



JAMMU AND KASHMIR PUBLIC SERVICE COMMISSION

Resham Garh Colony, Bakshi Nagar, Jammu

(<http://www.jkpsc.nic.in>)

NOTIFICATION NO.PSC/EX-2013/27

D A T E D : 22/04/2013

The J&K Forest Service Range Officers Grade-I (Forest) Examination will be conducted by the J&K Public Service Commission at Srinagar and Jammu on the dates to be notified separately by the Commission in accordance with the rules laid down vide SRO No. 359 dated 24.07.1970 read with amendments made vide SRO No. 106 dated 30.04.1992, SRO No. 272 dated 30.11.1992, SRO 3 dated 05.01.1994 and J&K Public Service Commission (Conduct of Examination) Rules, 2005. The details of scheme of examination and syllabus is given in annexure 'A'. The number of posts to be filled up through the examination is 07 as per the break up given here under: -

Government Forest Department (1st Special Drive):-

Name of the Discipline	OM	RBA	SC	ST	ALC	SLC	TOTAL
Range Officers Grade-I (Forest)	-	-	03	04	-	-	07

Eligibility conditions:-

1. Qualification: -

"B.Sc. (Forestry) or equivalent from any University recognized by the Indian Council of Agriculture Research."

2. Age as on 01.01.2013: -

- | | | | |
|-----|---------|---|-----------|
| i. | Minimum | = | 18 years. |
| ii. | Maximum | = | 37 Years. |

For candidates belonging to:

- | | | | |
|------|---|---|-----------|
| iii. | Scheduled Castes/ Scheduled Tribes | = | 40 years. |
| iv. | Those already in state Government Service | = | 40 years. |
| v. | Ex-Serviceman | = | 48 Years. |
| vi. | Handicapped candidates | = | 39 years. |

3. Physical Standard: -

The candidate should possess the following standards of physical fitness

- | | | |
|------------------------------|---|--------|
| Height | = | 163 cm |
| Chest girth (Fully expanded) | = | 84 cm |
| Chest expansions | = | 5 cm |

Physical fitness

(The physical fitness certificate with above standards should be from Chief Medical Officer concerned.)

4. Must be a permanent resident of the J&K State.

The examination shall be conducted in the following order:

1. Written Test.
2. Viva-Voce Test.
3. Walking Test.
4. Medical Test.

Note: (If the commission considers that the number of Application Forms received for admission is unduly large it may direct the candidates to appear in preliminary objective type test for shortlisting the candidates for Main Examination).

The minimum marks in each subject for qualifying the written test is 40%.

Application Forms: Application Forms can be obtained from the office of J&K Public Service Commission, Resham Ghar Colony Bakshi Nagar, Jammu/Polo Ground, Srinagar w.e.f. 25.04.2013 on cash payment of Rs.250/- (excluding the processing charges of Rs.10/-) to be paid in cash through the counters of J&K Bank Ltd. opened in PSC offices at Jammu/Srinagar.

How to fill up the form: The J&K PSC has developed a scanable application form (OMR) for the Range Officer Grade-I (Forest), Examination which will be processed on computerized machines. This application form alongwith a dummy application form and a list showing the code numbers is also enclosed with the application form. Before filling of the application form the candidate should carefully go through the dummy application form and the code list given. The application form should be filled up neatly and correctly. The candidates are required to get the Application Form (duly filled in) photocopied. Photograph duly attested should be pasted at the relevant place in the Application Form. They are further advised to attach attested copies of documents/testimonials with the photocopy of the application form and not with the Original application form.

The application form, photocopy of the filled up application form along with documents/testimonials etc. shall have to be submitted in the Commission office at Jammu/Srinagar personally in the special envelop supplied by the Commission for the purpose or mailed, by registered post to the address of Secretary, J&K Public Service Commission, Resham Ghar Colony Bakshi Nagar, Jammu/Polo Ground, Srinagar, before the last date notified for the purpose.

