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Paper - 1

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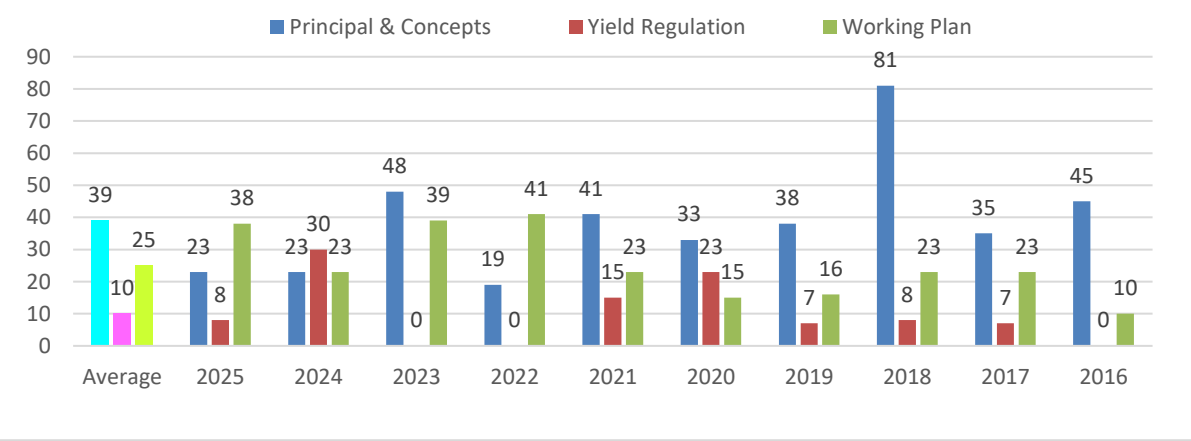
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CHAPTER 1

FOREST MANAGEMENT

Forest Management and Management Systems : ◈ ***Objective***, ***Principles***, and techniques; ◈ Concept of ***Sustained Yield*** (its principle, scope, and limitation); ◈ ***Rotation***, its types, and steps for reducing rotation age; ◈ ***Normal Forest***; ◈ ***Growing Stock***; ◈ ***Stand Structure*** and dynamics; ◈ ***Management of forest plantations***, commercial forests, and forest cover monitoring. Approaches viz., (i) site-specific planning, (ii) strategic planning, (iii) Approval, sanction, and expenditure. (iv) Monitoring (v) Reporting and governance; Regulation of yield. [***Covered in Module 3*** :-Details of steps involved such as formation of Village Forest Committees, Joint Forest Participatory Management]

Forest Working Plan : ◈ ***Forest Planning***, ***Evaluation***, and monitoring tools and approaches for integrated planning; ◈ Multipurpose development of forest resources and forest industries development; ◈ ***Working Plans*** and ***Working Schemes***, their role in nature conservation, bio-diversity, and other dimensions; ◈ ***Preparation*** and control. Divisional Working Plans, Annual Plan of operations.



[Part – I] PRINCIPLES & CONCEPTS

2025	• Discuss the concept of ***sustained yield***. How is it different from progressive yield on the basis of arguments given against sustained yield? [P2/1(c) | 8 M]. • Elucidate the ***scope*** and ***importance*** of forest management. How does choice of forest management objectives vary with ownership, locality, quality of forest produce and financial benefits? [P2/3(a) | 15 M].
2024	• Differentiate between ***Sustained Yield Management*** (SYM) and Sustainable Forest Management (SFM) [P2/1(a) | 8 M]. • What is ***Normal Growing Stock*** (NGS)? Explain briefly the method of determination of NGS in clear felling system with formulae [P2/3(a) | 15 M].

2023	• What are the objectives and principles of forest management? [P2/1(e) | 8 M]. • Describe the methods for assessment of ***Growing Stock*** [P2/2(a) | 15 M]. • What is village forest committee? Explain its role in forest management [Linked Q |P2/2(c) | 10 M]. • Describe the role of **MAI** (Mean Annual Increment) and **CAI** (Current Annual Increment) to decide rotation of a forest stand [P2/3(b) | 15 M]. • Describe the importance of forest management. How will it be operated in forest plantations? [P2/4(a) | 15 M].
2022	• What is the ***Purpose of Classifying Forests***? How are the forests classified for silvicultural management? [Linked Q |P2/1(a) | 8 M]. • Define Forest Management and write its ***Objectives***. Discuss in brief the major activities related to forest management [P2/2(a) | 15 M].
2021	• "Forestry enterprise is ***Peculiar*** compared to other enterprises" Justify [**P1**/1(b) | 8 M]. • Define ***Working Circle***. Mention different ***Types of Working Circles*** generally constituted in India. Explain ***Biodiversity Working Circle*** [P2/3(c) | 10 M]. • Define ***Rotation of Maximum Volume Production***. Explain the methods for fixing up of rotation of maximum volume production with the help of a neat diagram [P2/4(a) | 15 M]. • Differentiate Stand density and Canopy density. Mention Canopy density classification as per Forest Survey of India [P2/1(d) | 8 M].
2020	• What are the recommended practices *for* ***Strategic Harvest Planning?*** [P2/1(d) | 8 M]. • What are the factors that affect a ***Stand Structure***? Describe in brief the DBH distribution in even, uneven, and multi-aged normal forest stands [P2/2(a) | 15 M]. • What are the Socio-ecological implications of ***Modifying Rotation Lengths*** in forestry? [P2/3(c) | 10 M].
2019	• Explain the role of Normal Series of ***Age Gradation*** and ***Age Class*** in forest management [P2/1(a) | 8 M]. • Describe the method for calculation of ***Normal Growing Stock*** with the help of yield table [P2/2(a) | 15 M]. • What is ***Progressive Yield*** ? How is annual yield obtained in a forest worked with periodic block method? [*Linked* Q : *Yield regulation* | P2/4(a) | 15 M]. • What is Compartment*?* why is its study and description required when making a working plan? (15 m) [*Linked* Q : *Working Plan* | P2/2(b) | 15 M].
2018	• What is **Sustained Yield** ? Mention the positive and negative aspects related to sustained yield [P2/1(b) | 8 M]. • What is **Growing Stock**? How is normal growing stock calculated in **Clear Felling System** based on final MAI? [P2/2(b) | 15 M]. • Define **Rotation**. Explain different types of rotation with special reference to ecological, industrial, and economical benefits [P2/2(c) | 10 M].

	• What is **Increment** ? Discuss different types of increments. Discuss the graphical relationship between current annual increment and mean annual increment [P2/3(b) | 15 M]. • Define forest management. Give its objectives. How does the attitude of the owner put impact on the management of forests? [P2/4(a) | 15 M]. • What is sustained yield? Explain how it is achieved in practice [**P1**/1(c) | 8 M]. • How is the rotation of any particular species at any particular locality practically decided? [**P1**/2(c) | 10 M].
2017	• Why site-specific planning is essential for forest management? Explain different components of site-specific management [*Linked* Q : *Silviculture* | P2/1(a) | 8 M]. • How the **Forest Cover** was measured prior to and post 1980's in India? Define the various categories of forest cover [P2/1(b) | 8 M]. • Describe the different formulae used in forest trees for determining **Increment Percent** in diameter and volume [*Linked* Q : *Mensuration* | P2/3(a) | 15 M]. • Write about the concept of **Normal Forest** and the kind of abnormalities which affect the normal growing stock [P2/4(a) | 15 M].
2016	• How are the forests classified in India? Discuss its significance in forest management [*Linked* Q : *Silviculture* | P2/1(a) | 10 M]. • What is **Normal Growing Stock**? Explain the determination of NGS in clear felling system with graphical illustration and numerical examples [P2/1(b) | 10 M]. • How do you visualize the concept of **Normal Forest** in Indian context? describe the effect of silvicultural system on normality [P2/2(b) | 10 M]. • What is the **Increment Percent** ? Discuss the relationship between CAI and MAI of a forest stand [P2/2(c) | 10 M]. • Explain the concept of rotation and its application in regular and irregular forests [P2/4(b) | 10 M].
2015	• **Progressive Yield** concept differs from **Sustainable Yield**. Under the present situation, which would you suggest and why? [P2/2(a) | 15 M]. • Discuss how the **Rotation of Minimum Volume Production** differs from the **Silvicultural Rotation** [P2/2(c) | 10 M]. • Enumerate the importance of **Forest Survey of India** (FSI) in the forest management system [P2/7(c) | 10 M]. • Show by your interpretation, either graphically or theoretically, how the forest yield depends upon the **Growing Stock** [*Linked* Q : *Working Plan* | P2/2(b) | 15 M].
2014	• Define rotation and describe the various **types of Rotation** prescribed [P2/1(e) | 8 M]. • With the help of a diagram, discuss the **relationship between MAI and CAI**. What is their role in forest measurements? [P2/2(c) | 10 M]. • What are the **Peculiarities** you have observed in **Forest Management** practices? Suggest ways to overcome them [P2/4(b) | 10 M]. • Define **Growing Stock**. Explain the estimation of growing stock and density [P2/7(a) | 10 M]. • How enumeration of the **Growing Stock** is done? describe in brief the various methods of enumeration for preparing a working plan (15 m) [*Linked* Q : Working plan | P2/2(a) | 15 M].

2013	• Describe the **scope and objectives of Forest Management**. What is the impact of restrictions laid down by the Hon'ble Supreme Court on green felling in forests? [**P1**/8(a) | 10 M]. • Define the **rotation** and describe **its various types** used in Indian forestry [P2/2(a) | 20 M]. • Describe the compound interest and Schneider's formulae for calculation of **increment percentage** [*Linked* Q : Forest mensuration | P2/2(b) | 10 M].
2012	• Differentiate between – **CAI and MAI** [**P1**/3(a) *iv* | 4 M]. • Describe compound interest formula for calculation of diameter increment percent [P2/1(e)|8]. • Explain **dynamics of forest vegetation** giving an example of the evolution of Sal Forest in Uttaranchal [P2/8(c) | 10 M].
2011	• Write short notes on – interrelationship between **CAI** and **MAI** [**P1**/3(b) *i* | 5 M]. • Explain the situations under which a **Forest** becomes **Abnormal** [P2/1(a) | 10 M]. • Define **Rotation** & discuss different **Types** of **Rotations** giving suitable examples [P2/3(a) | 20 M].
2010	• Discuss the significance of normality in **sustainable management of forest** [P2/1(a) | 8 M]. • How is **De-Liocourt's principle** utilized to ensure normality concept in selection forest? [P2/1(c) | 8 M]. • How do variation in density and quality of a forest influence annual yield estimation? [*Linked* Q : Yield Estimation | P2/1(d) | 8 M]. • How are yield table data used for the assessment of **normal growing stock**? [P2/1(e) | 8 M]. • What is **working circle**? How is it decided in working plan exercise? [*Linked* Q : *Working plan* | P2/1(a) | 8 M]. • Briefly discuss the relative importance of **physical and silvicultural rotations** in respect of existing forest resources of India [P2/2(d) | 8 M]. • Explain the components of **compartment description** [*Linked* Q : *Working plan* | P2/3(d) | 10 M]. • How is the **soil expectation value** helpful for deciding financial rotation ? [P2/4(a) | 10 M]. • What is **intermediate yield** ? How does it differ from final yield ? [P2/4(d) | 10 M].

