



**ODISHA PUBLIC SERVICE COMMISSION**  
**ADVERTISEMENT No. 01 OF 2024-25**

**Recruitment to the posts of Assistant Soil Conservation Officer in Class-II (Group-B) of Odisha Soil Conservation Service under the Department of Agriculture & Farmers' Empowerment.**

**WEBSITE - <http://opsc.gov.in>**

Online applications are invited from the prospective candidates through the proforma application to be made available on the Website of the Commission (<http://opsc.gov.in>). **The link for registration and submission shall be available from 16.07.2024 to 16.08.2024 (Note: 16.08.2024 is the last date for submission of Registered Online Application)** for recruitment to **81 (Eighty One)** posts of Assistant Soil Conservation Officer in Class-II (Group-B) of Odisha Soil Conservation Services under the Department of Agriculture & Farmers' Empowerment carrying the pay at Level-10 of the Pay Matrix under ORSP Rules, 2017 in consistent with pre-revised scale of Pay under PB-2 – Rs. 9300/- - 34800/- with Grade Pay of Rs.4600/- with usual Dearness and other Allowances as may be sanctioned by the Government of Odisha from time to time. The posts are temporary but likely to be made permanent.

**2. VACANCY POSITION:** As per requisition filed by the Department of Agriculture & Farmers' Empowerment, Government of Odisha, the vacancy position along with reservation thereof is given below:

Sl. No.	Category	No. of vacancies
1.	Unreserved	45 (15-w)
2.	SEBC	11 (03-w)
3.	Scheduled Caste	08 (03-w)
4.	Scheduled Tribe	17 (06-w)
	<b>Total:</b>	<b>81 (27-w)</b>

Out of the total vacancies mentioned above, **02 (two)** posts are reserved for **Ex-Servicemen**, **03 (three)** posts are reserved for **Persons with Disabilities (whose permanent disability is 40% or more)** and **01 (one)** post is reserved for **Sports Persons**. Candidates belonging to the categories of Ex-Servicemen, Persons with Disabilities and Sports Persons shall be adjusted against the categories to which they belong.

The category wise details regarding the posts reserved for Persons with Disabilities (**whose permanent disability is 40% or more**) are mentioned below:

(02)

Sl. No.	Category	No. of Posts
1.	<b>Category II</b> (Hard of hearing with suitable aid) -	01 (one)
2.	<b>Category III</b> LD (One leg affected (R/L); but not arms; mobility not restricted/ Acid attack victims (arms not affected)/ Dwarfism -	01 (one)
3.	<b>Category IV</b> – (includes only multiple disabilities of PWDs having combination of disabilities from Category – II & III) -	01 (one)

**NOTE:**

- In case of non-availability of eligible/ suitable women candidate(s), the unfilled vacancies shall be filled up by the eligible/suitable male candidate(s) of the same category.
- The exchange of reservation between Scheduled Caste & Scheduled Tribe **will not be** considered.
- The number of vacancies to be filled up on the basis of this recruitment is subject to change by Government without notice, depending upon the exigencies of public service at the discretion of the State Government.

**3. AGE:**

A candidate must have attained the age of **21 (Twenty One)** years and must not be above the age of **38 (Thirty Eight)** years as on the 1<sup>st</sup> day of January 2024 i.e. he/she must have been born **not earlier than 2<sup>nd</sup> January, 1986 and not later than 1<sup>st</sup> January, 2003.**

Provided that the upper age limit shall be relaxable by **5 (five)** years for candidates belonging to the categories of Scheduled Caste, Scheduled Tribe, Socially and Educationally Backward Classes, Ex-Servicemen and Women and by **10 (ten)** years for Persons With Disabilities whose permanent disability is 40% (Forty percent ) or more.

**Persons with Disabilities belonging to SC/ ST/ SEBC categories are eligible for cumulative age relaxation benefit of 15 years.**

SAVE AS PROVIDED ABOVE, THE AGE LIMITS PRESCRIBED CAN IN NO CASE BE RELAXED.

Date of birth entered in the High School Certificate or equivalent certificate issued by the concerned Board/Council will only be accepted by the Commission.

**4. EDUCATIONAL QUALIFICATION:**

A candidate must have possessed a Bachelor of Science Degree in Agriculture **or** Bachelor of Science Degree in Horticulture **or** Bachelor Degree in Agriculture Engineering **or** Bachelor in Science in Forestry from any recognized University or Institution.

**5. EXAMINATION FEE:**

**No examination fee** is required to be paid for applying or appearing in the recruitment as per “Odisha Discontinuance of payment of application and examination fees for recruitment to different posts Services in the State Government Rules, 2022.”

**6. METHOD OF SELECTION:**

- (a) The selection of candidates for recruitment to the posts of Assistant Soil Conservation Officer will be made on the basis of marks obtained in the **Competitive Recruitment Examination (Written Test- MCQ Pattern & Interview)**.
- (b) The **Written Test** shall comprise of two papers namely **Paper – I & Paper -II** together carrying 200 marks i.e. **100 marks for each paper** which shall be of **Multiple Choice Question (MCQ) Pattern**.
- (c) **CANDIDATES MAY CHOOSE ANY ONE OF THE SUBJECT IN WHICH THEY WANT TO APPEAR FOR THE WRITTEN TEST I.E. AGRICULTURE OR AGRICULTURAL ENGINEERING OR FORESTRY OR HORTICULTURE.**
- (d) The **number of questions** in each paper shall be **100**, each carrying **one mark**.
- (e) The duration of examination shall be **one and half hour for each paper**.
- (f) The Commission will **short-list the candidates** to be called for Interview/ Viva-Voce test on the basis of **marks obtained in the written test in the following manner:**
- “Where the number of vacancies is upto 02 (two), the number of candidates to be called for Interview shall be 05 (five). Where the number of vacancies exceeds 02 (two), the number of candidates to be called for Interview shall be twice the number of vacancies.”**
- (g) The Total marks for **Interview/ Viva Voce Test** shall be **25**.
- (h) The detailed **syllabus** is enclosed at **Annexure – A**.