Documents/testimonials (attested copies) to be attached with the photocopy of the application form.

- (a) Matriculation or Secondary School certificate in proof of date of birth;
- (b) Educational qualification certificate;
- (c) Permanent Resident Certificate;
- (d) Certificate of belonging to Scheduled Caste/Scheduled Tribe from the Competent Authority under SRO 294 of 2005 dated, 21.10.2005, as amended from time to time.
- (e) Certificate regarding holding of a civil post in the State as required under rules.
- (f) Physical fitness certificate certifying the physical fitness of the candidate along with height and chest measurement from Chief Medical Officer concerned.

Note I: In-service Candidates will submit their application form after certificates from the Head of Office is recorded in the format given at the end of scannable application form. A photo copy of scannable application form should be submitted to J&K Public Service commission through their appointing authority.

Note II: Certified/attested copies of documents submitted by an applicant shall bear the signatures of the applicant as well as the name and designation of attesting officer.

Note III: The candidates are advised to write their complete postal address including Pin Code to facilitate quick delivery.

Last date for receipt of Applications: -

The applications shall be received at the counters set up for the purpose in Commissions Office located at Resham Ghar Colony Bakshi Nagar, Jammu/Polo View, Srinagar on all working days (Monday to Friday) from 10 A.M. to 3 P.M. up to **24.05.2013** which shall be the last date. Applications received through Speed post/courier services of any type shall be treated as having been received "By Hand" at the Commission's counter. Application received after the

above date will not be entertained under any circumstances and all such applications will be summarily rejected.

Note: The candidates should, therefore, ensure that their application forms reach the Commission's offices on or before the prescribed last date.

The last date for the receipt of applications provided in the notification viz 24.05.2013 shall be the cut off date for determining the eligibility with regard to qualification.

Withdrawal of application: No request for withdrawal of candidature received from a candidate-fifteen days after the last date for submission of application will be entertained under any circumstances.

Correspondence with the Commission: The Commission will not enter into any correspondence with the candidates about their candidature except in the following case:

If a candidate does not receive the Admit Card/Roll number Slip or any other communication regarding his/her candidature for the examination 15 days before the conduct of examination, he/she should contact the Commission's office at Resham Ghar Colony Bakshi Nagar, Jammu/Polo Ground, Srinagar for obtaining a duplicate copy of Admit Card/Roll number Slip.

Important: All correspondence with the Commission should invariably contain the following particulars:

1. Name and year of the examination;
2. Application form number;
3. Full name of the candidate (in Block letters) with parentage; and
4. Complete postal address as given in the application.

GENERAL INSTRUCTIONS

1. Candidates should fill up the application form carefully. No column of application form should be left blank. Incomplete and incorrectly filled application form shall be summarily rejected. No representation or correspondence regarding such rejection shall be entertained under any circumstances.

2. If a candidate receives an Admit Card/ Roll Number Slip in respect of some other candidate on account of handling error, the matter should be brought to the notice of Commission immediately. No candidate will be allowed to take the examination on the basis of an admission certificate issued in respect of another candidate.

3. The candidates should also note that their admission at all stages of the examination will be provisional and subject to fulfilling the prescribed eligibility conditions.

4. If it comes to the notice of Commission any time before or after Examination or interview, that the candidate does not fulfill any of the eligibility conditions and the candidate has claimed eligibility for the examination by misrepresentation, fraud or concealment of material fact or Impersonation, his/her candidature for the examination shall be cancelled and he/she shall be also liable for prosecution/disciplinary action by the Commission.

5. Any change of address given in the application form should at once be communicated to the Secretary, Public Service Commission, clearly indicating the Advt. No., Item No., and Name of the Post.

6. Candidates are requested to arrange for the redirection of communications to their new address, if necessary. The PSC makes every effort to take account of changes in candidate's address but cannot accept any responsibility in the matter.

7. The summoning of candidates for interview convey no assurance whatsoever that they will be selected. Appointment orders to selected candidates will be issued by the Government.