[Part – II] YIELD REGULATION

2025	• Describe ***Von Mantel's formula*** of yield regulation. Enlist its advantages and disadvantages. [P2/1(d) | 8 M].
2024	• What is yield regulation? What are the bases of yield regulation? Enlist different methods applicable to regular and irregular forests [P2/4(a) | 15 M]. • What are allometric growth models? Mention different types and explain their application in growth and yield management of forest stands [P2/4(b) | 15 M].
2021	• Explain the **French Method (1883)** of yield regulation in irregular forests. What are its advantages and disadvantages? [P2/3(a) | 15 M].
2020	• What are the classical methods for determining the allowable cut? [P2/2(b) | 15 M]. • What are the *key decision parameters* in an *uneven-aged forest management* [P2/1(a) | 8 M].

2019	• What is **progressive yield** ? How is annual yield obtained in a forest worked with periodic block method ? [*Linked* Q : Principles & Concepts | P2/4(a) | 15 M].
2018	• 50 *equi-productive* coups are to be worked out from 2000 hectares of forest under clear felling system with the following densities [P2/1(c) | 8 M]. *Area (ha)* – *Densities* 600 – Normal density 400 – 0·75 density 800 – 0·50 density 200 – 0·25 density Find out the number of coupes in different densities. 8
2017	• How a selection forest is managed under the **Felling Series**? Describe with suitable examples/diagrams [*Linked* Q : *Silviculture System* | P2/2(a) | 15 M].
2014	• How yield is regulated? Describe the **Von-Mantel's formula** for yield regulation in forests [P2/2(b) | 15 M]. • Describe the general principle of **yield regulation in Uneven-aged Forest** crop [P2/7(b) | 10 M]. • Give a short account on - the management of uneven-aged forests [**P1**/1(e) | 8 M].
2013	• What is the yield regulation in forest management? How can the yield regulation by **Judeich method** be used? [P2/1(e) | 8 M].
2011	• How is yield regulated in a forest which is worked under clear felling system? [P2/1(d) | 10 M]. • Discuss **Smythies Safeguarding formula** for annual harvest of timber from a selection forest (20 m) [P2/2(a) | 20 M].
2010	• Describe the procedure for allotting different **types of periodic blocks** in a forest [P2/3(b) | 10 M].

[Part - III] WORKING PLAN

2025	• What are the ***challenges*** in implementing traditional forest working plans in tribal and forest-dependent communities? Enlist the steps to overcome these challenges. [P2/1(a) | 8 M]. • Discuss the field work to be carried out by a ***Working Plan Officer*** for the preparation of Working Plan. [P2/2(b) | 15 M]. • Discuss the ***objectives*** and ***scope*** of Forest Working Plan. Give the characteristics of a good working plan. Enlist the summary of facts on which proposals are based for their preparation. [P2/3(b) | 15 M].
2024	• What is unit of working plan in India? How does it differ with other temperate countries? Briefly explain the Annual Plan of Operations (APOs) [P2/1(e) | 8 M]. • What is the National Working Plan Code 2023? What are its salient features? Discuss its importance in sustainable forest management and biodiversity Conservation [P2/2(a) | 15 M].
2023	• Differentiate between forest working plan and forest management plan [P2/1(a) | 8 M]. • What are Maps? How are they helpful in the management of forests? [P2/1(c) | 8 M].

	• Describe the role of working plan in forest conservation [P2/3(c) | 8 M]. • Describe regeneration survey in natural forest and explain the significance of regeneration stock map [P2/4(b) | 15 M].
2022	• How is the regeneration Map of Moist deciduous forest prepared [**P1**/1(c) | 8 M]. • Maps play a significant role in working plan preparation. Explain [P2/2(c) | 10 M]. • Describe the outline and the components of the preliminary working plan report [P2/3(a)| 15 M]. • "Working plan is a document of enforce systematic, obligatory and mandatory regulations for continuous management of a given forest". Discuss [P2/3(c) | 8 M].
2021	• "Working plan is a basic prerequisite for the management of forest division" Discuss [P2/1(c) | 8 M]. • What is **forest regeneration survey map**? How is it useful in the management of natural forests? [P2/3(c) | 10 M]. • Briefly explain the steps involved in **preparation of working plan** according to national working plan code, 2014 [P2/4(b) | 15 M].
2020	• A well-defined working plan is crucial for the **sustainable management of forests** and **biodiversity**. Write your answer in brief in the light of **National working plan code 2014** [P2/4(b) | 15 M].
2019	• Describe the **significance** of **working plan** and **working scheme** in conserving biodiversity [P2/1(b) | 8 M]. • What is Compartment? why is its study and description required when making a working plan? [*Linked* Q : *Principles & Concepts* | P2/2(b) | 15 M].
2018	• Define working plan. Discuss objectives and scope of a working plan. Describe salient features of a good working plan [P2/3(a) | 15 M]. • What are the **forest stock maps**? Discuss the details shown in stock maps for a working plan report [P2/1(e) | 8 M].
2017	• What are the objectives of working plan? How it is helpful for conservation of biodiversity and natural resource conservation of forests? [P2/1(c) | 8 M]. • Describe the Various **Kinds of Maps** prepared by the Working Plan Officer. What is their utility and purpose ? [P2/3(b) | 15 M].
2016	• Differentiate **Working Plan** and **Annual Plan** of operations. Suggest the changes needed in the working plan preparation for more effective application in forest management [P2/2(a) | 10 M].
2015	• Maps are an integral part of forest management. Give your perceptions about the kind of maps you consider important for managing a forest circle [P2/3(b) | 15 M].
2014	• Describe the following – (a) Regeneration Survey [**P1**/6(b) *iv* | 2.5 M].
2013	• What are the main contributions of Dr. D. Brandis in Indian forestry? Enumerate the various stages of working plan. What is the role of silvicultural system in the working plans? [P2/1(b) | 8 M]. • Describe a stock map. Discuss the scheme of recording crop composition (including colouring pattern used) and crop density [P2/4(a) | 8 M].

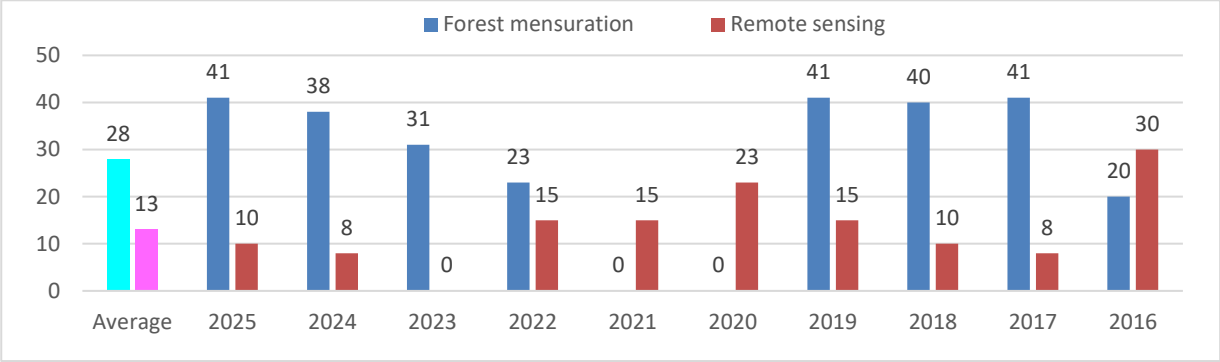
2011	• What is a **regeneration stock map**? How is it prepared? [**P1**/1(d) | 10 M]. • Explain various types of maps prepared by Working Plan Officer [P2/1(c) | 10 M].
2010	• What are the **different regeneration categories** that are observed and recorded during sal regeneration survey? [P2/1(b) | 8 M]. • What is working circle? How is it decided in working plan exercise? [*Linked* Q : Principles & Concepts | P2/2(b) | 8 M]. • Explain the components of **compartment description** [*Linked* Q : Principles & Concepts | P2/3(d) | 10 M].

CHAPTER 2

FOREST MENSURATION

Forest Mensuration : ◈ Methods of measuring – diameter, girth, height and volume of trees; ◈ Form-factor; ◈ volume estimation of stand, current annual increment; mean annual increment, ◈ Sampling methods, and sample plots. ◈ Yield calculation; yield and stand tables.

Remote Sensing : ◈ Forest cover monitoring through remote sensing, ◈ Geographic Information Systems for management and modelling.



FOREST MENSURATION

2025	• What do you mean by tree height? Explain diagrammatically the method of height estimation on level as well as on sloping grounds using tangent method. [P2/1(b) | 8 M]. • Differentiate between yield tables and stand tables. Give objectives of stand table. [P2/1(e) | 8 M]. • Explain stratified sampling and variable radius sampling methods. [P2/3(c) | 10 M]. • Give objectives of diameter and girth measurement. Discuss the comparison between tape and calliper measurements. How are tree diameter classes formed in India? [P2/4(a) | 15 M].
2024	• Explain (*i*) ***Crop Diameter***, (*ii*) ***Crop Height***, (*iii*) Spectral signature and (*iv*) General ***Volume Table*** [P2/1(b) | 8 M]. • What is ***Commercial Volume***? Explain different methods of volume estimation of felled logs and compare with quarter girth method [P2/2(b) | 15 M]. • Which criteria have to be considered while choosing statistically sound ***Sampling Design***? How do you estimate the sample size for forest inventories? Explain different kinds of sampling units [P2/3(b) | 15 M].
2023	• What is ***Point Sampling***? How is it used in forest enumeration? [P2/1(b) | 8 M].