**Note: Any details relating to this recruitment like cut-off marks, answer keys, individual marks etc. shall only be declared on the website of the Commission after publication of the final results and select list.**

**7. PLACE OF EXAMINATION:**

The written examination shall be held at Cuttack. It may also be held at Bhubaneswar/ Balasore/ Berhampur/ Sambalpur depending on the number of candidates from the respective zones.

The candidates are to mention their choice of Examination Zone at appropriate place in the online application form.

**8. OTHER ELIGIBILITY CONDITIONS:**

- (i) The candidate must be a citizen of India;
- (ii) The candidate must be able to read, write and speak Odia ; and have;
- a. Passed Middle School examination with Odia as a Language subject; or
  - b. Passed Matriculation or equivalent examination with Odia as medium of examination in non-language subject; or
  - c. Passed in Odia as language subject in the final examination of Class-VII from a school or Educational Institution recognized by the Government of Odisha or the Central Government; or

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- d. Passed a test in Odia in Middle English School Standard conducted by the School and Mass Education Department of the Government of Odisha / Board of Secondary Education, Odisha.
- (iii) A candidate, who has more than one spouse living, will not be eligible for appointment unless the State Government has exempted his/her case from operation of this limitation for any good and sufficient reasons;
- (iv) Government servants, whether temporary or permanent, are eligible to apply provided that they possess the requisite qualification and are within the prescribed age-limit as provided under para-3 & 4 of the Advertisement. They must **submit "No Objection Certificate"** issued by the competent authority **during document verification**;
- (v) If a candidate has at any time, been debarred for a certain period/ chance(s) by the Odisha Public Service Commission or other State Public Service Commission or U.P.S.C from appearing at any examination /Viva Voce test, he/she will not be eligible for such recruitment for that specified period/chance(s);
- (vi) A candidate who claims change in his/her name after having passed the High School Certificate Examination or equivalent examination, is required to furnish a copy of publication of the changed name in local leading daily newspaper as well as copy of notification in the Gazette in support of his/ her change of name;
- (vii) **Only those candidates, who fulfil the requisite qualification & are within the prescribed age limit etc. by the closing date of submission of online application, will be considered eligible;**

**9. IMPORTANT POINTS :**

- (i) **Online applications submitted to OPSC if found to be incomplete in any respect are liable to rejection without entertaining any correspondence with the applicants on that score;**
- (ii) **Admission to the Written Examination / Interview (Viva Voce test) will be provisional. If on verification at any stage before or after the written examination / Interview (Viva Voce test), it is found that a candidate does not fulfil all the eligibility conditions, his/her candidature will be liable to rejection. Decision of the Commission in regard to eligibility or otherwise of candidate shall be final;**
- (iii) Concessions meant for S.T./ S.C. by birth and SEBCs are admissible to the Scheduled Tribe, Scheduled Caste and Socially Educationally Backward Classes of Odisha only;
- (iv) **Community / Caste status once mentioned by the candidates under the appropriate box of the online application form will be treated as final and the same shall not be changed subsequently under any circumstances.**
- (v) This advertisement should not be construed as binding on the Government to make appointment;
- (vi) **Any misrepresentation or suppression of information by the candidate in the online application, will result in cancellation of his/her candidature or penalty, as decided by the Commission be imposed on the candidate;**

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- (vii) Mere empanelment in the select list shall not confer any right for appointment unless the Government is satisfied after making such enquiry as may be deemed necessary that the candidate is suitable in all respects for appointment to the service;
- (viii) Every candidate included in the select list shall be examined by the Medical Board and any candidate who fails to qualify the Medical Board shall not be eligible for appointment.

**10. CERTIFICATES/ DOCUMENTS TO BE ATTACHED:**

Candidates those who are called for document verification/ Interview (Viva Voce test) are required to bring with them the hard copy of online application form along with photo-copies of certificates, mark sheets etc. and originals of the same for verification which will be notified later on in due course, failing which he/she shall not be allowed to appear at the Interview (Viva Voce test). **The candidates are required to mention on copy of each document "Submitted by me" and put their full signature & date on the same.**

- (i) H.S.C. or equivalent certificate in support of declaration of age issued by the concerned Board /Council;
- (ii) Bachelor of Science Degree Certificate in Agriculture /Horticulture / Forestry & Degree in Agriculture Engineering Certificate from recognized University/ Institutions;
- (iii) Mark-sheets in support of all the aforesaid Examinations passed including fail marks, if any, issued by the concerned Board / Council /University.

**NOTE 1:**

- (a) **Candidates who have not been awarded percentage of marks, but only "GRADE MARKS", should, along with their applications, produce the conversion certificate from the concerned University indicating the actual equivalent percentage of marks and the conversion formula failing which, their applications are liable to be rejected.**
- (b) **While filling up the marks in the online application form, the candidate has to mention the actual marks secured by him/her in each Semester/Annual examination in the H.S.C, +2, Degree & Bachelors' Degree (excluding the marks secured in the Extra Optional paper).**
- (iv) Four recent passport size photographs **within 6 months** (unsigned & unattested) which has been uploaded with Online Application Form.
- (v) Caste Certificate **by birth** in support of claim as S.T./S.C. and S.E.B.C. whichever applicable.
- (vi) Required Odia test Pass Certificate from the competent Authority;
- (vii) Permanent Disability Certificate (indicating percentage of permanent disability i.e. **40% or more**);

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- (viii) Ex-Servicemen claiming reservation are required to submit/ upload Release Certificate issued as per Orissa Ex-Servicemen (Recruitment to state Civil Services and Posts) Rules, 1985 vide GA Deptt. Notification No. 22586/Gen, dt. 16.10.1985. Further, Ex-Servicemen candidates must submit an affidavit undertaking that he has not been appointed against any civil post after retirement from military services;
- (ix) Identity card issued by the Director of Sports, Odisha in case of Sports-Persons;
- (x) No Objection Certificate from the competent authority in case of Government Servant;
- (xi) Any proof of identity.

