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FORESTRY

TOOL KIT SERIES

UPPSC
UTTAR PRADESH

STATE FOREST SERVICE

2025-26

Detailed Syllabus Based study material + **Linkage of Concepts with PYQs** + **Infused with Infographics & Maps**

Module - 5

- Forest Surveying
- Forest roads & Bridges
- Building material & Construction
- Forest Ecology & Environment
- Dendrology – Taxonomy, Herbarium
- Ethnobotany & Medicinal Plants

MPPSC State Forest Service 2023


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Rank – 3

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Shivam Gautam

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Nitin Patel

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Ravi Kumar

Comprehensive Interview Guidance Programme + Test Series


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Ankur Gupta

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Alok Kumar Jhariya

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Rank – 11

Tarun Chouhan

Comprehensive Interview Guidance Programme + Test Series


Rank - 12

Raghvendra Thakur

Comprehensive Forestry Course + Test S. + CIGP

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Assistant Conservator of Forest (ACF)

108 Out of 126 Total Selections in

Range Forest Officer (RFO) 2023


Rank – 1

Arvind Ahirwar

Comprehensive Interview Guidance Programme + Test Series


Rank – 2

Pushpendra Singh Ahirwar

Comprehensive Forestry Course + CIGP


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Rank – 4

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Forestry

Module – 5

EDITION : 2026

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Module - 5

Syllabus

Indian Forest Service (IFoS) [Paper 2 | Section A] **UP PSC Forest (Main) 2025-26** [Paper 2 | Section A]	***Surveying and Forest Engineering*** : ◈ ***Forest surveying*** - different methods of surveying, maps and map reading. ◈ Basic principles of ***forest engineering*** - Building materials and construction. ◈ ***Roads and Bridges*** - General principles, objects, types, simple design and construction of timber bridges.
Indian Forest Service (IFoS) [Paper 2 | Section B] **UP PSC Forest (Main) 2025-26** [Paper 2 | Section B]	***Forest Ecology*** : ◈ ***Biotic*** and ***Abiotic Components***, forest ecosystems; forest community concepts; vegetation concepts, ecological succession and climax, primary productivity, nutrient cycling and water relations. ◈ ***Physiology in Stress Environments*** (drought, water logging salinity and alkalinity). ◈ ***Forest Types*** in India, identification of species, composition and associations. ◈ ***Conservation Of Forest Ecosystems***. ◈ ***Clonal Parks***. ***Dendrology*** : ◈ ***Taxonomic Classification***, principles and establishment of herbaria and arboreta ***Ethnobotany*** : ◈ ***Role of Ethnobotany*** in Indian Systems of Medicine; Ayurveda and Unani. ◈ Introduction, nomenclature, habitat, distribution and botanical features of ***Medicinal*** and ***Aromatic Plants***. ◈ Factors affecting action and ***Toxicity of Drug Plants*** and their chemical constituents. Other state PSC exams also have similar syllabi to the IFoS exam, such as the ***Bihar PSC*** State Forest Service (ACF) Exam (paper 1), ***Uttar Pradesh*** PSC State Forest Service [Paper 1, Section A]; ***Odisha PSC*** State Forest Service (Main) Examination [Paper 1 | Section A]; ***Jharkhand PSC*** State Forest Service (Main) Examination [Paper 1].