8. Candidates must be in sound bodily health. They must, if selected be prepared to undergo such medical examination and satisfy such medical authority as the Government may require.

9. Candidates will be informed of the result of their applications in due course and any interim enquiries about the result are, therefore, unnecessary and will not be attended to. The Commission do not enter into correspondence with the candidates about reasons for their non-selection for interview/appointment.

10. Canvassing, in any form, shall disqualify a candidate.

ACTION AGAINST CANDIDATES FOUND GUILTY OF MISCONDUCT

Candidates are warned that they should not furnish any particulars that are false or suppress any material information in filling up the application form. Candidates are also warned that they should, in no case, correct or alter or otherwise tamper with any entry in a document or its attested/certified copy submitted by them, nor should they submit a tampered/fabricated document. If there is any inaccuracy or any discrepancy between two or more such documents or their attested/certified copies, an explanation regarding this discrepancy should be furnished.

A candidate who is or has been declared by the Commission, to be guilty of:

- i. obtaining support of his/her candidature by any means, or
- ii. impersonating, or
- iii. procuring impersonation by any person, or
- iv. submitting fabricated documents or documents which have been tampered with, or
- v. making statements which are incorrect or false or suppressing material information, or
- vi. resorting to any other irregular or improper means in connection with his/her candidature for the selection, or
- vii. using unfair means during the test/examination, or
- viii. writing irrelevant matter including obscene language or pornographic matter, in the script(s), or
- ix. misbehaving in any other manner in the examination hall, or
- x. harassing or doing bodily harm to the staff employed by the Commission for the conduct of their test/examination, or
- xi. attempting to commit or, as the case may be, abetting the commission of all or any of the acts specified in the foregoing clauses may, in addition to rendering himself/herself liable to criminal prosecution, be liable:
 - a. to be disqualified by the Commission from selection for which he/she is a candidate, and/or
 - b. to be debarred either permanently or for a specified period: -
 - i. By the Commission from any examination or selection held by them.
 - ii. By the State Government from any employment under them, and
 - c. if he/she is already in service under Government, disciplinary action under the appropriate rules.

Sd/-
(Dr. T.S. Ashok Kumar), IFS
Secretary
J&K Public Service Commission

No. 01-PSC/Ex-Range Officer/04/2013

Dated: 22 .04.2013

1. Chief Secretary to J&K Govt., Jammu.
2. Commissioner Secretary to Government, Forest department, Jammu.
3. Chief Conservator of Forests, Jammu/Srinagar.

4. Assistant Chief Conservator of Forests, Jammu/Srinagar.
5. Director, Doordarshan Kendra, Jammu/Srinagar.
6. Director, Radio Kashmir, Jammu/Srinagar.
7. Director, Information, Srinagar (w.4.s.c.) for publication of the notification in two local dailies one each from Jammu/Srinagar.
8. General Manager, Govt. Press, Jammu for publication of the notification in the next issue of Govt. Gazette.
9. P.S. to Hon'ble Chairman, J&K Public Service Commission.
10. P.S. to Hon'ble Member, Sh._____
11. P.A. to Secretary & COE, J&K Public Service Commission.
12. Deputy Secretary (P), J&K Public Service Commission.
13. Under Secretary (I/M), J&K Public Service Commission.
14. Section Officer (Examination Section).
15. Incharge Camp Office, J&K Public Service Commission, Srinagar
16. Main file/Stock file/Notice Board.

ANNEXURE 'A'

SCHEME OF EXAMINATION

The examination shall be conducted in the following order: -

- i. Written Test;
- ii. Viva Voce Test;
- iii. Walking Test;
- iv. Medical Test.

(I) **Written Test: -**

(b) **Main examination (Essay type).**

There will be four subjects in the Main examination. The time allowed for each paper shall be three hours. The paper wise marks for written examination and viva voce is as under: -

<u>Compulsory Subjects</u>	<u>Maximum Marks</u>
1. Gen. English.	100
2. An essay to be written in English.	100
3. General Knowledge	200

Optional Subject (Any one of the following subjects)

1.	Botany	}	200
2.	Siliviculture		
3.	Field Crop Production		

(II) **Viva Voce**

The viva voce test shall carry 100 marks.