**NOTE 2:**

- (i) **Candidates claiming to be belonging to S.T. /S.C. / S.E.B.C Category of Odisha by birth are required to submit copy of the relevant Caste Certificate as mentioned in their online application form and issued by the competent authority in the prescribed form. Candidates of SEBC category (other than Creamy Layer) must submit copy of Caste Certificate issued by the competent authority within the last three years by the closing date for submission of Online Application Form;**
- (ii) **The SEBC certificate which is more than three years old by the closing date of submission of online application form is liable for rejection.**
- (iii) **Women candidates belonging to S.C. /S.T. /S.E.B.C Categories are required to submit Caste Certificates by birth showing “daughter of .....”. Caste Certificates by virtue of marriage (i.e. showing “wife of .....”) will not be accepted.**
- (iv) **O.B.C. CERTIFICATES WILL NOT BE ACCEPTED IN LIEU OF S.E.B.C. CERTIFICATES AND CANDIDATES SUBMITTING O.B.C CERTIFICATES ARE LIABLE FOR REJECTION.**
- (v) **The competent authorities are:- District Magistrate/Collector or Additional District Magistrate or Sub-divisional Magistrate/Sub-Collectors or Executive Magistrates or Revenue Officers, not below the rank of Tahasildar /Additional Tahasildar of Government of Odisha;**

**NOTE 3: Bachelor of Science Degree Certificate in Agriculture, Horticulture & Forestry, Degree certificate in Agriculture Engineering, Caste Certificate, Odia Test Pass Certificate, Release Certificate of Ex-Serviceman [issued as per Orissa Ex-Servicemen(Recruitment to State Civil Services and Posts) Rules, 1985 vide GA Deptt. Notification No. 22586/Gen, dt. 16.10.1985] and Permanent Disability Certificate of Persons with Disabilities (indicating percentage of Permanent Disability), Identity card of Sports-Persons issued by the Director of Sports, Odisha etc. must have been issued within the last date fixed for submission/ receipt of online application form.**

**11. GROUND OF REJECTION OF APPLICATION:-**

Applications of candidates will be rejected by the Commission on any of the following grounds:-

- (a) **In-complete online application form.**
- (b) **Non-submission of hard copy of online application form at the time of verification of original documents.**
- (c) **Not signing declaration (full signature) in the hard copy of online application form.**
- (d) **Not coming within age limit as mentioned in Para-3 of Advertisement (Overage relaxation shall not be allowed to PWD candidates having less than 40% disability).**
- (e) **Not having requisite qualification as provided under Para - 4 of Advertisement.**
- (f) **Not furnishing copies of certificates/documents as provided under Para - 10 of Advertisement.**
- (g) **Not passing Odia Test (M.E. standard) / not furnishing Odia Test pass evidence as required under Para 8 (ii) of the Advertisement.**
- (h) **Submission of wrong information / false information about qualification / Age / O.T. Pass evidence / Category Status (ST/S.C./SEBC/PWD/Women/Ex-servicemen/ Sports Persons etc.).**
- (i) **Suppression of facts / information about eligibility, if any.**
- (j) **Any other ground as per the decision of the Commission.**

**N.B:- APPLICATION / CANDIDATURE OF A CANDIDATE SHALL BE REJECTED AT ANY STAGE OF RECRUITMENT PROCESS, WHEN DISCREPANCY IS NOTICED /DETECTED.**

**12. HOW TO APPLY:**

- (a) Candidates must go through the details of this Advertisement available in the Website of OPSC before filling up online application form.
- (b) Candidates must apply online through the concerned Website of the OPSC <http://opsc.gov.in>. Applications received through **any other mode** would not be accepted and summarily rejected.
- (c) **Before filling up the online application form, the candidates must go through detailed instructions available at OPSC portal.**
- (d) The online application form is automated and system driven and will guide the candidate seamlessly in filling the application. The requisite options shall be enabled and information shall be asked as per data furnished by the candidate. Before filling up the information, ensure that accurate information is fed, for edit option is limited & on confirmation there is no scope for further edit even if wrongful entry has been made while filling up application.

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- (e) Candidates are requested to upload the scanned image of latest passport size photograph along with scanned image of his/her full signature and scanned image of Left-hand Thumb Impression (LTI) in the online application form. Uploaded photograph, Specimen (full) signature and LTI must be clearly identifiable / visible, otherwise the application of the candidate is liable to be rejected by the Commission and no representation from the candidate will be entertained.
- (f) Candidates should keep at least four copies of latest passport size photograph which is uploaded to the online application form for future use.
- (g) *On successful submission of the online Registration, a unique "Permanent Public Service Account Number (PPSAN)" will be assigned to the applicant. Candidates are required to take a printout of the finally submitted online Registration/Re-registration and finally submitted Online Application forms and put his/ her signature under the declaration for submission to OPSC along with copies of requisite certificate & documents as and when asked.*
- (h) The candidates are advised to submit the Online Application Form well in advance without waiting for the closing date to avoid last hour rush.
- (i) Certificate of Admission to the written examination to the eligible candidates will be uploaded in the Website of the OPSC prior to the date of written examination which will be published in the Website of the Commission and Newspapers. The candidates are required to download their Admission Certificate from the Website of the Commission and produce the same at the Examination centre for admission to the written examination. No separate correspondence will be made on this score.
- (j) "Notice" to candidates for document verification & interview and "Attestation form" & "Bio-data form" shall be uploaded in the website of OPSC prior to the date of Document Verification/ Interview.
- (k) Any complaint on the conduct of examination must be sent to the Grievance Wing of the Commission by e-Mail ([opsc@nic.in](mailto:opsc@nic.in)) within 07 (Seven) days of completion of the examination.

### **13. FACILITATION COUNTER:**

*To resolve any Technical problem faced in filling up of online Registration and Application forms, candidate may contact OPSC Technical Support over Telephone No. 0671-2304707 between 10.30 A.M. to 1.30 P.M. & 2.00 P.M. to 5.00 P.M. on any Odisha Government working days.*

In case of any guidance/ information on this advertisement & recruitment, candidates may go through the FAQ available in the website of the Commission or contact the O.P.S.C. Facilitation Counter over Telephone No. 0671-2304141/2305611 & Extn.- 207 on any working day between 10.30 A.M. to 1.30 P.M. & 2.00 P.M. to 5.00 P.M.