Module - 5

CONTENT

UPPSC STATE FOREST SERVICE (ACF/RFO) PYQs | 2017 – 2021

Forest Surveying & Engineering

Year	Questions
2021	निम्नलिखित प्रत्येक का उत्तर लगभग 150 शब्दों में दीजिए / Answer the following in about 150 words each. — केंटीलिवर पुल का उचित रेखाचित्र सहित वर्णन करो। /Describe the Cantilever bridge with suitable line diagram [P2/1(b) | 8 M] वन अभियांत्रिकी के सामान्य सिद्धान्तों को सूचीबद्ध करो। वनों में भवन और पुल निर्माण हेतु आसानी से उपलब्ध सामग्री का वर्णन करो। Enlist the general Forest Engineering Principles. Describe the easily available materials for the building and bridge construction in the Forest areas [P2/3(b) | 20 M] वन सर्वेक्षण की विभिन्न विधियाँ पर चर्चा कीजिए। चेन व कम्पास सर्वेक्षण का वर्णन करो। चेन सर्वेक्षण एवं प्लेन टेबल सर्वेक्षण में अंतर स्पष्ट करो। Discuss on different methods of forest surveying. Describe the Chain and Compass Survey. Explain the difference in Chain Survey and Plain Table Survey [P2/4(b) | 20 M]
2020	पुनरुत्पादन सर्वेक्षण क्या है? वानिकी प्रबंध में इसकी क्या प्रासंगिकता है? पुनरुत्पादन सर्वेक्षण की सत्यता व विश्वसनीयता कैसे सुनिश्चित की जा सकती है? What is regeneration survey? Explain its relevance in forest management. How can the accuracy and reliability be ensured in regeneration survey? [P2/3(a) | 20 M]
2019	निम्नलिखित प्रत्येक का उत्तर लगभग 150 शब्दों में दीजिए / Answer the following in about 150 words each — रेखाचित्र बनाकर झूला पुल का वर्णन करें। लकड़ी का पुल कहाँ बनाने की आवश्यकता पड़ती है? Describe with sketch a suspension bridge. Where is necessity for construction of timber bridge? [P2/1(e) | 8 M]
2018	सुदूर वन क्षेत्र में सड़क बनाने हेतु मुख्य सिद्धांतों का रेखाचित्र के साथ वर्णन करें / Discuss the major principles of designing a roads in the remote forest areas with suitable diagram [P2/3(b) | 20 M]
2017	शृंखला सर्वेक्षण के लाभ एवं हानियों का वर्णन करें। शृंखला सर्वेक्षण में निम्न परिस्थितियों में आप क्या करेंगे (i) शृंखला पंक्ति में एक नदी आ जाती है। (ii) शृंखला पंक्ति में एक घना वन क्षेत्र आ जाता है / Describe the advantages and disadvantages of chain survey. What will you do in the following conditions (i) A river interrupts the chain line. (ii) A dense forest area comes across the chain line [P2/3(a) | 20 M]

Forest Ecology & Biodiversity

Year	Questions
2019	निम्नलिखित प्रत्येक का उत्तर लगभग 150 शब्दों में दीजिए / Answer the following in about 150 words each — जैव विविधता को परिभाषित करें। जैव विविधता के महत्व का वर्णन कीजिए तथा आप इसका संरक्षण कैसे करेंगे? Define biodiversity. Describe the importance of biodiversity and how will you conserve it? [P2/1(c) | 8 M]
2018	निम्नलिखित के बीच अंतर करें (अधिकतम 5 बिन्दु अथवा 5 पंक्तियाँ) / Differentiate between the following (maximum 5 points or 5 lines). — जैव विविधता हॉटस्पॉट और आर्बोरेटा /Biodiversity hotspots and arboreta [P1/5(b) | 8 M] निम्नलिखित पर कृषि-वानिकी की भूमिका का वर्णन करें। / Describe the role of agroforestry on the following.

CHAPTER 1

FOREST ROADS & BRIDGES

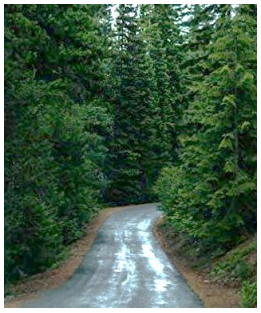
Chapter outline

1.1 FOREST ROADS

Road is an open and wide way connecting one place to another and makes it easy to move vehicles and people. If these roads are constructed in or around the forest areas, they are called **Forest roads**.

TYPES OF ROADS

- Based on the time period, it will be used.