Total Marks (written + viva-voce):- **700**

(III) **Walking Test: -**

The candidate will have to undergo a walking test consisting of a walk of 25 Kms. to be completed in four hours. The date and time for the walking test will be intimated to the eligible candidates.

(IV) **Medical Test: -**

The successful candidates will be required to undergo a medical test before the Medical Board. The candidates shall have to pay fee to the Medical Board as may be prescribed for the said Medical examination.

NOTE

Instructions to appear before the Medical Board shall not be understood to mean that a candidate. If found fit, will necessarily be selected and appointed. Summoning of candidates for medical examination conveys no assurance whatsoever that they will be selected or appointed. Appointment orders of selected candidates will be issued by the Government in accordance with the availability of vacancies.

Syllabus for the written examination

(a) Compulsory subjects

1. **General English**

This paper will be of 10+2 standard and shall consist of a short essay, comprehension, précis writing, usage and vocabulary.

2. **Essay in English**

One essay to be written on a topic out of given topics in the paper. The essay will be of 10+2 standard.

3. **General Knowledge**

This paper will contain questions on Elementary Science, Geography and Current events etc.

Optional Papers/Subjects

The candidate may choose only one paper from amongst the three optional papers/subjects. The scope of the syllabus will be broadly of bachelor's degree level.

(b) SYLLABUS OF OPTIONAL PAPERS/SUBJECTS

(I) BOTANY

1. **Microbes and Microbiology.**

- 1.1 General account of viruses, Mycoplasma and Cynaobacteria.
- 1.2 Bacteria-Structure, Nutrition and reproduction (A general account with broad classification).
- 1.3 Economic importance of Bacteria; Bacteria as indicators of pollution; bacteria in industry and agriculture.
- 1.4 Microbiology of air, water, soil and food materials.

2. **Algae.**

- 2.1 General characteristics and classification of algae (Fritsch 1935,1945)
- 2.2 Important features of Chlorophyceae and Xanthophyceae, life histories of Chlamydomonas, Volvox, Oedogonium, Coleochaete, Chara, and Vaucheria.
- 2.3 Important features of Phaeophyceae and Rhodophyceae, Life histories of Ectocarpus, Sargassum and Polysiphonia.
- 2.4 Economic importance of algae-algae as food, feed and source of fibre; algae as indicators of pollution; algae blooms; algae toxins; algae in industry.

3. **Fungi**

- 3.1 General characteristics and classification of fungi (Ainsworth (1971), Exonomic importance of fungi, General account of Lichens.
- 3.2 Important features of Mastigomycotina; Life histories of Pythium and Allomyces.
- 3.3 Important characteristics of Zygomycotina and Ascomycotina; Life history of Mucor, Saccharomyces, Eurotium and Peziza.
- 3.4 Important characteristics of Basidiomycotina and Deuteromycotina; life histories of Puccinia, Agaricus, Collectotrichum and Cercospora.

4. **Bryophytes**

- 4.1 General characteristics, classification (Smith, 1955) and Alternation of Generations in Bryophytes.
- 4.2 Structure and reproduction in hepaticae with reference to Marchantia.
- 4.3 Structure and reproduction in Anthocerotales and Musci with reference to Anthoceros and Funaria.

- 4.4 Importance of bryophytes in preventing soil erosion; management of forest floors; monitoring and controlling pollution; geobotanical prospecting; in horticulture and as source of antibiotics.

5. **Pteridophytes.**

- 5.1 General Characteristics, classification (Sporne 1975) and origin of pteridophytes (the first vascular plants); stelar system and alternation of generations in pteridophytes.
- 5.2 Important characteristics of Psilopsida and Lycopsidea; structure and reproduction in Psilotum, Rhynia, Lycopodium and Selaginella.
- 5.3 Important characteristics of sphenopsida, structure and reproduction in Equisetum.
- 5.4 Important characteristics of pteropsida, structure and reproduction in pteris and Marsilea.