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The candidates are required to visit the website of the Commission at <http://opsc.gov.in> for detailed information about important notices, rejection of applications, the date & time of Written Examination/ Document Verification/ Interview and also keep track of publication of various notices to the effect in the leading local daily newspapers for information.

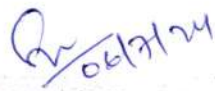
**CLOSING DATES**

**(A) ONLINE REGISTRATION AND SUBMISSION OF ONLINE REGISTERED APPLICATIONS SHALL BE AVAILABLE IN THE WEBSITE FROM 16.07.2024 TO TILL 16.08.2024 (11:59 P.M).**

**(B) ONLY ONLINE APPLICATIONS RECEIVED WITHIN THE DEADLINE I.E. 16.08.2024 SHALL BE ACCEPTED.**

**NB: THE ONLINE APPLICATIONS, IF FOUND DEFECTIVE IN ANY RESPECT IS LIABLE TO BE SUMMARILY REJECTED.**

CUTTACK  
DATE : 06.07.2024

  
SECRETARY (I/C)  
ODISHA PUBLIC SERVICE COMMISSION  
CUTTACK

## ANNEXURE-A

### NEW SYLLABUS FOR ASSISTANT SOIL CONSERVATION OFFICERS' EXAMINATION

#### PAPER-I (Agriculture)

##### Unit-I :

General agriculture: Importance, Trend in agriculture and allied sectors, Present day problems and remedial measures, Government policies.

##### Unit-II :

Natural Resources: Land Water, Forest, Energy – their use, exploitation, conservation, equitable use of resources for sustainable lifestyle: Plant Ecosystem: Biodiversity and its conservation: Environmental Pollution: Natural Disasters and their management: Organic farming and Sustainable agriculture: Conservation agriculture: Agricultural waste management: Climate change and agriculture.

##### Unit -III :

Soil farming processes; Soil physical properties: tenure structure, density and porosity; Soil water retention, movement and availability; Soil reaction-pH, Soil acidity and alkalinity; Soil organic matter: influence on soil properties and soil fertility; Soil organisms: macro and micro organisms, their beneficial and harmful effects; Soil pollution: behavior of pesticides and inorganic contaminants, prevention and mitigation; Soil quality and health.

##### Unit-IV :

Weather and crop growth; Tillage and tith; Modern concepts of Tillage; Seed and sowing; Cropping systems and Integrated Farming System; Crop nutrition: Essential nutrients - their functions and deficiency symptoms in plants; Nutrient sources: organic manures-fertilizers-biofertilizers-Integrated Nutrient Management; Water and weed management in field; horticultural and plantation crops; Plant protection; Harvesting, storage and value addition.

##### Unit-V:

Economic importance: production and protection technology of important field crops – rice, maize, finger millet, pulses and oilseeds, cotton, sugarcane, potato, Importance and scope of fruit and plantation crops – production and protection technologies for the cultivation of fruit and plantation crops-mango, banana, citrus, guava, litchi, papaya, pineapple, pomegranate, jackfruit, coconut, areca nut, cashew, tea, coffee, rubber: Nursery techniques and their management: Nutrition garden

**NEW SYLLABUS FOR ASSISTANT SOIL CONSERVATION OFFICERS' EXAMINATION**

**PAPER-II (Agriculture)**

**Unit-I**

Agro forestry-objectives and potential; Agro forestry system-sub-system and practice; Planning for agro forestry-constraints, diagnosis and design methodology, selection of tree crop species for agro forestry; Agro forestry for food, feed, fuel and nutritional security, soil improvement-carbon sequestration, microclimate amelioration, industrial requirement

**Unit-II**

Rainfed agriculture: problems and prospects; Rainfall analysis: Draught-classification, causes and impacts, drought management strategy; crops and cropping systems, soil moisture and rain water conservation-in-situ and Ex-situ storage, water harvesting and recycling, contingent crop planning under aberrant weather conditions, dry land horticulture: Watershed planning based on land capability classes and hydrologic data, watershed delineation and prioritization: Water budgeting in a watershed: Integrated watershed management-concept, objectives components, arable lands agriculture and horticulture, non-arable lands-forestry, fishery and animal husbandry; Watershed programme-execution, follow-up practices, maintenance, monitoring and evaluation; Participatory watershed management – role of watershed associations, user groups and self –help groups : and formulation of project proposal for watershed management programme including cost-benefit analysis.

**Unit-III**

Soil and water conservation – issues and importance: causes and agents of soil erosion: water erosion: Hydrologic cycle,precipitation and its forms, Runoff estimation, Forms of water erosion, Gully classification and control measures, Principles of erosion control : Introduction to contouring , strip cropping, contour bund, graded bund and bench terracing, grassed water ways and their design: Water harvesting - principles, importance and techniques: Runoff harvesting-short-term and long-term techniques: Water harvesting structures – farm ponds-percolation pond-dug-out and embankment reservoir types, tanks and subsurface dykes: Wind erosion: mechanics of wind erosion. Types of soil movement Principles of wind erosion control and its control measures

**Unit-IV**

Wasteland-causes, distribution and sustainable wasteland development- Government policies, Participatory approach; Afforestation, shifting cultivation, Optimal land use options: Reclamation of Saline, Sodic, Acid, Waterlogged, Eroded, Compacted, Flooded, Polluted soils and Mine spoils : Desertification-impact and causes, prevention and control measures ; Bio-remediation of soils through multipurpose tree species

**Unit-V**

Protected cultivation ; importance and scope controlled conditions, method and techniques , canopy management, irrigation and fertigation, liquid fertilizers ad their solubility and compatibility, insect pest and disease management: Production of quality planting materials, cultivation of high value crops and off-season production in green houses ; Components of precision farming: Remote sensing Geographical information system (GIS) Differential Geo-positioning System(DGPS), Variable Rate applicator(VRA), application of precision farming in agriculture; Remote sensing and GIS in diagnosis and management of problem soils : Land capability and land suitability classification