TEMPORARY	PERMANENT
	
Usable only for dry & winter Months	All weathered and motorable road

- Based on **LOCATION** : (a) inside the forest, and (b) peripheral road
- Based on **USE**
  - (i) **Main motorable road** : main road connected HQ to the forest block, important rest houses and forest depots. They are the metalled road with well-drained and are being used throughout the year.
  - (ii) **Branch (Feeder) Jeepable road** : these are the feeder road connecting interior forest areas with the main road. These are the usual earth roads, though in some cases, the surface may be improvised by spreading sand, gravel, or laterite stones.
  - (iii) **Bridle paths** : Prepared for a quick and direct route from place to place to transport the timber by animals.
  - (iv) **Inspection paths** : the narrow path of 06 to 1-meter width, usually constructed in and around each sub-compartment, make them assessable

CHAPTER 2

SURVEYING

[INTRODUCTION]

Chapter outline

2.1 INTRODUCTION

Surveying is the art of determining the relative positions of different objects on the earth's surface by measuring the *horizontal distances* between them and preparing a map to any suitable scale [In this branch, the measurements are taken only in the horizontal plane].

- **Leveling** is the art of determining the relative *vertical distances* of different points on the earth's surface. Therefore, the measurements are taken only in the vertical plane in leveling.

NEED, OBJECTIVES & SCOPE OF SURVEYING IN FORESTRY

Surveying and Map readings are important tools for protecting, managing, and administering a forest estate. A forester is often required to map out fire-burnt areas; demarcate and/or check forest boundaries; layout felling Coupes; prepare plantation maps and stock maps; detect and rectify encroachments and illicit possessions; prepare plans of areas to be cleared, or fenced or planted; align extraction roads and paths and for a variety of other purposes connected with his duties.

- To prepare a *topographic map* of a forest area that shows the hills, valleys, rivers, and forest villages of a forest area.
- To prepare a *cadastral map* showing the boundaries of the compartment, blocks, etc.
- To prepare plantation, stock, and management maps
- Determining the direction and distance Between different offices, plantation sites, and available water sources like rivers, streams, etc.
- Construction of forest roads and bridges
- To map out fire burnt areas
- To detect encroachments on the forest land, forest resources allocation, etc.

CHAPTER 4

CHAIN SURVEY

Chapter outline

4.1 DEFINITION

Chain surveying is the method of land surveying in which only linear measurements are taken with the help of a chain and no angular measurements are recorded. Here, the tie lines and check lines control the accuracy of work.

4.2 PRINCIPLE

The principle of chain surveying is **triangulation**. This means the entire targeted area that needs to be surveyed is divided into a number of small triangles which should be well-conditioned.

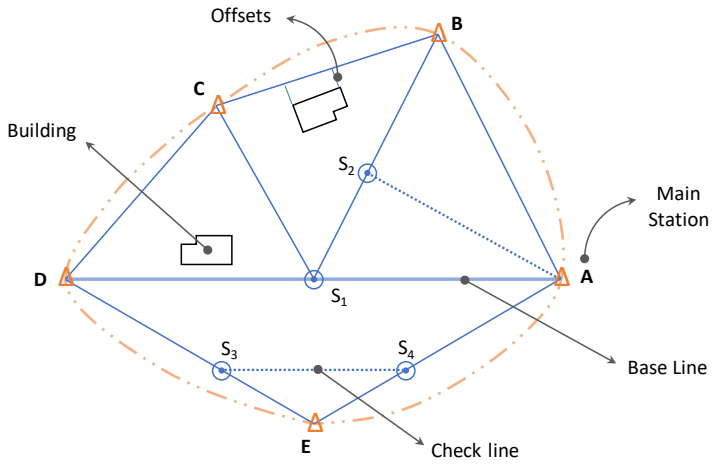


Figure : A network of triangles

A CHAIN SURVEY IS RECOMMENDED WHEN

- The ground surface is more or less level, *i.e.,* river flat plains or valleys.
- The surveyed area is small
- The formation of the well-conditioned triangle is easy
- When we required a small-scale map.

CHAPTER 5

COMPASS SURVEY

Chapter outline

In chain surveying, the area to be surveyed is divided into a number of triangles. Hence, this method is suitable for small areas of fairly level ground. When the area is large, undulated, and crowded with many details or follows a river or coastline, *triangulation* (which is the basic principle of chain surveys) is not feasible. In such an area, the method of *traversing* is adopted.