	• Explain briefly the reference point for measurement of diameter and girth of tree species [P2/1(d) | 8 M]. • How does the yield table differ from the ***Volume Table***? Describe the contents of yield table with justifications [P2/2(b) | 15 M].
2022	• Explain (i) Artificial Form Factor, (ii) Absolute ***Form Factor***, (iii) Normal Form Factor, and (iv) Form Quotient [P2/1(e) | 8 M]. • Describe the tangent method used to calculate height of trees on (i) Level ground, and (ii) Sloping ground [P2/4(b) | 15 M]. • Describe the graphical method of preparation of ***Volume Table*** [P2/1(b) | 8 M].
2019	• Explain ***Metzger's Theory*** of tree form and its significance in volume calculation [P2/1(c) | 8 M] • Describe the procedure for estimating the volume of standing and felled tree [P2/1(e) | 8 M]. • Explain the principles of the height measuring instruments giving suitable examples [P2/2(c) | 10 M]. • What is ***Point Sampling***? How is it helpful to find out the basal area of a forest? [P2/3(b) |15 M]
2018	• What are the precautions required for diameter measurements with ***Calipers***? Discuss the errors that occur due to non-observation of the precautions [P2/2(a) | 15 M]. • Define ***Volume Tables*** and give their classification [P2/3(c) | 10 M]. • Define forest ***Sampling***. Give advantages of sampling Discuss different types of non-random sampling methods used in forestry [P2/4(b) | 15 M].
2017	• How ***Volume Tables*** are classified on the basis of kind of out-tum? Describe briefly [P2/1(e) | 8 M]. • How the geometrical measurements for calculating volume yield are made in (i) Buttressed tree, (ii) Leaning tree on a slope, and (iii) a tree forked at the base? Give a thematic presentation [P2/2(b) | 15 M]. • Describe the different formulae used in forest trees for determining ***Increment Percent*** in diameter and volume [*Linked* Q | P2/3(a) | 15 M]. • Write a note on kinds of enumeration and explain in brief different random ***Sampling*** techniques used in forest inventories [P2/4(c) | 10 M].
2016	• Discuss the significance of ***Stump Analysis*** in forest mensuration. How does it help in understanding the past growth of trees? [P2/1(c) | 10 M]. • *Sampling* has a very important role in ***Forest Inventory***. Discuss with the help of kinds of sampling [P2/4(c) | 10 M].
2015	• Which of the instruments has ***Wheeler's Pentaprism*** replaced and why? [P2/1(c) | 8 M]. • How important are the ***Increment Borers*** in forest health and growth analysis? Does Pressler's borer have any adverse effects on the tree sampled? Elaborate on the issue [P2/1(d) | 15 M]. • How far do ***Taper Tables*** help in measuring the volume of a tree? Discuss their types and methods of preparation [P2/4(a) | 15 M]. • Why are ***Sample Plots*** laid out in different forest species? What is their utility and how are

<table>
<tr><td></td><td>they enumerated? [P2/4(b) | 15 M].</td></tr>
<tr><td>2014</td><td>

What is a Stand Table? Give a brief description for preparation of a stand table [P2/1(a) | 8 M].
How is Stump Analysis carried out and what kind of information does it yield? [P2/1(c) | 8 M].
What is a tree Stem Form? How is tree stem form calculated and what are its uses in forestry? [P2/3(b) | 15 M].
Differentiate between Sample Plots and preservation plots. Discuss their role in management [P2/3(c) | 15 M].
"Spiegel Relaskop is an instrument of great use in forestry" justify with reasons. How is the basal area per hectare determined by this instrument? Explain [P2/4(c) | 15 M].
In brief, but in an explanatory way describe the preparation and utility of yield tables in forestry [P2/5(a) | 8 M].
What is an Increment Borer? Describe its role in forestry [P2/6(c) | 15 M].

</td></tr>
<tr><td>2013</td><td>

Differentiate between the graphical method and the regression equation method for the preparation of general Volume Tables [P2/2(a) | 8 M].
Differentiate between Hojer's Formula and Behre's Formula for tree form [P2/1(d) | 8 M].
Describe the compound interest and Schneider's formulae for calculation of Increment Percentage [Linked Q | P2/2(b) | 10 M].
Differentiate between Random Sampling and non-random sampling. Describe different methods of non-random sampling that are used in forest inventories [P2/2(c) | 10 M].
In Stem Analysis, diameters of 30th ring (as computed on BH section) at different height sections was found as follows [P2/4(c) | 10 M].
<table>
<tr><td>Ht. of Section (m)</td><td>01.37</td><td>04.24</td><td>07.24</td><td>10.24</td><td>13.24</td><td>14.74</td></tr>
<tr><td>Diameter (cm)</td><td>29.5</td><td>25.2</td><td>21.0</td><td>16.00</td><td>10.40</td><td>06.60</td></tr>
</table>
The diameter curve of 30th ring cuts the height axis at 18.24 m
(The average seedling takes 10 years to reach 1.37 m)
Calculate the MAI at 40 years of Age of the tree.

</td></tr>
<tr><td>2012</td><td>

What are the items of information available in the Volume Table in addition to the volume of tree? Briefly describe them [P2/1(a) | 8 M].
Describe the process of Tree Height measurement by the Abney level. What are its advantages and disadvantages? [P2/1(b) | 8 M].
Describe various formulae for calculation of the Volume Of Logs [P2/1(c) | 8 M].
Define Stem Analysis and discuss its purpose [P2/1(d) | 8 M].
Describe Compound Interest Formula for calculation of diameter increment percent [Linked Q | P2/1(e) | 8 M].
Describe the indirect methods for Volume Estimation of trees [P2/2(a) | 14 M].
If the Angle Of Elevation to the tip of the tree is 30° and 45° respectively, measured from two sides of a ravine, and width of the ravine at the top is 15" m and height of the eye of observer from the ground is 1·5 m, find the height of the tree [P2/2(b) | 8 M].
Calculate values of – [P2/3(a) | 10 M].

</td></tr>
</table>

	(i) Bark thickness; (ii) Log volume OB; (iii) Log volume UB; (iv) Volume of bark, and (v) Bark percentage, for a log with measurements DBH OB = 130 cm, DBH UB = 124 cm and Length = 4·8 m • Discuss the ***Metzer's Theory*** of Stem Form [P2/3(c) | 8 M]. • A tree with elliptical c/s when measured at BH by a ***Calipers*** gives two values as 71 cm and 65 cm. Girth of the tree at BH by tape is 1·82 m. Calculate the basal area by three different methods, listing the methods clearly, and discuss which method is the correct one [P2/3(d) | 12 M]. • Estimation of ***Crown Volume*** depends on which factors and what are the different geometrical shapes of crowns? Write down the various formulae for measurement of crown volume [P2/2(c) | 10 M]. • Briefly explain the ***Monteith Formula*** for biomass estimation of plants [P2/7(e) | 5 M].
2011	• Describe reference point of ***Diameter/Girth Measurement*** on a standing tree [**P1**/1(b) | 10 M]. • Explain principles of ***Height Measuring*** instruments [P2/2(b) | 10 M]. • What is ***Quarter Girth Formula***? Why is it preferred for calculation of log volume? [P2/2(c) | 10 M]. • What is ***Yield Table***? How contents of yield table is utilized in forestry? [P2/3(c) | 10 M].
2010	• Comment on the comparative significance of ***Calliper*** and ***Tape*** for D.B.H. Measurement [P2/2(a) | 8 M]. • Write down the methods for laying out ***Sample Plots*** for periodic recording of growth data [P2/2(c) | 8 M]. • Explain the principle and use of ***Abney's Level*** [P2/3(c) | 10 M]. • Write principle of ***Christen Hypsometer*** and its use [P2/4(c) | 10 M].

[Part-II] REMOTE SENSING & GIS

2025	• Discuss the importance of remote sensing and GIS in forest resource monitoring and their use for better checks and production of forest resources in long-term forest working. [P2/4(c) | 10 M].
2024	• What is **GPS**? Briefly explain its segments and its applications in forest inventories and monitoring [P2/1(c) | 8 M].
2022	• "Application of ***Remote Sensing*** and **GIS** helps in continuous forest cover monitoring and efficient forest management activities". Explain with Examples [P2/4(a) | 15 M].
2021	• Define ***Gioinformatics***. What are its elements? Explain its role in management and monitoring of forest resources [P2/2(a) | 15 M].

2020	• Why should **GIS** be considered as a 'Pure Science'? [P2/1(b) | 8 M]. • What are the application of ***Remote Sensing*** in forestry? [P2/3(a) | 15 M].
2019	• Describe the role of ***Remote Sensing*** and **GIS** in monitoring forest resources [P2/4(b) | 15 M].
2018	• Define ***Remote Sensing***. Discuss its *application in forest management* along with GIS applications [P2/4(c) | 10 M].
2017	• What are the applications of ***Remote Sensing*** and **GIS** in the field of forestry and wildlife? [P2/1(d) | 8 M].
2016	• Define ***Photogrammetry***. Discuss in detail its application in forest management [P2/1(d) | 10 M] • Thermal ***Remote Sensing*** has specific application in forest management, Describe [P2/3(b)|10 M] • The recent developments in **GIS** ***and Digital Image*** *Processing* make forest cover assessment and mapping more easier and accurate. Explain your views [P2/4(d) | 10 M].
2015	• Discuss how the microwave ***Remote Sensing*** has been found to be more useful in forestry than other satellite imageries [P2/4(c) | 10 M].
2014	• Differentiate between ***Geostationary*** and ***Sun Synchronous Satellite***; and satellite imagery and remote sensing [P2/1(b) | 8 M].
2012	• What are the advantages and disadvantages of **LANDSAT** images? [P2/2(d) | 8 M].
2011	• How is ***Remote Sensing*** advantageous as compared to ground surveys? [P2/1(e) | 10 M].
2010	• What are the ***Pictorial Elements*** used of interpretation of aerial photo graphs [P2/3(a) | 10 M]. • How does the ***Flying Height*** influence the scale of aerial photo graphs in hilly areas [P2/4(b) | 10 M].

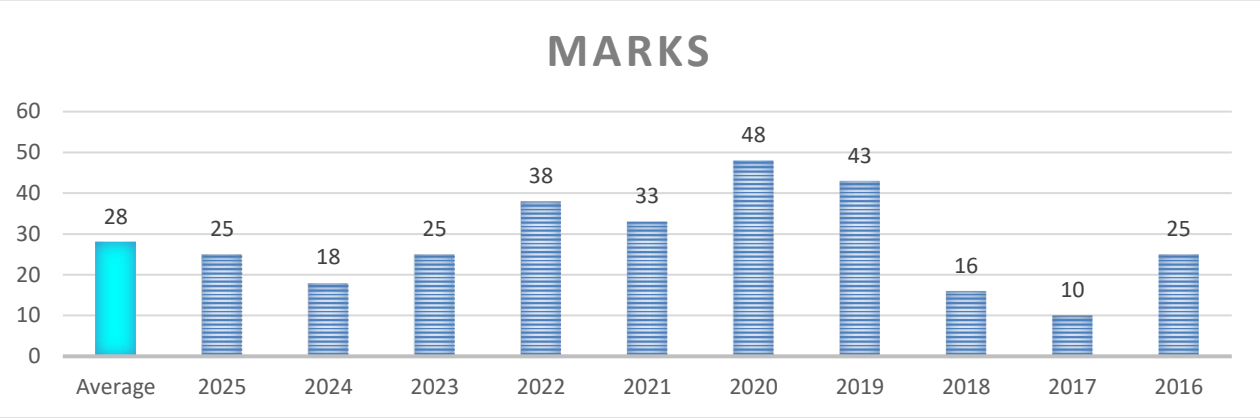
Primary Reference Resources

- Forest mensuration by Chaturvedi AN & Khanna LS, IBD publication Dehradun.
- Forest mensuration by Anthonie VL and Alparslan A, Springer publication.
- Forest mensuration by Kershaw JA et. al, Wiley Blackwell publication (5th edition).
- Forest inventory, Methodology and application by Annika k & Mattis M, Springer publication.
- FAO web portal.
- Remote sensing and GIS by Basudeb Bhatta, Oxford University press (3rd Edition, 2020)
- Websites for Previous year Papers – UPSC, OPSC, HPPSC, UKPSC, UPPSC and crowd sourcing.