6. **Cell Structure.**

- 6.1 Cell wall; Primary cell wall, its structure, formation and function.
- 6.2 Plasma membrane; The bilayer lipid structure fluid mosaic model, its functions.
- 6.3 Cell organelles: structure and functions of E.R., Golgi bodies, Plastids and mitochondria.
- 6.4 Ultra-structure of nuclear membrane. Nucleolus: Organization and function.

7. **Chromosome structure and multiplication.**

- 7.1 chromosome structure : physical and chemical structure and importance of centromere and telomere; sex chromosomes.
- 7.2 Organization of DNA in prokaryotica and eukaryotic genomes. Role of proteins; nucleosome model.
- 7.3 Equational division, factors triggering mitosis, various stages of mitosis.
- 7.4 Reductional division, detailed structure of pairing and crossing over.

8. **Genome organization and function/Gene protein.**

- 8.1 Basic unit: DNA, structure and replication; satellite and repetitive DNA.
- 8.2 Gene function: Genetic Code, transcriptions; Regulation of gene expression in prokaryotes and eukaryotes.
- 8.3 Protein synthesis: Ribosomes and tRNA, structure and function, ID, 2-D, and 3 D structure of proteins.
- 8.4 Extranuclear genome: structure and functions of mitochondrial and Plastid DNA, Plasmids.

9. **Alternations on the genome.**

- 9.1 Structural alterations; types, effect and detections of intra chromosomal alterations- deletions, duplications and inversions.
- 9.2 Mechanism, effect and detection of interchromosomal alterations.
- 9.3 Euploidy-type, origin and effect with suitable examples.
- 9.4 Aneuploidy –types, origin and effect with suitable examples.

10. **Alterations in the basic unit of inheritance and inheritance patterns.**

- 10.1 Gene/Point mutations-spontaneous and induced; mechanism of induction; uses.
- 10.2 Shift of Genes through mobile elements-transposons, mechanism and salient features, DNA damages, causes and repair mechanisms.
- 10.3 Mendelism, laws of segregation and independent assortment, allelic and non-allelic interactions.
- 10.4 Linkage and recombination; linkage in mapping of genes.

11. **Seed Plants-origin evolution and characteristics.**

- 11.1 Characteristics of seed plants; evolution of seed habit seed plants with and without fruit.
- 11.2 Geological time scale; fossilization-process and types; age of fossils and their importance.
- 11.3 General characteristics of gymnosperms; classification of gymnosperms by Coulter and Chamberlain.
- 11.4 Evolution and diversity of gymnosperms.

12. **Morphology and Reproduction in Gymnosperms**

- 12.1 Morphology, anatomy, reproduction and life cycle in Cycas.
- 12.2 Morphology, anatomy, reproduction and life cycle in Cedrus.
- 12.3 Morphology, anatomy, reproduction and life cycle in Ephedra.
- 12.4 Fossil gymnosperms : Bennettitales- History and

13. Angiosperm origin and nomenclature.

- 13.1 Origin and evolution of angiosperms, characteristics and examples of some primitive angiosperms (Magnolia). Fossil angiosperms- a general account with reference to angiosperm floras.'
- 13.2 History of angiosperm taxonomy; Aims and Fundamental components of taxonomy;- Taxonomy, omega taxonomy and holotaxonomy.
- 13.3 Taxonomic identification; taxonomic keys and literature (Floras, Monographs and reviews).
- 13.4 Botanical nomenclature-principles and rules; taxonomic ranks; type concept and principle of priority.

14. Classification and tools in angiosperm taxonomy

- 14.1 Salient features of the classification of Bentham and Hooker, merits and demerits.
- 14.2 Salient features of the classification of Engler and Prantl; merits and demerits.
- 14.3 Contribution of cytology to taxonomy.
- 14.4 Contribution of phytochemistry and taxometrics to taxonomy.

