grammar shall be tested chiefly by composition, conversation and passage for comment.
- vi. **Motor Mechanics:** Petrol and diesel engines; four stroke and two stroke engines; fuel system; ignition system; lubrication system; transmission system; cooling system; fault detection and daily checks.

- vii. **Forest Administration and Account:** (a) Introduction, need, organizational set up, types of administrative and management units and their set up, management information system in forest department, inter-departmental coordination, forest manuals. (b) Generally accepted accounting principles. Convention and concept, Cash Book and other subsidiary registers maintained in division and range offices. Analysis of check and post-check, budget and grant, power of sanction, appropriation and reconciliation, issue of cheques, payments, muster-roll, measurement book, forest advances, advance of contractors.

Forest Corporation: Analysis of balance sheet and profit and loss account, ratio analysis and fund flow analysis.

- viii. **Swimming:** The standard of training and proficiency shall be determined by the Director.”

7. In the said regulations, in the Second Schedule.

- (a) For the brackets, words and figures “ {See Regulation 5 (2)}” the brackets, words and figures “ {See Regulation 5}” shall be substituted;
- (b) For the entry “Nagamees in roman script” occurring in the Second column relating to regional language, against the cadre of Nagaland, the entry “AO, Augami Sema or Lothai” shall be substituted.

EXPLANATORY MEMORANDUM

It has been decided to introduce the new pattern for training of the Indian Forest Service Probationers from the year 1994. Many of the probationers have already joined the Indira Gandhi National Forest Academy, Dehradun and are undergoing training as per the revised syllabus.

It is certified that the no officer would be adversely affected by amendment to the Indian Forest Service (Probationer's Final Examination) Regulation, 1968 being given retrospective effect.

**DETAILS OF SUBJECTS & LECTURES
FOR IFS PROBATIONERS' TRAINING AT IGNFA**

NO.	SUBJECT	NO. OF LECTURES (45 min. duration)
1.	Elementary Mathematics/Biology Theory	20
	Biology Practical	40
2.	Statistics	20
3.	Economics	25
4.	Ecology	55
5.	Geology & Soil Science	Theory
		Practical
6.	Forest Mensuration	30
7.	Overview of Forestry	20
8.	Computer	Awareness
		Applications in Forestry
10.	Soil Conservation & Land Management	40
11.	Silvicultural Practices	40
12.	Silvicultural Systems	30
13.	Systematic Botany	Theory
		Practical
14.	Forest Biometry	45
15.	Forest Mangement	40
16.	Survey	Theory
		Practical
17.	Engineering	Theory
		Practical & Field Exercises
18.	Forest Harvesting & Wood Based Industries	Theory
		Practical
19.	Non Wood Forest Produce	30
20.	Wood Technology	Theory
		Practical
21.	Biodiversity Conservation & Wildlife Mangement	50
22.	Regional Language	Theory
		Practical
23.	National Language	Theory
		Practical
24.	Forest Administration	24
25.	Forest Account	10
26.	Forest Protection	60
27.	Forest Policy & Law	60
28.	Advanced Forest Management	45
29.	General Management	40
30.	Environmental Conservation	30
31.	Remote Sensing & GIS	Theory
		Practical
32.	People & Forests	50
33.	Motor Mechanics (Qualifying)	10
34.	First Aid and Ambulance Drill (Qualifying)	10
Total Lecture		1418