CHAPTER 3

FOREST SURVEYING & ENGINEERING

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) PYQs [2010 to 2024]

FOREST SURVEYING & ENGINEERING

2025	• What are cantilever bridges? Discuss the stability of cantilever bridges along with their disadvantages. [P2/2(c) | 10 M]. • Discuss the environmental impact of road, tunnel and bridge construction in forest ecosystems. [P2/4(b) | 15 M].
2024	• Differentiate between ***Traverse Surveying*** and ***Chain Surveying*** [P2/1(d) | 8 M]. • Differentiate amongst ***Contour Line***, ***Contour Gradient*** and ***Contour Interval***. Describe the characteristics of contours [P2/4(c) | 10 M].
2023	• What do you understand by ***Bridges*** and ***Culverts***? Write the types of any two bridges with sketches [P2/4(c) | 10 M]. • Give a list of materials used in ***Construction of Building*** and describe the characteristics of any two materials [P2/3(a) | 15 M].
2022	• Write the general ***Principles of Surveying***. Describe (i) direct methods of chaining on sloping ground, and (ii) chaining when vision is obstructed, but chaining is free [P2/2(b) | 15 M]. • Explain the ***Single-Line*** and ***Double-Line*** Field Books with neat sketches. Mention the steps followed in the field work of Chain Survey [P2/3(b) | 15 M].

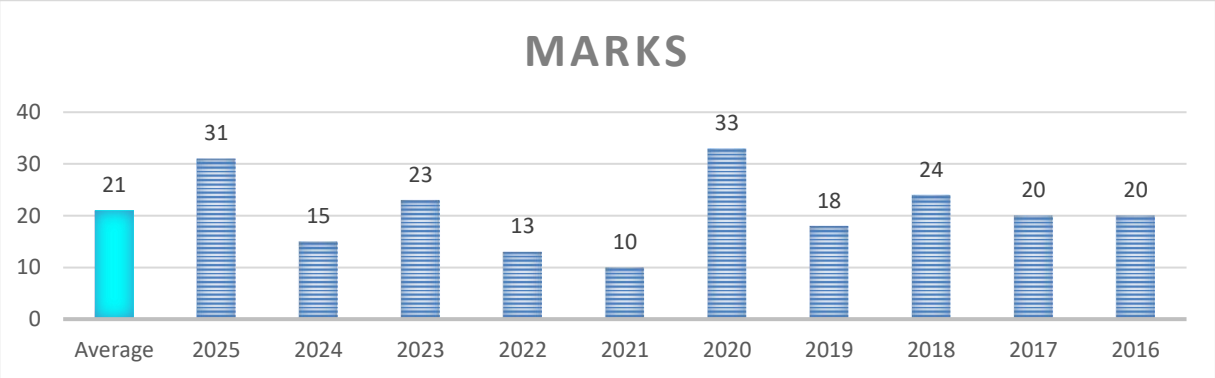
	• Describe the major considerations of ***Road Alignment*** in the plains. Explain the terms (i) Gradient, (ii) Camber, and (iii) Drainage related to roads in the hills [P2/1(c) | 8 M].
2021	• Explain the term (i) True meridian, (ii) Magnetic meridian, (iii) ***Reduced Bearing***, and (iv) Fore and back bearing [P2/1(e) | 8 M]. • What are the advantages and disadvantages of ***Plane Table Surveying***? Describe Radiation, Intersection, Traversing and Resection methods of plane table surveying [P2/2(b) | 15 M]. • Describe structure of ***Suspension Bridge*** and Cantilever bridge. [P2/4(c) | 10 M].
2020	• Construction and maintenance of ***Forest Roads*** can be considered as an essential investment of forest growth. Comment [P2/1(e) | 8 M]. • What are the factors that cause foundation failure during construction of a ***Forest Building***? [P2/2(c) | 10 M]. • What are the basic details of an engineering design of a ***Timber Bridge***? What steps should be taken to ensure its durability? [P2/3(b) | 15 M]. • What are the objectives of forest surveying? How does topographic survey aid in forest planning and management? [P2/4(a) | 15 M].
2019	• Define ***Bridge*** and explain different types of bridge with sketches. [P2/1(d) | 8 M]. • Give a list of ***Survey Methods*** adopted in Forest. Describe the survey of forest when a river comes in the way of Survey line. [P2/3(a) | 15 M]. • Explain concrete and write the characteristics of good ***Concrete Mixture*** [P2/3(c) | 10 M]. • What is ***Brick*** ? Describe different types of bricks giving their characteristics [P2/4(c) | 10 M].
2018	• What is the importance of surveying in forestry? Discuss different methods of surveying to solve the forestry field problems. [P2/1(a) | 8 M]. • Give the ***Classification of Forest Roads***. What features are required for a reconnaissance for forest roads? [P2/1(d) | 8 M].
2017	• Describe the ***Dead*** and ***Live Loads*** and how they are calculated on the roof trusses over buildings? [P2/3(c) | 10 M].
2016	• Enumerate the methods of direct ***Linear Measurements***. Discuss in brief the application of prismatic compass in forest survey [P2/2(d) | 10 M]. • Distinguish the ***Irish Bridge***, Simple ***Wooden Bridge*** and ***Suspension Bridge*** with details and neat sketches [P2/3(c) | 15 M].
2015	• ***Topographic Surveys*** are found useful in forest management. Discuss [P2/1(b) | 8 M]. • Which are the basic factors you have to look for before running out a survey lines in chain survey? [P2/1(e) | 8 M]. • How will you fined the reduced levels of the given points by height of collimation methods and rise and fall method and then check arithmetically? [P2/3(a) | 15 M]. • In a forest survey, you are provided a ***Prismatic Compass***. How will you accomplish the bearings of line AB? [P2/3(c) | 10 M].
2014	• How is ***Compass Survey*** done? what are the advantages of compass surveying? [P2/4(a) | 15 M].

2013	• Define the ***Arches*** used in construction. What are the different characteristics required in an arch? [P2/3(b) | 10 M]. • Describe all the ***5 Kinds of Chains*** used in survey and advantages and disadvantages of chain surveys [P2/3(c) | 8 M]. • Write down the ***Chemical Constituents*** of earth (chemical formula and percentage range of contents) for manufacture of good quality of *bricks*. [P2/3(d) | 7 M]. • Find out the maximum and minimum pressures of a wall which is 60 ft long and 4.5 ft wide at the base of its footing, carrying loads at the following distances from the left hand side : 20 tons at 10 ft, 30 tons at 25 ft, 40 tons at 28 ft, 48 tons at 50 ft and 12 tons at 55 ft. [P2/4(d) | 15 M].
2012	• Describe the structure of ***Dumpy Level*** through a well labelled diagram. [P2/3(b) | 10 M]. • Discuss the "***Two-Point Problem***" - the special case of resection in Plain Table Survey. [P2/4(a) | 12 M]. • Describe the limitations and advantages of ***Plane Table Survey***. [P2/4(b) | 8 M].
2011	• Describe how you would continue the line with the chain only, When (20 m) [P2/4(a) | 20 M]. (i) A large river interrupts the chain line, and (ii) A forest area comes across the chain line • Explain the term [P2/4(b) | 10 M]. *(i)* Whole circle bearing, and *(ii)* Quadrantal bearing • Describe, with sketches of ***Suspension Bridge***. [P2/4(c) | 10 M].
2010	• Describe methods of using ***Prismatic Compass*** in forest surveys. [P2/1(f) | 8 M]. • Distinguish between ***Irish Bridge***, ***Suspension Bridge*** and ***Cantilever Bridge***. [P2/2(e) | 8 M].

CHAPTER 4

FOREST ECOLOGY

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***.



FOREST ECOLOGY

2025	• What are the functional characteristics of an ecosystem? Briefly explain the process of energy flow within an ecosystem. [P2/5(a) | 8 M]. • What are the most effective strategies for balancing biodiversity conservation with sustainable resource utilization in forest ecosystems, especially in the face of climate change and increasing anthropogenic pressures? [P2/5(c) | 8 M]. • Define forest ecology. Briefly describe the key parameters of forest productivity and explain the methods used to determine ecosystem productivity. [P2/8(a) | 15 M].
2024	• Describe in brief the importance of ***Biogeochemical Cycles***. Compare between carbon cycle and nitrogen cycling [P2/6(a) | 15 M].
2023	• Describe the major attributes of forest ecosystem [P2/5(a) | 8 M]. • Explain different types of ***Biodiversity*** and describe various methods for its management [P2/6(b) | 15 M].
2022	• Discuss the components of a desert ecosystem. Write steps to control shifting of sand dunes [Linked Q : *Wasteland management* | P2/6(b) | 15 M]. • What are Commensalism, Amensalism, Mutualism and Symbiosis? Write the functions of an ecosystem [Linked Q : *Silviculture* | P2/8(c) | 10 M].
2021	• Justify the statement "Wild animals are one of the biotic components of the forest

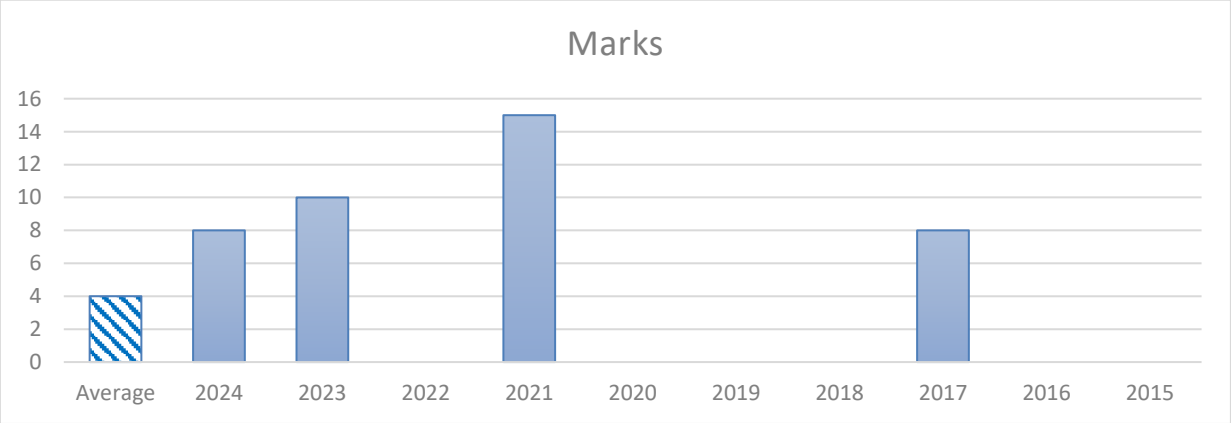
	ecosystem" How do they help in forest regeneration? [P2/6(c) | 10 M].
2020	• Why is carbon cycle important? How do human activities affect ***Carbon Cycle***? [P2/6(c) | 10 M]. • Describe the ***In–Situ*** biodiversity conservation with reference to Biosphere Reserves [P2/5(e) | 8 M]. • What do you mean by ***Population Diversity***? What are the different methods to measure biodiversity? [P2/6(a) | 15 M].
2019	• What are ***Ecological Pyramids***? Explain different types. Mention the implications of concepts of ecological pyramids in understanding forest ecosystems [P2/7(c) | 10 M]. • Describe the features and importance of ***Clonal Parks*** in forest conservation [P2/5(a) | 8 M].
2018	• What is ***Carbon Sink*** *?* How do forest soils act as important carbon sinks? [P2/5(b) | 8 M]. • Forest ecology is the study of complex interactions between organic and inorganic components of the forest ecosystem. Explain organic and inorganic components providing two examples of each as they relate to the forest ecosystem [P2/5(c) | 8 M]. • What is the ecological and economical importance of ***Biodiversity***? Mention the salient measures for conservation of biodiversity [P2/5(d) | 8 M].
2017	• Discuss the term ***Biodiversity***. Explain the levels in which it can be studied. What are the different measures employed to measure biological diversity? Elaborate [**P1**/6(a) | 20 M].
2016	• Garg (1988) described the ***Ecological Pyramid*** as a graphical representation of relationship between the trophic levels of an ecosystem. Explain with the help of neat diagrams [P2/5(a) | 10 M]. • Define ***Ecological Amplitude***. Describe the classification and characters of plant communities [P2/8(d) | 10 M].
2015	• Why is ***Carbon Recycling*** important? What are its influences on climate? Discuss your points for or against [P2/6(a) | 10 M].
2014	• Which are the six major attributes of an ecosystem-explain in detail [P2/5(b) | 8 M].
2013	• Describe the ***Qualitative Characteristics*** of plant community [P2/8(e) | 5 M]. • Discuss about the different kinds of ***Food Chains*** in different habitats and ecosystems [P2/5(d) |8]
2012	• What is the role of different techniques involved in connection with conservation and multiplication of threatened species? [**P1**/6(g) | 5 M]. • Describe Raunkier's life forms [P2/5(e) | 8 M]. • Discuss "ecological amplitude" and the law of tolerance" in the context in which they are generally used [P2/6(d) | 6 M]. • Discuss the phytosociological analysis describing formulae for calculation of [P2/7(a) | 15 M]. (i) Frequency and relative frequency, (ii) Density and relative density (iii) Abundance (iv) Relative dominance, and (v) Importance value index (IVI) • Explain with the help of suitable examples the various kinds of Population Interactions during