## OPTIONAL SUBJECT: AGRICULTURAL ENGINEERING

### PAPER-I

#### UNIT-I WATERSHED HYDROLOGY AND FLUID MECHANICS

Properties of fluids: ideal and real fluid. Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces, centre of pressure, buoyancy, meta centre and meta centric height, condition of floatation and stability of submerged and floating bodies; kinematics of fluid flow: types of fluid flow; dynamics of fluid flow, Bernoulli's theorem, venturimeter, orifice meter; laminar and turbulent flow in pipes, general equation for head loss Darcy's equation, minor and major hydraulic losses through pipes, hydraulic gradient and energy gradient; flow through simple and compound pipes; flow through orifices and mouthpieces; flow over notches and weirs; open channel flow: design and hydraulics: velocity and pressure profiles in open channels, hydraulic jump; dimensional analysis: Rayleigh's method and Buckingham's 'pi' theorem, types of similarities, dimensionless numbers; hydrologic cycle, rainfall measurement and estimation of mean rainfall, frequency analysis of point rainfall; mass curve, hyetograph, depth-area-duration curves and intensity duration- frequency relationship; hydrologic processes; Evaporation - estimation and measurement; runoff estimation; hydrograph- components, base flow separation, unit hydrograph theory, s-curve, synthetic hydrograph; drought - classification, causes, impacts and management strategy.

#### UNIT- II IRRIGATION AND DRAINAGE ENGINEERING

Purpose of irrigation, merits and demerits of irrigation, source of irrigation water; measurement of irrigation water: weir, flumes and orifices and other methods; Design and lining of irrigation field channels, on-farm structures for water conveyance, control & distribution; Underground pipe conveyance system: components and design; Land leveling-criteria and design methods; Soil-water-plant relationship: soil properties influencing irrigation management, soil water movement, infiltration, soil water potential, soil moisture characteristics, soil moisture constants, measurement of soil moisture, moisture stress and plant response; Water requirement of crops: concept of evapotranspiration (ET), measurement and estimation of ET, water and irrigation requirement of crops, depth of irrigation, frequency of irrigation, irrigation efficiencies; Surface methods of water application: border, check basin and furrow irrigation; Water logging-causes and impacts; Drainage, objectives of drainage, drainage coefficient; Surface and sub surface drainage, types and design; Hooghoudt's and Ernst's drain spacing equations; Design of subsurface drainage system, drainage materials, drainage pipes, drain envelope; Layout, construction and installation of drains; vertical drainage, bio-drainage, tile drain, mole drain; Salt balance, reclamation of saline and alkaline soils, leaching requirements; Command area development (CAD) programme- on farm development works, design of lined and un-lined field channel and its cost estimation, cross drainage works; rotational irrigation system, conjunctive use of water; farmers' participation in command area development.

#### UNIT- III SOIL AND WATER CONSERVATION ENGINEERING

Soil erosion: introduction, causes and types - geological and accelerated erosion, agents, factors affecting and effects of erosion; Water erosion: mechanics and forms- Gullies: classification, stages of development; Soil loss estimation; Rainfall erosivity and soil erodibility; Measurement of soil erosion; Water erosion control measures- agronomical measures, contour farming, strip cropping, conservation tillage and mulching; Engineering measures- bunds and terraces, bunds: contour and graded bunds- design and surplussing arrangements; terraces, planning, design and

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layout procedure, contour stone wall and trenching; Gully and ravine reclamation- principles of gully control, vegetative measures, temporary structures and diversion drains. Grassed waterways and design; Energy and momentum principles in open channels; specific energy and specific force, hydraulic jump and its application, types of hydraulic jump, energy dissipation due to the jump; Soil erosion control structures- introduction, classification and functional requirements. Permanent structures for soil conservation and gully control- check dams, drop, chute and drop inlet spillways; Wind erosion and its control-vegetative, mechanical measures, wind breaks and shelter belts and stabilization of sand dunes; Land capability classification, dryland farming; Water harvesting techniques- classification based on source, storage and use, runoff harvesting- short-term and long-term techniques; Structures- farm ponds- types and design; percolation pond, nala bunds, check dam; earthen embankments-types, methods of construction and design.

#### **UNIT-IV GROUNDWATER WELLS, PUMPS AND ARTIFICIAL RECHARGE**

Occurrence and movement of ground water, aquifer and its types, aquifer properties, groundwater flow direction, flow in relation to groundwater contours; Classification of wells, design of open wells; Darcy's law, determination of hydraulic conductivity; groundwater hydraulics- Dupit's assumptions and Dupit's method, Thiem's method; Well interference; Design of tube well and gravel pack, sanitary protection of tube wells; Groundwater exploration techniques; methods of drilling of wells: percussion, rotary, reverse rotary; DTH; Development of tube well; Basin wise ground water development and safe yield, conjunctive use of ground water; Quality of ground water, groundwater pollution; Sea water intrusion of coastal aquifers, upconing of saline water, Ghyben-Herzberg relationship between fresh and saline water; Pumping systems: water lifting devices; Classification of pumps, components of centrifugal pumps, priming, pump selection, installation and troubleshooting, performance curves, effect of speed on capacity, head and power, effect of change of impeller dimensions on performance characteristics; Hydraulic ram, deep well turbine pump and submersible pump; Artificial groundwater recharge techniques; different direct, indirect and combination of methods;

#### **UNIT- V WATERSHED PLANNING AND MANAGEMENT**

Watershed- introduction and characteristics; Watershed management- concept, objectives, factors affecting watershed planning based on land capability classes, hydrologic data for watershed planning, watershed codification, delineation and prioritization of watersheds – sediment yield index; Community mobilization and participatory institution building: participatory watershed management, role of watershed associations, user groups and self-help groups; Participatory Rural Appraisal, understanding gender in relation to agriculture; Water budgeting in a watershed; Management measures - rainwater conservation technologies *in-situ* and *ex-situ* storage, water harvesting and recycling; Dry farming techniques; Integrated watershed management- concept, components, arable lands, non-arable lands; Use of remote sensing thematic maps and GIS in watershed planning; Watershed programme- execution, follow-up practices, maintenance, monitoring and evaluation; Planning and formulation of project proposal for watershed management programme including cost-benefit analysis.