15. Diversity of angiosperms.

- 15.1 Morphological diversity of families Ranunculaceae, Brassicaceae, Malvaceae and Rutaceae.
- 15.2 Morphological diversity of families Fabaceae, Rosaceae, Apiaceae and Acanthaceae.
- 15.3 Morphological diversity of families Apocyanaceae, Solanaceae, Lamiaceae and Euphorbiaceae.
- 15.4 Morphological diversity of Families Liliaceae, Amaryllidaceae and Poaceae.

16. Structure, Development and Reproduction in seed bearing plants.

- 16.1 Basic body plan of a flowering plants; Modular type of growth.
- 16.2 Diversity in plant form in annuals, biennials and perennials.
- 16.3 Convergence of evolution of tree habit in gymnosperms monocotyledons and dicotyledons.
- 16.4 The largest and oldest trees of the world; canopy architecture.

17. Root and Shoot

- 17.1 Apical meristem of root, its position, structure and derivatives.
- 17.2 Structural modifications of root for storage, respiration, reproduction and for interaction with microbes.
- 17.3 Apical meristem, its organization and role.
- 17.4 Vascularisation of primary shoot in monocotyledons and dicotyledons; formation of internodes; branching pattern; monopodial and sympodial growth.

18. Secondary and Basic structure.

- 18.1 Vascular cambium and its derivatives; wood structure in relation to translocation of water and minerals.
- 18.2 Growth rings; heart wood, sapwood, role of woody skeleton; structure and functions of secondary phloem; periderm.
- 18.3 Leaf, Initiation; development, arrangement and diversity in size and shape; senescence and abscission.
- 18.4 Internal structure of leaf in relation to photosynthesis and water loss; adaptation to water stress.

19. Flower

- 19.1 Flower: A modified shoot; structure, development, variety and functions of flower.
- 19.2 Structure of anther and Pistil; Male gametophyte and female gametophyte.
- 19.3 Pollination: Type, attractants and rewards for pollination; Pollen-Pistil interaction, self incompatibility.
- 19.4 Double fertilization : Endosperm-type cytology and function; formation of fruit.

20. Units and mechanisms of multiplication.

- 20.1 Seed formation and its significance.
- 20.2 Seed dormancy; Genetic recombination and replenishment through seed.
- 20.3 Seed dispersal strategies.
- 20.4 Vegetative propagation-grafting, layering, budding and economic aspects.

21. Physiology, Biochemistry and biotechnology.

- 21.1 Discovery and nomenclature of enzymes, characteristics of enzymes, concept of holoenzymes, apoenzyme, eo-enzyme and co-factors.
- 21.2 Regulation of enzyme activity, mechanism of enzyme action.
- 21.3 Importance of water to plant life; physical properties of water .
- 21.4 Diffusion of water, Osmosis, absorption, transport of water through xylem & transpiration; physiology of opening and closing of stomata.
- 21.5 Macro and Micro elements, importance of mineral nutrients to the plant and their role, mineral uptake, deficiency and toxicity symptoms.
- 21.2 Mechanism of transport of organic substance in phloem, source sink relationship, factors affecting translocation.
- 21.7 Significances and historical aspects of photosynthesis, photosynthetic pigments, action spectra and enhancement, effect.
- 21.8 Concept of two photo systems in photosynthesis, Z- scheme, photophosphorylation, calvin cycle: C4 pathway, CAM plants, photorespiration.
- 21.9 ATP- the biological energy, currency, aerobic and anaerobic respiration, krebs cycle, electron transport mechanism (Chemi-osmotic theory).
- 21.10 Redox potential, oxididative phosphorylation, pentose phosphate pathway.
- 21.11 Biology of nitrogen fixation, importance of nitrate reductase and its requiation. ammonium assimilation.
- 21.12 Structure and function of Lipids, fatty acid and biosynthesis B- Oxidation, saturated and unsaturated fatty acides, storage and mobilization of fatty acids.
- 21.13 Definition and phases of growth, development and kinetics of growth, seed germination and factors of their regulation.
- 21.14 Plant movements- the concept of photoperiodism, physiology of flowering, florigen concept, biological clocks, physiology of senescence, fruit ripening.
- 21.15 Histroy and discovery of plant hormones, auxins, gibberellins, cytokinins, absoisic acid and ethylene, biosynthesis and mechanism of action.
- 21.16 Photomorphogenesis: phytochromes and cryptochromes, their discovery, physiological role and mechanism of action.
- 21.17 Tool and techniques of recombinant DNA Technology, cloning vectors: genomic and DNA library.
- 21.18 Transposable elements, techniques of gene mapping and chromosome walking.
- 21.19 Functional definition of biotechnology, basic concepts for plant tissue culture, cellular totipotency, differentiation and morphogenesis.
- 21.20 Biology of Agrobacterium, vectors for gene delivery and market genes, salient achievements in crop biotechnology.