	their growth period and give difference between ***Commensalism*** and ***Amensalism*** of plant relationship [*Linked Q : Silviculture* | P2/7(a) | 10 M]. • Write short notes on – [**P1**/8 (a, e, f) | 5 × 3 = 15 M]. (1) Source-sink relationship with respect to carbon cycle (5 m). (2) Energy flow model in ecosystem (5 m). (3) ***Ex-situ*** and ***in-situ*** conservation (5 m). • Describe the mathematical expression for Biotic Potential and Environmental resistance [Linked Q : *Wildlife* | P2/6(c) | 6 M].
2011	• Discuss the direct use ***Value of Biodiversity*** [**P1**/5(d) | 10 M]. • Name the biodiversity ***Hot Spots*** in India. Discuss the major threats to biodiversity [**P1**/7(d) | 10 M]
2010	• "Tropical regions are rich in floral biodiversity as compared to temperate regions" Do you agree? [**P1**/1(f) | 5 M]. • Differentiate between the following – (*iv*) ***Net Primary Production*** and ***Yield*** [**P1**/3(a) *iv* | 5 M]. • What do you understand by the term ***'Hot Spot'*** in relation to floral biodiversity? Explain methods of ***Ex-Situ*** and ***In-Situ*** conservation [**P1**/7(a) | 10 M]. • How are different parameters used in System Ecology? [P2/8(b) | 10 M].

CHAPTER 5

DENDROLOGY

Dendrology : ◈ ***Taxonomic Classification***, principles and establishment of herbaria and arboreta



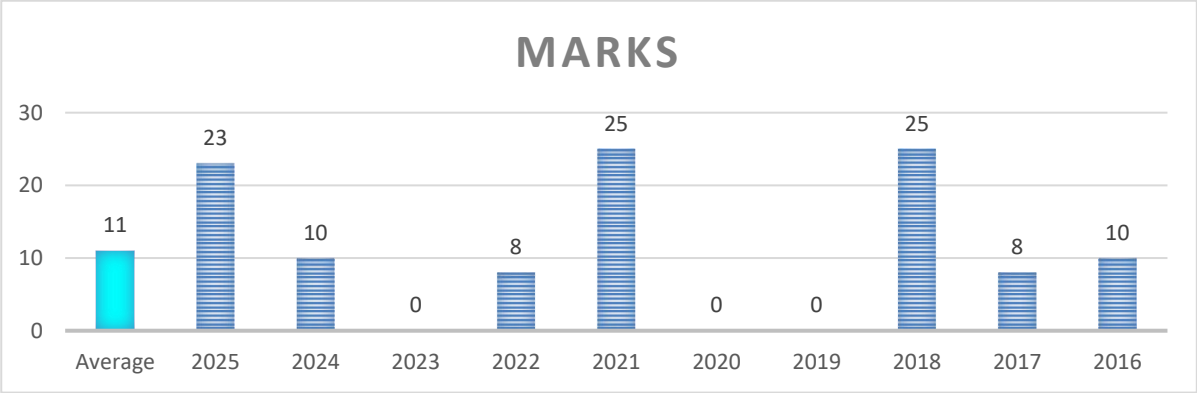
DENDROLOGY

2024	• What are the different steps for preparation of ***Herbarium Specimens***? [P2/5(b) | 8 M].
2023	• What are the different types of ***Plant Classification Systems***? Name the one which is mostly followed in Indian herbaria [P2/8(c) | 10 M].
2021	• What are holotype, neotype, lectotype and syntype of plant science? Describe the role of arboreta and ***Clonal Parks*** in conservation of biodiversity [P2/8(b) | 15 M].
2017	• Define ***Herbarium*** and write its significance. What are the steps in establishing herbarium and which method of plant classification is followed in herbarium arrangement? [P2/5(a) | 8 M].
2010	• List merits of ***Bentham*** and ***Hooker*** system of plant classification used in dendrology [P2/5(d) | 8 M].

CHAPTER 6

ETHNOBOTANY

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.



ETHNOBOTANY

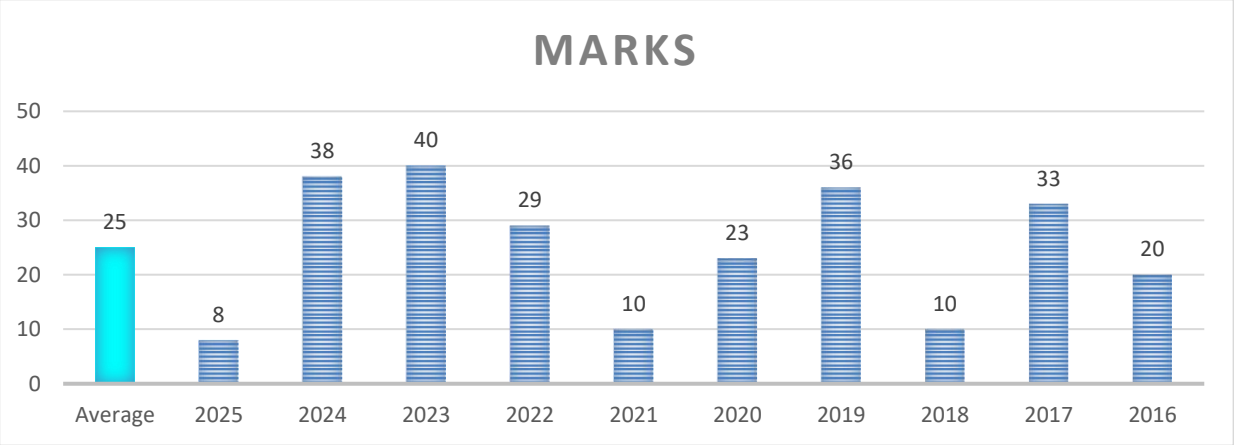
2025	• Why is proper nomenclature crucial in studying medicinal and aromatic plants? [P2/6(b) | 8 M]. • How do India's forest ecosystems influence the therapeutic use and conservation of medicinal and aromatic plants in Ayurveda and Unani, considering their habitat specificity, ecological distribution and botanical traits? [P2/6(a) | 15 M].
2024	• How does the knowledge of Ethnobotany contribute in the ***Indian System of Medicines***? [P2/7(c) | 10 M].
2022	• Describe the principles of ***Ayurvedic System*** of treatment. Write scientific names of five common tree species used in Ayurveda [P2/5(d) | 8 M].
2021	• Discuss the role of ***Tree Domestication*** in biodiversity conservation [**P1**/8(c) | 10 M]. • Write the scientific name of ***10 Medicinal Plants*** and their uses [P2/7(a) | 15 M].
2018	• Define ethnobotany. Write in detail about the role of ethnobotany in ***Modern Medicine*** and its approaches to the drug industry [P2/7(a) | 15 M]. • Enlist the common and scientific names of trees and shrubs (seven each) having medicinal importance in ethnobotany [P2/7(c) | 10 M].
2017	• What is ethnobotany and describe the role of ethnobotany in the ***Indian Systems of Medicine*** [P2/5(e) | 8 M].
2016	• The knowledge of ethnobotany helps to identify viable medicinal plants for ***Pharmaceutical***

	Industries. Explain [P2/5(b) | 10 M].
2015	• Give the scientific names of at least five drug yielding plants with their use in ***pharmaceutical industry*** [P2/5(e) | 8 M].
2013	• Write short notes on the following medicinal plants [P2/7(d) | 4 × 2.5 M]. (i) Aconitum heterophyllum (ii) Orchis latifolia (iii) Podophyllum emodii (iv) Morchella esculanta • Write critical notes on any four of the following – [P2/8(b) *iii* | 3 × 2.5 M]. (*iii*) ***Siddha system*** of medicines (2.5 m). (*iv*) Drugs of Alkaloids (*v*) Biological evaluation of Drugs
2012	• Describe the economic importance of *Acacia nilotica*, *Terminalia belerica*, *Vitex negundo* and *Madhuca latifolia* in detail [**P1**/7(d) | 10 M].

CHAPTER 7

FOREST PROTECTION

Forest Protection: ◈ ***Injuries To Forest*** – abiotic and biotic, destructive agencies, insect-pests and disease, effects of air pollution on forests and forest die back. ◈ ***Susceptibility of Forests*** to damage, nature of damage, cause, prevention, protective measures and benefits due to chemical and biological control. ◈ ***General Forest Protection*** against fire, equipment and methods, controlled use of fire, economic and environmental costs; ◈ ***Timber Salvage Operations*** after natural disasters. ◈ ***Role of Afforestation*** and forest regeneration in absorption of CO_2. ◈ Rotational and controlled grazing, different methods of control against grazing and browsing animals; ◈ ***Effect of Wild Animals*** on forest regeneration, ◈ ***Human Impacts*** – encroachment, poaching, grazing, live fencing, theft, shifting cultivation and control.