**UNIT- I FARM MACHINERY AND EQUIPMENT-I**

Classification of farm machines; unit operations in crop production; primary tillage and secondary tillage machinery- draft measurement and power requirement; field capacities and field efficiency; calculations for economics of machinery usage, comparison of ownership with hiring of machines; Familiarization with land reclamation and earth moving equipment; Tillage equipments-mould board plough, disc plough, chisel plough, sub-soiler, harrows, puddler, cultivators and identification of major functional components, hitching systems and controls of farm machinery; sowing, planting & transplanting equipments. seed drills, no-till drills, and strip till drills-calibrations and adjustment; various types of planters, Study of types of furrow openers and metering systems in drills and planters. Properties of materials used for critical and functional components of agricultural machine; Introduction to steels and alloys for agricultural application. Identification of heat treatment processes specially for the agricultural machinery components.

**UNIT- II FARM MACHINERY AND EQUIPMENT-II**

Plant protection equipments: sprayers and dusters- classification, types of nozzles, calibration of sprayers and chemical application rates; interculture equipments and types, use and functional requirements of weeders – manual and powered; fertilizer application equipments; Study of harvesting operation – harvesting methods, harvesting equipments and devices, mowers, cutter bar, reapers, binders and windrowers; hay conditioning, threshing systems – manual and mechanical systems; types of threshing drums and their applications, types of threshers- tangential and axial, their constructional details and cleaning systems. Study of grain combines and straw combines working principle and constructional details. Study of root crop diggers – principle of operation, blade adjustment and approach angle; Study of potato and groundnut diggers. Study of Cotton harvesting – Cotton harvesting mechanisms, study of cotton pickers and strippers maize harvesting combines. vegetables and fruit harvesting equipment and tools.

**UNIT- III RENEWABLE ENERGY SOURCES AND APPLICATIONS**

Different sources of renewable energy- solar, wind, geothermal, biomass, ocean energy sources; Solar energy- energy available from sun, solar radiation data, solar energy conversion into heat through flat plate and concentrating collectors, different solar thermal devices; Solar photo voltaics- basics and applications, p-n junctions; Solar cells, PV systems, stand alone, grid connected solar power station; Calculation of energy through photovoltaic power generation and cost economics; Wind energy- energy availability, general formula, lift and drag; Basics of wind energy conversion, effect of density, frequency variances, angle of attack, wind speed, types of windmill rotors, determination of torque coefficient, induction type generators; Working principle of wind power plant; Wind farms, aero-generators, wind power generation system; Biogas- basics of anaerobic digestion, types and constructional details of biogas plants, design considerations, advantages and disadvantages of biogas spent slurry; Generation of power from biogas; Design & use of different commercial biogas plants; Power generation from urban, municipal and industrial waste; Ocean thermal and electric power generation, wave and tidal power; Power generation from biomass (gasification & Dendro-thermal).

**UNIT- IV POST HARVEST ENGINEERING**

General unit operations in agricultural process engineering and importance of these unit operations in grain processing; Structure and composition of cereals, pulses and oil seeds; Cleaning and grading: Principles of cleaning, scalping, sorting and grading; screens, different types of screen

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separators, capacity and effectiveness of screens, various types of separators as specific gravity, magnetic, disc, spiral, pneumatic, inclined belt draper, velvet roll separator, colour sorter, cyclone separator; Drying: Moisture content and water activity, EMC determination; Drying principles and theory, thin layer and deep bed drying, falling rate and constant rate drying periods, maximum and decreasing drying rate periods, drying equations, Drying methods; Different types of grain dryers, dryer performance; Principles of grain storage; different types of grain storage structures; deep bin and shallow bin; Size reduction: Principle; Bond's law, Kick's law, Rittinger's law; Construction features and applications of jaw crusher, hammer mill, attrition mill, and ball mill; Material handling: Basic parts of different types of conveyors and elevators, pneumatic conveying, power requirement for conveying and elevating; parboiling, parboiling methods, Milling of rice: unit operations and equipment involved in traditional and modern rice milling methods; Milling of wheat, Milling of pulses- pre-conditioning, dry milling and wet milling methods; Milling of oilseeds: unit operations and equipment, mechanical expression, screw press, hydraulic press, solvent extraction method, refining of oil, stabilization of rice bran;

General methods of preservation of fruits and vegetables and their relative advantages and disadvantages; Flowcharts for preparation of different finished products; Sorting and grading methods specific to fruits and vegetables, shape and size sorting, weight sorting, colour sorting, sorting effectiveness; Peeling: different peeling methods and devices; Size reduction and juice extraction: equipment for slicing, shredding, crushing, chopping, juice extraction; Blanching: importance and objectives; blanching methods and equipment; Drying: Dryers for fruits and vegetables, tray dryer, tunnel dryer, vacuum dryer, microwave dryer, freeze dryer etc.; Chilling requirements of different fruits and vegetables; Freezing of food, freezing time calculations, slow and fast freezing; Equipment for chilling and freezing; Cold chain logistics and reefer containers; Cold storage heat load calculations and selection of matching equipment; Modified atmosphere packaging, Storage methods as low temperature storage, evaporatively cooled storage and controlled atmospheric storage

#### **UNIT- V**

##### **PROTECTED CULTIVATION, SPRINKLER AND MICRO IRRIGATION SYSTEM**

Greenhouse-types, components, cladding materials, plant environment interactions, solar radiation and transpiration, light, temperature, relative humidity, carbon dioxide enrichment; Design and construction of greenhouses- site selection, orientation, design for ventilation requirement using exhaust fan system, selection of equipment; Greenhouse cooling system- methods, ventilation with roof and side ventilators, evaporative cooling, different shading materials, fogging, combined fogging and fan-pad cooling system, design of cooling system, maintenance of cooling and ventilation systems, pad care, etc.; Greenhouse heating- components; crops for greenhouse cultivation, irrigation requirement, fertilizer management, cultivation, harvesting and post-harvest techniques; Sprinkler irrigation: adaptability, problems and prospects, types of sprinkler irrigation systems; design of sprinkler irrigation system: layout selection, hydraulic design of lateral, sub-main and main pipe line, design steps; performance evaluation of sprinkler irrigation system: uniformity coefficient and pattern efficiency; design of drip irrigation system: general considerations, wetting patterns, irrigation requirement, emitter selection, maintenance, clogging problems; filter cleaning, flushing and chemical treatment; fertigation.