22. **Plant and Environment.**

- 22.1 Atmosphere-gaseous composition: water-water cycle, and its significance, global radiation, photosynthetically active radiation, temperature.
- 22.2 Soil structure; soil profiles and development, physico-chemical properties of soil and biotic components.
- 22.3 Morphological, anatomical and physiological responses of plants to water (hydrophytes and xerophytes) and salinity.
- 22.4 Morphological, anatomical and physiological responses of plants to light (potoperiodism, heliophytes, sciophytes) and temp. (thermoperiodically and vernalization).
- 22.5 Population ecology, growth curves: Ecotypes and ecads.
- 22.6 Community ecology: Community characteristics; frequency, density, cover, life forms, biological spectrum, ecological sucession.
- 22.7 Ecosystem: structure, abiotic and biotic components, food chain, food web, ecological pyramids and energy flow.
- 22.8 Biogeochemical cycles of carbon, nitrogen and phosphorus.

23. **Natural Resources and Management.**

- 23.1 Biogeographical regions of India.
- 23.2 Vegetation types of India; Forests and grasslands.
- 23.3 Strategies for environmental Management.'
- 23.4 Conservation of Natural resources.
- 24. **Utilization of plants.**
- 24.1 Food Plants: origin of wheat, maize and potato and their cultivation in India.
- 24.2 Fibres : cultivation and processing of cotton and jute.
- 24.3 Beverages: Botony and processing of tea and coffee.
- 24.4 Spices: history and the parts used of Asafoctida. Cumin, Fennel, Goriander, Cloves, Cinnamomum and Cardamon..

25. Utilization of Plants.

- 25.1 Veg. oils: Source of vegetable oils: Botany, Cultivation and utilization of Groundnut, mustard and coconut.
- 25.2 A general account of firewood and timber sources of J&K State and utilization of Bamboos.
- 25.3 Medicinal plants of J&K State: a general account.
- 25.4 Rubber: sources of rubber, extraction and processing of commercial rubber.

(II) SILVICULTURE

1. Principles of Silviculture

Definition of Forestry:- Stages of forestry development and its influence on forestry today. Definition of silvics and silviculture role of silviculture. Major forest types, distribution and composition in India and J&K.

Study of site factors like climatic, edaphic, physiographic and biotic in relation to forest.'

Classification of climatic factors, the role played by light, temperature, rainfall, snow, wind, humidity and evaporation in relation to forest vegetation.

Edaphic factors of biological agencies parent rock topography etc. on the soil formation. Soil profiles- physical and chemical properties, mineral nutrients, nutrient cycling, soil moisture and their influences on forest production.

Tree growth photosynthesis biotic factor-influence of plants, insects, wild animals man and domestic animals on vegetation.

Tree growth photosynthesis, respiration, translocation and transpiration. Cambial development, growth rings, effects on environment on cambial development. Shoot and crown development. Flowering, fruiting and seed production.