FOREST PROTECTION

2025	• Explain (i) ***Water blister*** of teak, (ii) ***Gummosis*** of eucalyptus, (iii) ***Leaf crack***, and (iv) **Frost** crack. [P2/5(d) | 8 M].
2024	• Discuss the ***Effect of Wild Animals*** on forest regeneration [P2/5(d) | 8 M]. • Explain different methods for prevention and control of ***Insect-Pests*** in forests, plantations and nurseries. Mention the major insect-pests in *Teak*, *Deodar*, *Sal* and *Shisham* [P2/6(b) | 15 M]. • What are ***Forest Rights***? Which general principles may be applied for ***Protecting Forests Against Misuse*** of rights and concessions? [*Linked* Q | P2/8(a) | 15 M].
2023	• What constitute ***Fire Environment*** in a forest? Describe different types of forest fires and write the significance of fire line [P2/7(a) | 15 M]. • Explain ***Rotational Grazing*** and discuss its significance to restore natural regeneration [P2/7(c) | 10 M]. • What is deforestation? Discuss the impact of deforestation on the environment [**P1**/6(c) | 15 M].
2022	• What are the ***Biotic*** and ***Abiotic Stresses*** on trees? Explain the responses of trees to these

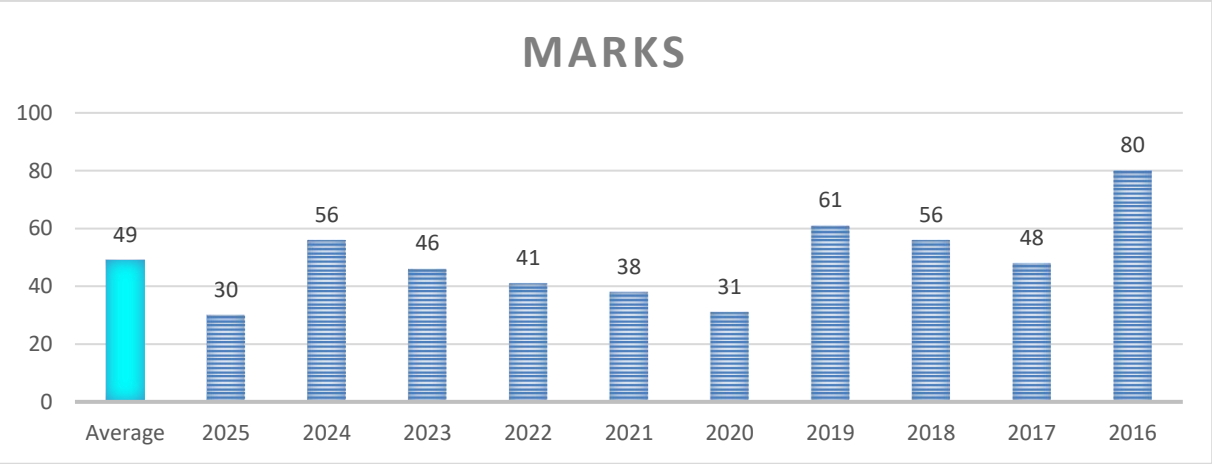
	stresses [*Linked* Q	P2/5(a)	8 M]. • Describe the ***Adverse Climatic Factors*** causing damage to forests [P2/8(b)	15 M]. • Explain the ***Salvage Operations*** for plantation trees after natural disasters [P2/6(c)	10 M].
2021	• What is ***Controlled Burning***? How does it help in improving forest regeneration? [P2/8(c)	10 M].
2020	• What is the need to protect the forests? Enumerate the ***major threats responsible for forest injuries***. Suggest suitable preventive and protective measures to safeguard the forest wealth [P2/6(b)	15 M]. • What is the ***significance of afforestation and reforestation*** to the ecosystem? How are the National Afforestation programme, Green India Mission and Forest Fire Prevention and Management Scheme helping in restoration of forests? [*Linked* Q	P2/7(a)	15 M].
2019	• Describe how ***Controlled Fire*** can be used as a tool in forest management [P2/5(d)	8 M]. • What is ***Controlled Grazing***? Describe how it helps in the better management of forest pasture land [P2/6(c)	10 M]. • Describe the ***Causes*** *of* ***Deforestation***. What are the measures to be taken for the control of deforestation? [P2/8(c)	10 M]. • What do you mean by ***Deforestation***? Explain the major causes of deforestation [P1/5(d)	8 M].
2018	• What are the causes of ***Forest Fire***? What measures are taken to protect forests against damage by fire? [P1/7(c)	10 M].
2017	• Discuss briefly the ***Impacts*** *of* ***humans*** *on* ***Forest Health***. Explain different measures to check forest encroachment [P2/6(c)	10 M]. • Describe ***Types*** *of* ***Forest Fires***, their ill-effects and preventive measures. Briefly discuss the role of forest fire on forest ecosystems [P2/8(a)	15 M]. • What are the major ***Grazing Systems*** *and* ***grazing regions*** in India? Describe briefly, methods to prevent pressure from grazing in forests [P2/5(c)	8 M].
2016	• ***Forest Fire*** still remains a major threat to forest ecosystems across the globe. How do you address this issue? [P2/5(d)	10 M]. • Describe the benefits and limitations of ***Chemical*** *and* ***Biological Control Of Diseases*** in forest nurseries and plantations [P2/7(d)	10 M].
2015	• There are measures which are taken to protect the forests from ***Fire Damage***. Which are those and how effective have they been? [P2/5(d)	8 M]. • Does ***Rotational Grazing*** have an advantage over ***Controlled Grazing*** in the smooth management of forest ecosystems? Give your reasons for and against, both. [P2/6(c)	10 M].
2014	• Do you think that the ***Controlled Fire*** is beneficial to forest vegetation? Discuss [P1/4(c)	10 M].
2013	• Discuss different ***Methods of Disease Control*** in forest nursery with examples [P2/6(c)	8 M]. • Describe the ***Anthropogenic Causes of Forest Destruction***. How can these be checked? [P1/7(a)	10 M].
2012	• Briefly discuss – ***Lopping*** management. [P1/2(c) *ii*	4 M]. • Comment on the view that after deforestation ***Forest Fires*** are most important cause of forest

	destruction. Also give different types of forest fires and their causes, and preventive measures for forest fires. [**P1**/3(c) | 8 M]. • Describe the extent, method of cultivation and effects of ***Shifting Cultivation***. Suggest some suitable alternatives to shifting cultivation. [**P1**/5(d) | 5 M]. • What are the main reasons for ***Decline*** *of the* ***Forest Cover*** in our country? [**P1**/6(a) | 5 M]. • Distinction between Potential and Deferred Grazing [**P1**/6(e) | 5 M]. • What are the causes of ***Forest Fire*** ? Discuss in brief the damage caused to forest by fire along with its control [**P1**/6(h) | 5 M]. • Describe the prevention and control of termite damages in timber [P2/7(b) | 5 M]. • State what are the plant parasitic nematodes associated with nursery forest plant species. [P2/7(d) | 5 M]. • Describe various ***Types*** *of* ***Grasslands*** mentioning the associations of grasses and their environmental locations in the different regions of India [as described by Whyte (1957)]. [P2/5(c) | 8 M].
2011	• Write short notes on – ***Forest Decline*** (2.5 m) [**P1**/7(c) ii | 2.5 M]. • How severe is the damage of ***Ganoderma*** in Indian Forests? Discuss with some case history [P2/6(c) | 10 M]. • How grazing is managed for the ***Browsing Animals***? Discuss various management options for *sustainable grazing* in forest. [P2/7(c) | 10 M].
2010	• Write short notes on – ***Lopping Management*** [**P1**/5(d) | 5 M]. • What are ***Fire-Prone Areas***? How are these detected? What precautionary measures need to be taken to overcome this problem? [P2/5(f) | 8 M]. • How is damage due to ***Teak Defoliator*** and stem borer managed in the plantations? [P2/6(b) | 10 M]. • Write causal pathogens of important diseases of ***Poplar*** *and* ***Gmelina arborea***. Write integrated management of any one disease in each species [P2/8(a) | 10 M].

CHAPTER 8

FOREST UTILIZATION

Forest Resources & Utilization : Environmentally sound forest harvesting practices; logging and extraction techniques and principles, transportation systems, storage and sale. Anatomical structure of wood, defects and abnormalities of wood, timber identification – general principles. ◈ Need and importance of ***Wood Seasoning and Preservation***; general principles of seasoning, air and kiln seasoning, solar dehumidification, steam heated and electrical kilns. ◈ ***Composite Wood*** – adhesives -manufacture, properties, uses, plywood manufacture-properties, uses, fibre boards-manufacture properties, uses; particle boards manufacture; properties, uses. Present status of composite wood industry in India and future expansion plans. ◈ ***Non-Timber Forest Products*** (NTFPs) – definition and scope; gums, resins, oleoresins, fibres, oil seeds nuts, rubber, canes, bamboos, medicinal plants, charcoal, lac and shellac, Katha and Bidi leaves, collection; processing and disposal. ◈ ***Pulp Paper*** and ***Rayon*** – present position of supply of raw material to industry, wood substitution, utilization of plantation wood; problems and possibilities.



FOREST UTILIZATION

2025	• Describe the process and ***importance of wood seasoning***. How do air and kiln seasoning methods differ? [P2/7(a) | 15 M]. • What are environmentally sound forest harvesting practices? Why are they important for sustainable forestry? [P2/8(b) | 15 M].
2024	• Explain (i) tensile stress, (ii) shear strain, (iii) compressive stress, (iv) Young's modulus of elasticity and (v) rigidity modulus [P2/2(c) | 10 M]. • Explain the ***Anatomical Features*** of hardwoods [P2/5(a) | 8 M]. • Describe the ***Classification of Timbers*** based on the air-dry weight method with example of tree species [P2/5(e) | 8 M]. • What are the different types of ***Composite Woods***? Differentiate between fibre board and particle board [P2/7(a) | 15 M].