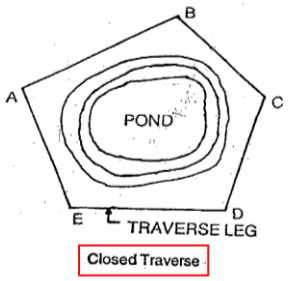
In traversing, the framework consists of a set of connected lines. Lengths are measured by chain or tape, and directions are identified by angle measuring instruments, such as a compass. Therefore, the process is called *compass traversing*.

5.1 DEFINITION

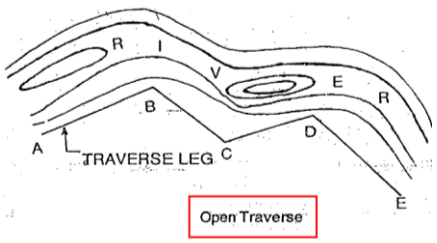
Compass surveying is a type of surveying in which the directions of surveying lines are determined with a magnetic compass, and the length of the surveying lines is measured with a tape or chain, or laser range finder.

5.2 PRINCIPLE OF COMPASS SURVEY

Traversing involves a series of connected lines. The distance of lines is measured by the chain, and the angle between lines are calculated by compass.



Closed Traverse



Open Traverse

5.3 RELATED IMPORTANT TERMINOLOGY

- **True meridian** : The line or plane passing through the geographical north pole and geographical south pole is known as the 'true meridian' or 'geographical meridian'.

CHAPTER 8

BUILDING MATERIAL

Chapter outline

Building materials have an important role to play in this modern age of technology. Although their most important use is in construction activities

8.1 STONE

Stones used in construction are derived from the rocks forming the crust of the earth's surface.

TYPES OF ROCKS

- According to geological formation : (a) igneous rock, (b) Sedimentary rock and (c) Metamorphic rock.
- According to chemical composition : (a) Siliceous Rocks, *i.e.,* Granite. (b) Calcareous Rocks, *i.e.,* Limestone. (c) Argillaceous Rocks, *i.e.,* Slate.

PROPERTIES OF GOOD STRUCTURAL STONE

- Strong against crushing forces
- Durability
- Hardness and toughness
- Appearance : Stones with lighter shades are preferable.
- Availability: Large size blocks of stones should easily be available, and it should be cheap.
- Stones should have the ability to receive polish and paint when used for facework.
- Stones should be resistant to fire
- Fineness of grain

TYPES OF BUILDING STONES

- Granite
- Basalt
- Limestone & Chalk
- Sandstone
- Laterite

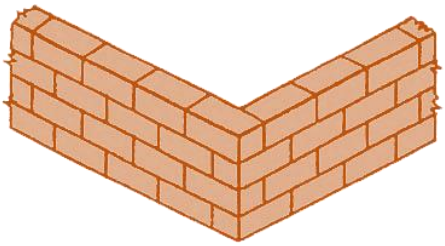
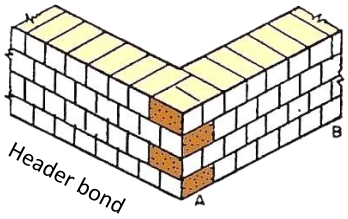
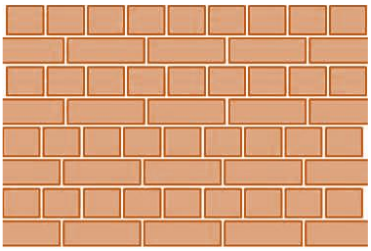


Figure : Stretcher bond

- **Header bond** : The facing of this bond has all the courses as headers only and the overlap which is half the width of the brick is obtained by introducing a three-quarter bat in each alternate course at the quoins. This pattern is used in case of wall of one brick thickness.



- **English bond** : The bricks in the facing are laid in alternate courses of headers and stretchers. The header course is commenced with a quoin header followed by a queen closer and continued with successive headers. Suitable for walls carrying heavy loads



- **Flemish bond** : When alternate header and stretcher are laid in same course. Every alternate course starts with quoin header followed by a queen closer to develop face lap. Every header will obtain a location that is central with respect to the stretcher above or below