Root growth-distribution and biomass. Environmental effects on development silvicultural manipulation of root growth.

Stand dynamics- Plant succession, competition and tolerance stand development- basal area and yield table.

2. Practices of Silviculture

Classification of forests. Forest regeneration, natural, artificial (Plantation forests) and mixed regeneration. Natural forest types and their management. Plantation forests: planting survey, planting plan, plantation records, maps, ecological aspects for the choice of tree species, site preparation, planting tools and planting, direct seeding gap filling, afforestation of dryland, wetland and adverse sites and taungya. Enrichment planting; fertilizer, application, nursery crops, cover crops. Tending; control of climbers and undesirable trees. Weed Management. Pruning and lopping. Thinning- thinning of irregular crops, increment felling, improvement felling. Fire prescribed burning. Conflicts between afforestation and cattle ranching.

3. Silviculture of trees and shrubs (Soft wood)

The origin, distribution, general description, economic value, Phenology, silviculture characters, regeneration methods, management of soft woods such as Cedrus deodara, cupressus torrulosa, pinus wallichiana; P. roxburghii, P. helpensis, P. gerardiana, Abies Pindrow, Pinus Smethana and Tropical Pines like P. oocarpa, P. patula, P. insignis Rhododendrons, Pyrus pashia, and indigofera species, Juniperus, aquaticus robusta.

4. Silvicultural Systems

Silvicultural system:- definition modern silviculture, classical silviculture, classification and detailed study of the following systems.

Clear felling, system (Including clear strip and alternate strip system); shelter wood system; uniform system, the group system the shelter wood system; the wedge system; the irregular shelter wood system; the coppice of two rotation system; the shelter wood coppice system; coppice selection

system; coppice with standard system; coppice with reserve system; pollard system and culm selection system in bamboo

5. **Silviculture of Indian trees-II**

General description, growth and silviculture characters and regeneration methods of following species:-

Quercus species, Alnus nitida, Acer Spp. Acacia nilotica, A. catechu, Dalbergia Sisso, Juglans regia. Toona Ciliata Bauhinia Variegata, Fraxinus spp. Celtis australis, Grewia optiva, morus species, platanus orientalis, Eucalyptus spp, populus spp. salix species, Robinea pseudoacacia, ulmus wallichiana, catalpa bignonioides, Albizzia spp Dondonaea viscosa, parrotia spp. viburnum, olea cuspidate, Aesculus indica, Ailanthus excelsa; Tectona grandis, shorea robusta Berberis spp. prosopis spp Leucaena leucocephala, Hippophae rhamnoides.

(III) **FIELD CROP PRODUCTION**

1. **Cereals , Millets and Pulses**

Economic importance-origin and distribution, soil climatic requirement land preparation, varieties, seed-rate/seed treatment, sowing time density growth stages, water management nutrient and weed management after cultivation, harvest and processing.

Cereals:- Rice, maize, wheat, oats, barley.

Millets:- Sorghum pearl – millet; finger millet and small millets.

Pulses:- Beans, blackgram, greengram. cowpea, soyabean, lentil and peas.

2. **Oil seeds and commercial crops.**

Economic importance-origin and distribution-soil and climatic requirement, land preparation varieties, seed rate, seed treatment, sowing density crop growth stages, integrated nutrient management-irrigation, weed management, harvest and processing cropping system and yield constraints together utilization.

Oil seeds:- Groundnut Sesamum, Sunflower, Castor, Safflower, rapeseed, mustard, niger and linseed.

Commercial Crops:- Tobacco , cotton, sugarcane, sugarbeet, saffron, zeera, potato, onion and garlic.

3. **Forages and Grasses**

Forage crops:- definition, classification of forage crops (annual and perennial): leguminous and cereal forages crops with their characteristics Quality- characteristics of forages crops: storage and preservation of forages (hay and silage) making Grassland improvement problems and prospects. Renovations of degraded grasslands; Role of grasses and legumes in soil fertility.

Brief description about the cultivation of important grasses and legumes.