	• Explain the importance of ***Wood Preservatives***. Differentiate between water soluble type and organic solvent type of wood preservatives [P2/8(b) | 15 M].
2023	• What are ***Gums***? How do they differ from resins? Write the botanical names of two plants of each. [P2/5(b) | 8 M]. • Write the botanical names of six tree species yielding ***Essential Oil***. [P2/5(d) | 8 M]. • Compare different types of ***Composite Wood***. Name the tree species which are mainly preferred for it. Write the future prospects of composite wood industry in the country [P2/7(b) | 15 M]. • Explain the present status, scope and constraints of ***Biofuel Production*** in India. Write the botanical names of five tree-borne oilseeds [P2/8(b) | 15 M].
2022	• Mention any eight ***Specialized Uses of Wood*** with examples [P2/5(b) | 8 M]. • Explain the role of renewable energy sources like solar energy in ***Wood Seasoning*** [P2/5(c) | 8 M]. • Trace the ***History of Logging*** in India. Explain how mechanization in harvesting and extraction helps in reducing the wastage and improving efficacy of logging [P2/6(a) | 15 M]. • "Increasing usage of ***Composite Woods*** necessitates the needs for increased raw material from plantations for short rotation trees" Explain [P2/7(c) | 10 M].
2021	• Write the general principles of ***Wood Seasoning***. How is electrical kiln seasoning advantageous over air seasoning? (15m) [P2/6(a) | 15 M]. • What are ***Gums***, ***Resins***, ***Oleoresings*** and ***Gum Resings***? Classify and give at least two examples under each group [P2/8(a) | 15 M]. • Unscientific harvesting of **NTFPs** has led to depletion of NTFP resources. Discuss [P2/5(d) | 8 M].
2020	• What are the recommended practices for ***Strategic Harvest Planning***? [P2/1(d) | 8 M]. • What are the rules laid down for ***Efficient Felling***? Classify the timbers based on industrial use [P2/5(d) | 8 M]. • Describe the process of ***Wood Formation***. Write in details about the physical, chemical and mechanical properties of wood [P2/8(a) | 15 M].
2019	• What is ***Reduce Impact Logging*** (RIL) ? What is its composition? Explain the benefits of RIL. [P2/5(b) | 8 M]. • Define ***Non-Timber Forest Products*** (NTFPs). Explain their importance to human societies and economy. [P2/5(c) | 8 M]. • Define wood. Explain the microscopic/***Anatomical Features*** which aid in identification of timber species in details. [P2/6(a) | 15 M].
2019	• What are ***Particle Boards***? Explain the features of different types of particle boards. [P2/7(b) | 15 M]. • List different system and methods of ***Sale of Forest Produces***. What are the different methods of sales adopted in state forest department? [P2/8(b) | 15 M].
2018	• What are the industrial uses of ***Gums*** *and* ***Resins***? Discuss the factors affecting the production and supply of gums and resins [P2/5(a) | 8 M]. • Write down four advantages of timber ***Seasoning*** and suggest which one is commercially

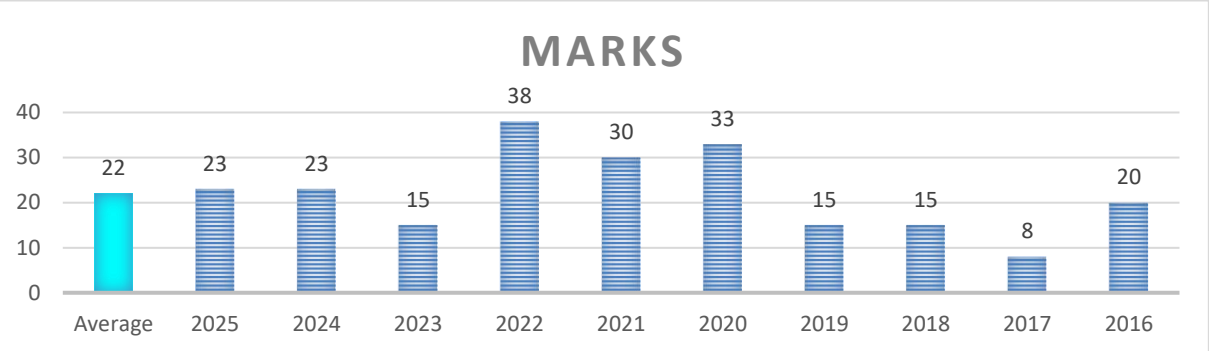
	suitable over other methods, with suitable examples. [P2/5(e) | 8 M]. • List out ***Different Types*** *of* ***Preservatives*** used for protection of timber against fungi and insects and classify them based on solvent used. [P2/6(a) | 15 M]. • What are the key elements of the wood industry and paper industry strategies? Explain [P2/8(a) | 15 M]. • Describe the ***Defects*** *that Appear* ***During Seasoning*** in timbers [P2/8(c) | 10 M].
2017	• Briefly write about the ***Natural Defects*** observed in wood. [P2/5(b) | 8 M]. • What is ***Wood Seasoning***? Write in detail the aims of wood seasoning and explain salient steps in manufacturing of plywood. [P2/6(b) | 15 M]. • What is ***Logging***? What are the objects of felling? Briefly write the general rules of felling and basic cuts of tree felling. [P2/7(a) | 15 M]. • What are the differences between ***Gums*** and ***Resins***? How are gums and resins classified? Enlist different methods of tapping resins. [P2/8(c) | 10 M].
2016	• ***Clonal Forestry*** approach proved successful in meeting the industrial wood demand particularly pulpwood. Substantiate your view and perception in this regard [P2/4(a) | 10 M]. • Dry deciduous forests are rich in ***Non-Timber Forest Products*** (NTFPs). Justify the statement with examples [P2/5(c) | 10 M]. • Give an account of ***Mechanical Properties*** of wood and suggest the standard tests for the same [P2/6(c) | 10 M]. • ***Bamboos*** become the major raw material for many cottages as well as corporate industries. Explain [P2/7(a) | 10 M]. • What are the general principles and ***Advantages of Wood Seasoning***? Describe the solar kiln seasoning with neat sketches [P2/7(b) | 10 M]. • Write critical notes on the following [P2/7(c) | 10 M]. (a) *Gums* (b) *Oilseeds* (c) *Katha* (d) Bidi leaves • Give an account of ***Composite Wood*** products and their utilities [P2/8(b) | 10 M]. • Explain the recent developments in mechanization of ***Logging Operations*** and their impact on the efficiency and wastage [P2/8(c) | 10 M].
2015	• There are various processes involved in the expression and ***Extraction*** *of* ***Oilseeds*** available in forests. Elaborate on the processes involved and their utilization [P2/5(a) | 8 M]. • Timber encounters many different problems during the process of ***Drying***. What are those problems and how are they overcome? [P2/5(b) | 8 M]. • Indian forests are found to be rich in ***Different*** *kinds of* ***Non-Timber Forest Products*** (NTFPs). Can you list at least 10 NTFPs? [P2/6(b) | 10 M]. • What are the major ***Fibres*** and ***Flosses*** which are obtained from forests in India? Citing at least ten species, discuss their commercial importance [P2/8(d) | 10 M].
2014	• Write in detail the processing and uses of ***Tannins*** in India [P2/5(d) | 8 M]. • Explain the term ***Logging***, its purposes and stages [P2/5(e) | 8 M]. • What is wood preservation? Why is ***Preservation*** *of* ***Wood*** necessary? Mention main types of wood preservation methods [P2/6(b) | 15 M].
2013	• What are advantages of ***Wood Seasoning***? Describe the various methods of wood seasoning

	and mention classification of timbers for seasoning [P2/6(a) | 15 M]. • Give the ***Classification of Timbers*** based on air dry weight with suitable examples [P2/8(d) | 7 M].
2012	• Explain properties of good ***Wood Preservatives*** and classify the various Wood Preservatives with the help of a flowchart [P2/6(a) | 12 M]. • Describe the ***Boucherie Process*** of Wood preservation with its advantages [P2/6(b) | 6 M]. • Briefly comment on the extent of ***Wastage*** (in approximate percentage of total timber content) from harvesting to marketing stages and give the reasons for such wastages [P2/8(d) | 5 M]. • What are the set of tools used in ***Rill Method***? Briefly highlight their features [P2/4(d) | 10 M]. • Differentiate between the following – **NTFPs** and **MPTs** [**P1**/3(a) *iii* | 4 M]. • Write short notes on – (g) ***Heartwood*** and ***Sapwood*** [**P1**/8(g) | 5 M].
2011	• List 10 bamboo species of commerce in India with their scientific name & state of origin [P2/5(a) | 10 M]. • Write Common and scientific names of 10 tree species yielding resins and Oleo-resigns (10 m). [P2/5(e) | 10 M]. • What are the ***Wood Composites***? How they are prepared? What are the common gluing agents used in wood composites? [P2/7(a) | 20 M]. • Discuss the various ***Common Defects*** encountered after harvesting of the wood during stacking [P2/8(c) | 10 M].
2010	• What are the ***Keys*** *to* ***Identify Timbers*** *for* ***Construction Purpose***? [P2/5(a) | 8 M]. • Name five important tree species used for axle and wheels of different carts. In which regions of country is this sort of transportation more prevalent? State the reasons [P2/5(c) | 8 M]. • Name five ***Aromatic Grasses*** with their uses and methods of extraction [P2/8(c) | 10 M]. • There is no replacement for ***Rattans*** in forest-based industry" Justify this statement and list five important species reported from different parts of the country [P2/8(d) | 10 M]. • What are the different types of water-soluble ***Wood Preservatives***? [P2/7(b) | 10 M].

CHAPTER 9

FOREST LEGISLATION

Forest Policy : ◈ ***History*** of forest development ◈ Indian ***Forest Policy*** of 1894, 1952 and 1988. National Forest Policy 1988 of People's involvement, Joint Forest Management, Involvement of women; Forestry policies and issues related to land use, timber and non-timber products, sustainable forest management; industrialisation policies; institutional and structural changes. ◈ ***Decentralization*** and Forestry Public Administration. ◈ **Forest Laws** : necessity, general principles, Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972 and their amendments ◈ Application of ***Indian Penal Code*** to Forestry.



FOREST LEGISLATION

2025	• In the context of current environmental and developmental pressures, how effective are the Forest (Conservation) Act, 1980 and the Wildlife (Protection) Act, 1972? What are the changes needed to enhance their impact? [P2/5(e) | 8 M]. • How do Indian forest policies address land use and resource management? What reforms are needed for sustainable and inclusive forest management? [P2/7(b) | 15 M].
2024	• Explain, as per the ***Indian Forest Act, 1927***, (*i*) reserved forests, (*ii*) protected forests, (*iii*) unclassed forests and (*iv*) village forests [P2/5(c) | 8 M]. • What are ***Forest Rights***? Which general principles may be applied for protecting forests against misuse of rights and concessions? [P2/8(a) | 15 M].
2023	• Discuss the salient features of the ***Wildlife (Protection) Act, 1972*** and write its significance in dealing with wildlife offences [P2/8(a) | 15 M].
2022	• Write the provisions of the ***Indian Forest Act, 1927***, applied to declare village forests and protected forests [P2/5(e) | 8 M]. • Write the salient features of India's ***National Forest Policy, 1998***. Justify the statement "India needs a revision of Forest Policy" [P2/7(b) | 15 M].