# Syllabus for ASCO recruitment

## Dept. of soil conservation, Government of Odisha

### (Horticulture)

#### Paper- I

##### Unit-I

Scope, importance and future prospects of Horticulture. Role of Horticulture in national and state economy. Classification, nutritive value, area and production, exports and imports of Horticultural crops. Horticultural zones of India. Training and pruning. Horticulture-based cropping system. Soil management, nutrient management, weed management, water management and important pests and diseases of Horticultural crops and their management. Physiological disorders of Horticultural crops. Use of plant growth regulators. Organic farming. Dry land horticulture. Precision Farming.

##### Unit-II

Scope, importance, classification and breeding of fruit and plantation crops. Soil, climate, varieties, rootstocks, planting, cultural practices, nutrition, irrigation, physiological disorders, plant protection, harvesting, yield, storage and processing of important fruit crops like mango, banana, citrus, guava, papaya, litchi, pineapple, jackfruit, sapota, aonla, ber, pomegranate, jamun, custard apple, fig, bael, apple, pear, peach, strawberry, walnut, almond etc. and plantation crops like coconut, areca nut, cashewnut, date palm, oil palm, cocoa, tea, coffee, palmyrah palm, etc.

##### Unit-III

Scope, future prospects, economic importance, export potential of vegetable crops. Off season vegetable cultivation. Vegetable seed production. Soil, climate, varieties, nursery practices, sowing/transplanting, nutrient management, water management, weed management, use of chemicals and growth regulators, plant protection, physiological disorders, harvesting, postharvest handling tropical and subtropical vegetable crops such as tomato, brinjal, okra, chilli, bell pepper, bitter melon, bottle gourd, watermelon, musk melon, pumpkin, ridge gourd, amaranthus, spinach, garden pea, cowpea, beans, cabbage, cauliflower, potato, sweet potato, colocasia, carrot, radish, onion, spinach, palak, knol khol, sprouting broccoli, Brussels sprout, etc. Production technology of important spice and condiments like ginger, turmeric, coriander, fenugreek, fennel, cumin, cardamom, black pepper, clove, nutmeg, cinnamon, etc.

##### Unit-IV

Scope and importance of commercial floriculture in India. Production techniques of flower crops like rose, marigold, chrysanthemum, gladiolus, dahlia, tuberose, orchid, china aster, gerbera, etc. and ornamental plants like annuals, biennials, herbaceous perennials, grasses and bulbous ornamentals, shrubs, climbers, trees, indoor plants, palms and cycads, cacti and succulents and foliage plants. Types and features of ornamental garden, landscape architecture, avenue planting, bioaesthetic planning, flower arrangement. Lawn, park, vertical garden, terrace garden, bottle garden, terrariums and bonsai. Protected cultivation of ornamental crops.

##### Unit-V

Importance and scope of Postharvest Technology and processing in horticultural crops. Maturity indices, harvesting, handling, grading, storage, packaging and transport of horticultural crops. Pre- and post-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process. Postharvest treatments of horticultural crops. Pre-harvest treatment and pre-cooling, pre-storage treatments. Vacuum packaging, cold storage, poly shrink packaging. Methods of preparation of various processed products viz. juices, squashes, syrups, cordials, fermented beverages, jam, jelly, marmalade, candies, crystallized fruits, preserves, pickle, chutneys and sauces, ketch up etc. Preservation by sugar, salt, chemicals and vinegar. Quality control of processed products, Govt. policy on import and export of processed fruits. Food laws.



# Syllabus for ASCO recruitment

Dept. of soil conservation, Government of Odisha

(Horticulture)

Paper- II

## Unit-I

Sexual and asexual methods of propagation. Seed dormancy. Nursery management of Horticultural crops. Nursery registration act. Nutrient management and plant protection measures in nursery. Media for propagation of plants in nursery beds, practicing different types of cuttings, layering, graftings and buddings including opacity and grafting, top grafting and bridge grafting etc.

Soils of India and Odisha Problematic soils and their management. Soil micro-organisms and their importance. Manures and fertilizers: classification and their role on plant growth and development. Macro and micronutrients. Nutrient deficiency and toxicity. Integrated nutrient management for Horticultural crops. Bio-fertilizers. Nutrient use efficiency.

## Unit-II

Agro-climatic zones of India and Odisha, Agro-ecology of Horticultural crops, Weather and Climate, Climate change and its effects on Horticultural crops, Climate resilient Horticulture. Water resources of Odisha and India. Water requirement of horticultural crops, critical stages of crop growth for irrigation. Effects of moisture stress on plant growth. Methods of irrigation, viz., surface, sub-surface and overhead irrigation methods, their suitability, merits and limitations, fertigation. Water holding capacity, field capacity, permanent wilting point. Water budgeting. Water management in protected cultivation.

## Unit-III

Production technology of important medicinal and aromatic crops like Withania, periwinkle, Rauwolfia, isabgol, opium poppy, belladonna, cinchona, lemon grass, rosemary, palmarosa, citronella grass, vetiver, lavender, geranium, patchouli, mint, Ocimum, etc.

Agroforestry and social forestry. Agroforestry system, sub-system and practice: agri-silviculture, silvipastoral, horti-silviculture, horti-silvipastoral, shifting cultivation, home gardens, alley cropping, intercropping, wind breaks, shelterbelts and energy plantations. Multi-purpose tree species.

## Unit-IV

Entrepreneurship development in Horticulture. Transfer of technology from lab to land. Scope and importance of Participatory Rural Appraisal (PRA) & Rapid Rural Appraisal (RRA). Methods of communication. ICT in Extension education.

Demand and supply. Cost of cultivation of Horticultural crops. Preparation of projects for horticultural crops. Marketing of Horticultural crops. Marketing Process: Need for marketing, Role of marketing, marketing functions, classification of markets and constraints in marketing of Horticultural produce.

**Unit-V**

Pests and diseases of Horticultural crops. Integrated pest and disease management, physiological disorders of Horticultural crops and their management. Beneficiary insects and microorganisms.