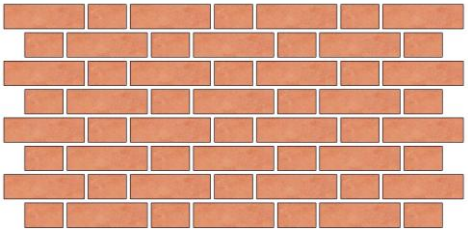
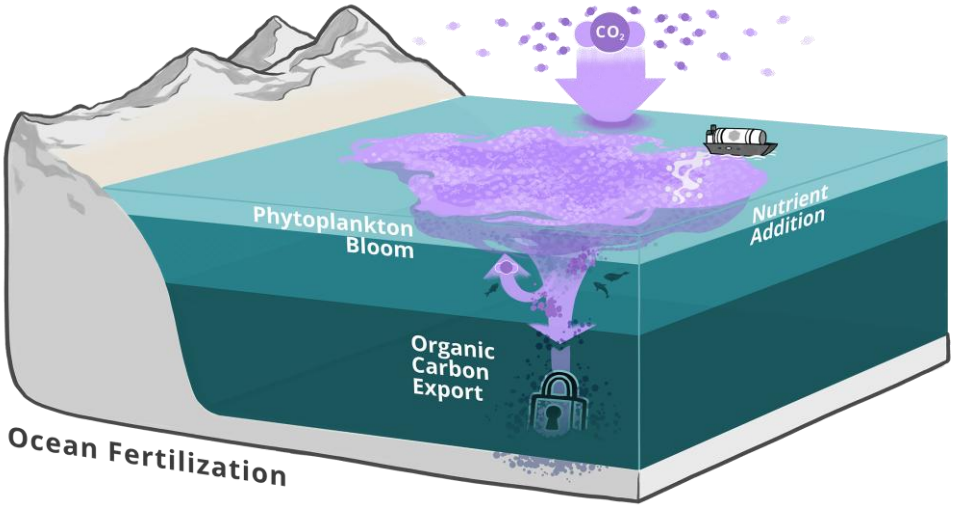


Figure : Flemish bond

TERMINOLOGY USED IN BRICKS MASONRY WORK

- Course : a horizontal layer of bricks stones
- Bed : lower surface of bricks or stones in each course
- Back : The inner surface of wall not exposed is called back. The material forming back is known as backing

- Irrigation : The availability of water is a critical factor for primary productivity
- Restoration of degraded ecosystems
- Management of fishing and harvesting : In aquatic ecosystems



📖 Why does ecology matter to a forester? Describe the various ecosystem services accruing from terrestrial forest ecosystem and the mangrove forest ecosystem [GPSC RFO (Main) 2021 | 10 m]

Foresters are responsible for managing forests, which are complex ecosystems that are home to a variety of plant and animal species.

Understanding the ecology of a forest helps foresters to make informed decisions about how to manage the forest in a way that is sustainable and that preserves the health of the ecosystem over time

This can help to ensure that the forest remains healthy and resilient in the face of disturbances such as fire, disease, and climate change.

Terrestrial forest ecosystems provide a wide range of ecosystem services

- Biodiversity conservation
- Climate regulation
- Soil and water conservation (Watershed)
- Water Quality / Recharge
- NTFP/Timber production = Tribal economy

Give examples of three such ecosystems which have high productivity in spite of low nutrient environment all around. Mention the reasons for the higher productivity in such environment [GPSC RFO (Main) 2021 | 10 m]

- **Mangrove ecosystem**
- **Desert ecosystem** : Despite the harsh and nutrient-poor conditions of deserts, many desert ecosystems are able to support a high level of productivity. This is due to the unique adaptations that many desert species have developed in order to survive, such as the ability to store water and nutrients in their tissues, or the ability to photosynthesize more efficiently in the intense light of the desert sun.
- **Tundra ecosystem**

INDIAN FOREST SERVICE (IFOS) 2023

Ritvika Pandey

Forestry Comprehensive Course

Swastic Yaduvanshi

Forestry Comprehensive Course

Vidyanshu Shekhar Jha

Forestry Comprehensive Course + Test Series

Rohan Tiwari

Forestry Comprehensive Course

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Yogesh Rajoriya

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G Prashanth

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Kanishak Aggarwal

Forestry Comprehensive Course

Shashi Shekhar

Forestry Comprehensive Course

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Aravindkumar R

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