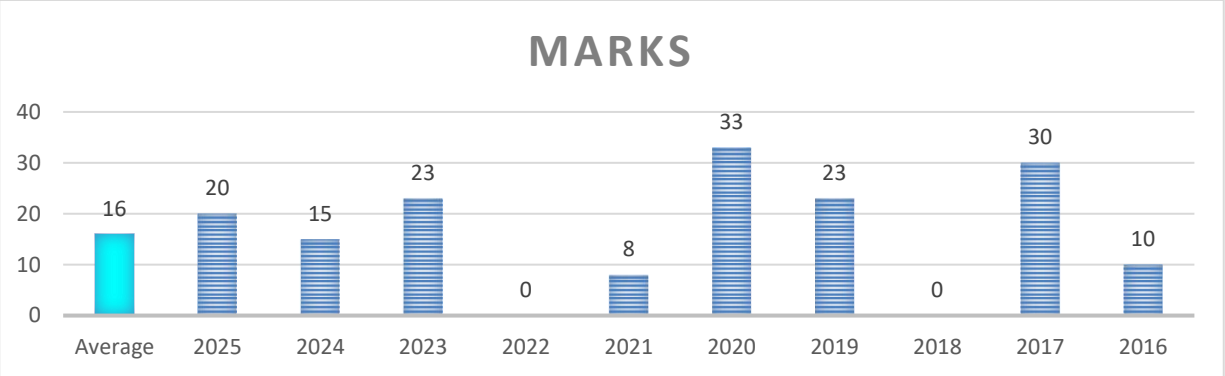
	• Describe the provision of the ***Forest (Conservation) Act, 1980*** on (i) restriction on the de-reservation of forest land for non-forest purpose, and (ii) diversion of forest land for regularisation of encroachment [P2/8(a) | 15 M].
2021	• Write the provisions of sections 35, 37 and 38 under the ***Indian Forest Act, 1927***, applied to control over forests and land not being the property of the government. [P2/6(b) | 15 M]. • Describe the provisions of sections (3 – 27) of the ***Indian Forest Act, 1927*** applied to declare any forest land or wasteland as a Reserve Forest over which the government has proprietary rights. [P2/7(b) | 15 M].
2020	• What are the direct roles of the ***Biodiversity Act, 2002*** in conservation of wildlife? [P2/5(b) | 8 M]. • Write in details about the historical background of forest policies in India and their aims. Describe in brief about the organization of forest sector in India. [P2/8(b) | 15 M]. • How has the ***National Forest Policy*** *of* **1988** changed the national scenario? Describe in brief. Highlight some major achievements in relation to the above policy. [P2/8(c) | 10 M].
2019	• Write in detail regarding the appointment of authorities and restrictions of hunting of wild animals under the ***Wildlife (Protection) Act*** *of* **1972**. [P2/8(a) | 15 M].
2018	• What are the main differences between forest policy and forest laws? Give *salient* points of the National Forest ***Policy*** *of* **1952** and **1988**. [P2/8(b) | 15 M].
2017	• Narrate the ***Background*** and ***Objectives*** of implementation of national ***Forest Policies*** of India. [P2/5(d) | 8 M].
2016	• Compare and contrast the ***Indian Forest Act, 1927*** and the ***Forest Conservation Act, 1980***. [P2/6(a) | 10 M]. • How are "Environment", Environmental pollutant" and "Hazardous substance" narrated in environment (protection) act, 1986? [**P1**/7(b) | 10 M].
2015	• Give a comparative and appropriate statement on the Natural Forest ***Policy of 1988*** with that of **1952**. [P2/7(a) | 15 M]. • Describe the ***role*** *of* ***Permanent Forest Policy*** after its enactment for the regulation of forestry management in India. [P2/8(b) | 10 M]. • Discuss the important role of The ***Wildlife Protection Act, 1972*** in forest management. Give salient points only [P2/8(a) | 10 M]. • What is the penalty prescribed in Section 15 of the Environment (Protection) Act, 1986 for contravention of the provisions of the Environment Act rules and orders? [**P1**/5(c) | 8 M].
2014	• Describe the salient features of ***National Forest Policy 1988***. How does it differ from the 1952 Forest Policy? [P2/8(c) | 10 M].

2013	• Discuss the procedure for declaration of reserved forests in the backdrop of important sections of the Indian Forest Act, 1927 [P2/5(a) | 8 M]. • What are the factors responsible affecting forest policy? Discuss (8 m). [P2/5(e) | 8 M]. • Mention the salient features of ***National Forest Policy, 1988***, and discuss its advantages over ***N.F.P. 1894***. [P2/6(b) | 10 M]. • Describe the salient features mentioned in the ***New Draft Forest Bill, 1994***. [P2/7(b) | 10 M]. • Briefly describe the national legislation on biodiversity. Name the activities for which States can seek funds from the Central Government [**P1**/7(c) | 10 M].
2012	• Bring out the ***Background*** and ***Need*** for ***Forest Policy Of 1988*** with its basic objectives [P2/8(a) | 15 M]. • Attempt the following, keeping your answers brief and to the point : (a) "Describe Section (2) of Forest Conservation Act of 1980" [P2/5(a) | 8 M].
2011	• Write the constitution of ***National Board of Wildlife***. Explain the provisions of the Sections of wildlife (Protection) Act 1972, Used to declare an area as 'Sanctuary' [P2/8(a) | 20 M].
2010	• What are the functions of ***Indian Board For Wildlife*** with regard to conservation of wildlife? [P2/7(d) | 10 M].

CHAPTER 10

FOREST ECONOMICS

Forest Economics : ◈ ***Fundamental Principles***, Cost-benefit analyses; Estimation of demand and supply; ◈ Analysis of ***Trends*** *in the* ***National*** *and* ***International Market*** and changes in production and consumption patterns; assessment and projection of market structures ◈ Role of ***Private Sector*** and ***Co-Operatives***; role of corporate financing. Socio-economic analysis of forest productivity and attitudes ◈ ***Valuation*** of forest goods and service.



FOREST ECONOMICS

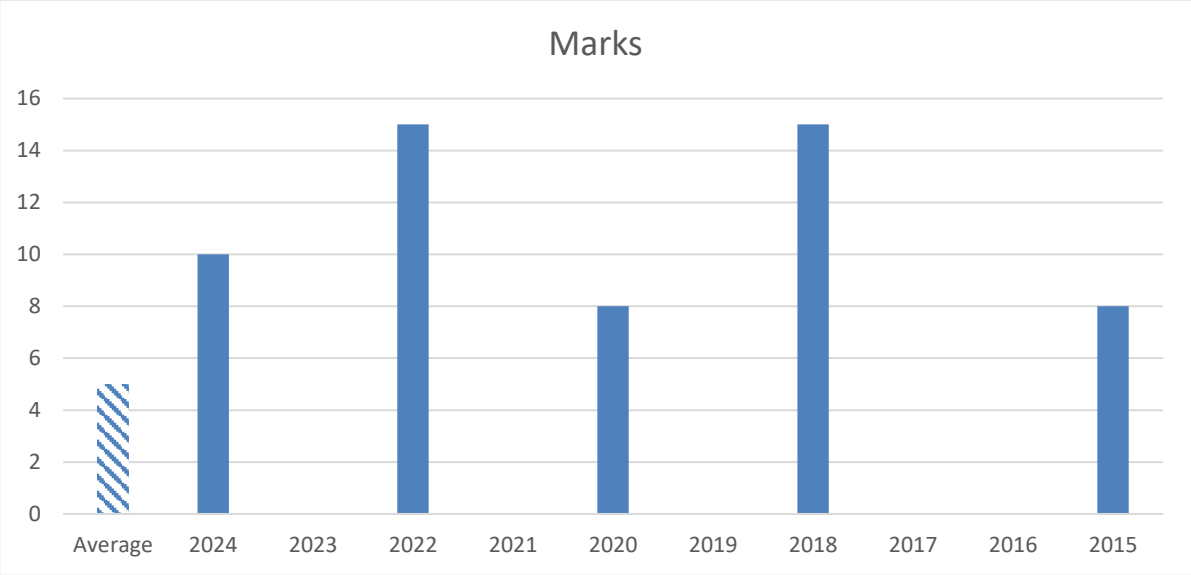
2025	• How do production and consumption patterns of forest resources influence market structures? What methods can be employed to assess future projections for sustainable forest-based economic planning in India? [P2/6(c) | 10 M]. • How do cooperatives and the private sector shape forest economics and enhance the socio-economic well-being of forest-dependent communities through sustainable resource management, value addition and livelihood generation? [P2/8(c) | 10 M].
2024	• What are ***Ecosystem Services***? Differentiate between use values and non-use values. Explain different methods of valuation of ecosystem services [P2/7(b) | 15 M].
2023	• Explain the ***Fundamental Principles*** involved in forest economics [P2/5(e) | 8 M]. • What is ***Cost-Benefit***? Explain demand and supply with respect to forestry [P2/6(a) | 15 M].
2021	• Mention different ***Methods of Valuation*** of intangible services from forest ecosystem and explain any one [P2/5(e) | 8 M].
2020	• How does inflation influence forest goods? Briefly explain the ***Types*** *of* ***Inflation*** that directly influence the price of forest goods. [P2/5(c) | 8 M]. • Discuss the role of forest resources in the Indian economy. Suggest suitable storage

	methods for wood or other forest produce and their management strategies [P2/6(a) | 15 M]. • What do you understand by ***Forest Valuation***? Discuss in brief. Describe various valuation techniques for forests. [P2/7(c) | 10 M].
2019	• Discuss various ***Channels*** *for* ***Marketing*** of forest products [P2/5(e) | 8 M]. • What is ***Forest Valuation***? Write its objective and briefly explain the methods of forest valuation. [P2/7(a) | 15 M].
2017	• Explain the ***Discounting Measures*** *in* ***Forest Business Management*** with different formulae used in forest economics. [P2/7(b) | 15 M]. • Discuss in detail the roles and interventions of Government and Private agencies in marketing of forest produce. [P2/8(b) | 15 M].
2016	• Explain the ***Concept*** *of* ***Demand*** with the help of demand curve and its application in forest trade. [P2/6(b) | 10 M].
2013	• Give the important features of ***Demand*** *and* ***Supply Curves***. What are the factors responsible for demand and supply of forest produce? [P2/6(d) | 7 M].

CHAPTER 11

WILDLIFE BIOLOGY

Wildlife Biology : There is virtually no syllabus other than mentioning the subject title + Few things linked with wildlife are scattered over the entire syllabus.



WILDLIFE BIOLOGY

2024	• What are the different five main ***Conservation Categories*** under IUCN? [P2/8(c) | 10 M].
2022	• What do you understand by ***Human-Wildlife Conflict***? Explain with examples [P2/7(a) | 15 M].
2020	• What is the ***Significance*** *of* ***Wildlife*** in today's perspective? Discuss in brief about the components of wildlife ecology [P2/5(e) | 8 M].
2018	• How is ***Enumeration*** *of* ***Animal Population*** in natural forests carried out in general? Also specify the method(s) adopted in the case of tigers. [P2/6(b) | 15 M].
2015	• To protect the wild animals venturing out from their core areas, some administrative and management arrangements are made. What are those? Discuss. [P2/5(c) | 8 M].
2014	• Discuss in detail the importance, success and limitations of the '***Project Tiger***' [P2/5(c) | 8 M]. • Discuss the role of National Parks in conservation of biodiversity [P2/6(a) | 10 M].
2013	• What do you understand by ***Wildlife Census***? Write different methods of census in brief

	[P2/7(c) | 10 M].
2012	• Describe the mathematical expression for ***Biotic Potential*** and ***Environmental Resistance***. [*Linked* Q | P2/6(c) | 6 M]. • Describe the importance of ***Pug Marks*** and illustrate sex differentiation based on pug marks. How do these help in Forest management system? [P2/6(e) | 10 M]. • What is the role of different techniques involved in connection with conservation and multiplication of threatened species? [**P1**/6(g) | 5 M].
2010	• List five each of the important resident and ***Migratory Birds*** noticed in Indian forests [P2/5(b) | 8 M].

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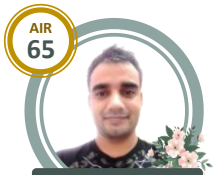
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