Biodiversity and its conservation, watershed management, Wasteland reclamation, Natural Disasters and mitigation strategies. Seed purity, seed quality, seed germination, seed dormancy, seed certification and seed production of Horticultural crops.

## FORESTRY PAPER I

### Unit 1: General Silviculture

Forests, their role in soil conservation, carbon sequestration and other benefits. Importance of silviculture. Classification of forests and forest types. Site factors influencing vegetation: climatic, edaphic, topographic and biotic factors. Natural regeneration of forest from seeds and vegetative parts. Artificial regeneration of forests: choice of species, site, methods and spacing. Plantation development including propagation of plants in nursery, nursery infrastructure, containers used, site preparation for plantation, planting pattern, maintenance of plantations and plantation journal. Tending operations: weeding, cleaning, thinning, pruning, improvement felling, salvage cutting and sanitation cutting, girdling and climber control. Plantation of difficult sites such as saline soils, alkali soils, acid soils, desert and shifting sand dunes, coastal soil, lateritic soils, ravine lands, mined out areas, wet and waterlogged lands, denuded hill slopes, road sides and canal banks.

### Unit 2: Silvicultural Systems

Characteristics of silvicultural systems: pattern of felling, method of regeneration, tending of new crop and character of new crop. Classification of silvicultural systems. Characteristics, suitability, advantages and disadvantages of different silvicultural systems such as Clear felling system, Uniform system, Group system, Indian irregular shelterwood system, Selection system, Group selection system, Accessory systems, Simple coppice system, Coppice of two rotation system, Shelterwood coppice system, Coppice with standards system, Coppice with reserves system, Coppice selection system and Pollard system. Culm selection system in bamboo.

### Unit 3: Silviculture of Trees

Silviculture of important trees including their economic importance, description, distribution, site factors, phenology, silvicultural characters, natural regeneration, artificial regeneration, tending operations, insect pests and diseases: *Abies pindrow*, *Acacia auriculiformis*, *Acacia catechu*, *Acacia nilotica*, *Albizia lebbek*, *Azadirachta indica*, *Dunousu bambos*, *Bambusa vulgaris*, *Casuarina equisetifolia*, *Cedrus deodara*, *Dalbergia sissoo*, *Dendrocalamus strictus*, *Eucalyptus tereticornis*, *Leucaena leucocephala*, *Picea smithiana*, *Pinus roxburghii*, *Populus deltoides*, *Prosopis cineraria*, *Prosopis juliflora*, *Santalum album*, *Shorea robusta* and *Tectona grandis*.

### Unit 4: Forest Soils, Soil Conservation and Watershed management

Forests Soils: classification, factors affecting soil formation; physical, chemical and biological properties. Soil conservation: definition, causes for erosion; types - wind and water

erosion; conservation and management of eroded soils/areas, wind breaks and shelter belts. Maintenance and build up of soil organic matter, provision of lopping for green leaf manuring; forest leaf litter and composting; Role of microorganisms in ameliorating soils; N and C cycles, VAM. Watershed Management: concepts of watershed; role of mini-forests and forest trees in overall resource management, forest hydrology, watershed development in respect of torrent control, river channel stabilization, avalanche and landslide controls, rehabilitation of degraded areas; hilly and mountain areas; watershed management and environmental functions of forests; water-harvesting and conservation; ground water recharge and watershed management. Role of integrating forest trees, horticultural crops, field crops, grasses and fodders in watershed management.

#### **Unit 5: Tree Improvement and Seed Technology**

General concept of tree improvement, methods and techniques, variation and its use, provenance, seed source, exotics; quantitative aspects of forest tree improvement. seed production and seed orchards, progeny tests, use of tree improvement in natural forest and stand improvement, genetic testing programming, selection and breeding for resistance to diseases, insects, and adverse environment; the genetic base, forest genetic resources and gene conservation in situ and ex-situ. Cost benefit ratio, economic evaluation.

### **FORESTRY PAPER II**

#### **Unit 1: Agroforestry**

Agroforestry: concept and scope. Advantages and disadvantages of agroforestry. Classification of agroforestry systems. Agrisilvicultural systems, Silvipastoral systems, Agrisilvipastoral systems, Miscellaneous (other) systems. Principles of species selection in agroforestry. Agroforestry in different agroecological zones. Agroforestry for timber, industrial raw material, energy and biomass production, NTFP production, soil improvement and water conservation. Tree-Crop interaction in agroforestry. Tree management in agroforestry. Trees suitable for agroforestry. Diagnosis & Design in agroforestry. Agroforestry extension. National Agroforestry Policy of India.

#### **Unit 2: Forest Mensuration and Inventory**

Scope of forest mensuration. Units of measuring tree parameters. Measurement of individual trees: measurement of diameter, girth, height, volume, age, form and growth of trees. Preparation of volume tables. Current annual increment, mean annual increment and stump analysis. Measurement of tree crops: diameter of crops, height of crops, age of crops and volume of crops. Forest inventory: kinds of inventory, sampling methods and sample

plots. Point sampling. Estimation of stand yield: yield table, content of yield table, preparation of yield table and uses of yield table. Stand table. Forest cover monitoring through remote sensing.

**Unit 3: Forest Ecology and Ethnobotany**

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). Taxonomic classification, principles and establishment of herbaria and arboreta. Conservation of forest ecosystems. Role of ethnobotany in Indian Systems of Medicine.

**Unit 4: Forest Products and Utilization**

Environmentally sound forest harvesting practices; logging and extraction techniques and principles, transportation system, storage and sale; Non-Timber Forest Products (NTFPs): gums, resins, oleoresins, fibres, oil seeds nuts, rubber, canes, bamboos, medicinal plants, charcoal, lac and shellac and katha. Bidi leaves: collection; processing and disposal. 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. Pulp-paper and rayon; present position of supply of raw material to industry, wood substitution, utilization of plantation wood; problems and possibilities.

**Unit 5: Forest Economics and Legislation**

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. Legislation: history of forest development; Indian Forest Policy of 1894, 1952 and 1990. 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. 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 Right Act 2006.