Advertisement No. IIE-92/2025/5925/OSSC Date: 30.12.2025

DETAILED ADVERTISEMENT WITH REFERENCE TO INDICTIVE ADVERTISEMENT No. 5925/OSSC DATED 30.12.2025 FOR COMBINED TECHNICAL SERVICES RECRUITMENT EXAMINATION (CTSRE)-2025 FOR GROUP-B POSTS/SERVICES UNDER DIFFERENT DEPARTMENTS/HEADS OF DEPARTMENTS OF GOVERNMENT OF ODISHA.

(POST CODE: CTS/302)

(WEBSITE: www.ossc.gov.in)

1. **Programme of Online Application-**

	Start Date	End Date
Online Registration and Payment of examination fees	30.05.2026	29.06.2026
Submission of Online Application Form	30.05.2026	02.07.2026
Date of editing of Online Application form	30.05.2026	05.07.2026
Mode of Application	Online Mode only through the website "www.ossc.gov.in". No Physical copy/Hard copy of the Online Application Form needs to be submitted by the applicant.	

a. This recruitment shall be guided by **"Combined Technical Services Recruitment Examination Rules-2022"** as amended from time to time.

b. Online Applications invited from prospective candidates for recruitment to fill up the vacancies reported by the following Department/HODs under Govt. of Odisha as shown below.

Sl. No	Name of the Post/Services	Name of the Department/Heads of Department in which vacancy exists for this recruitment	No. of Vacancy (Out of which Women)	Group of Post/Services	Pay Matrix Level
1	Junior Engineer (Civil)	Engineer-in-Civil, Water Resources	24 (W-08)	Group-B	Level-9, Cell-1 of ORSP, 2017
2	Junior Engineer (Civil)	Director, Panchayati Raj, Panchayati Raj & Drinking Water Department	450 (W-150)	Group-B	Level-9, Cell-1 of ORSP, 2017
3	Junior Engineer (Civil)	Director, Municipal Administration	132 (W-44)	Group-B	Level-9, Cell-1 of ORSP, 2017
4	Architectural Assistant	Chief Architect, Odisha, Bhubaneswar	23 (W-07)	Group-B	Level-9, Cell-1 of ORSP, 2017

5	Cameraman	Information & Public Relations Department.	02 (W-Nil)	Group-B	Level-9, Cell-1 of ORSP, 2017
6	Photographer	Information & Public Relations Department.	01 (W-Nil)	Group-B	Level-9, Cell-1 of ORSP, 2017
7	Sound Recordist	Information & Public Relations Department.	01 (W-Nil)	Group-B	Level-9, Cell-1 of ORSP, 2017
8	Mechanic	Information & Public Relations Department.	01 (W-Nil)	Group-B	Level-9, Cell-1 of ORSP, 2017
9	Video Film Editor	Information & Public Relations Department.	02 (W-01)	Group-B	Level-9, Cell-1 of ORSP, 2017
10	Junior Draughtsman (Civil)	Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	07 (W-02)	Group-C	Level-8, Cell-1 of ORSP, 2017
11	Tracer (State Cadre Field)	Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	03 (W-Nil)	Group-C	Level-5, Cell-1 of ORSP, 2017

c. Candidates must possess a valid e-mail Id and Mobile number while applying for the post and keep the same active till the completion of this recruitment process, to receive important messages from the Commission.

d. **The appointment will be only against one of the posts carrying corresponding pay as indicated in the above table and candidates applying for more than one post/ service need to give option/preference for the post/service in case they have the requisite qualification for the posts**.

e. The candidates other than SC, ST and PwD category shall have to pay the Examination fee of Rupees Five Hundred (₹ 500/- only). The examination fee paid shall be refunded to the candidates who actually appear in the recruitment examination.

f. Appointments shall be on a regular basis carrying the level of Pay as mentioned in the table above.

g. Candidates should ensure that they fulfil all the eligibility criteria prescribed for the post as laid down in the advertisement. Admission of a candidate to the written examination and other tests shall be provisional and on the basis of information furnished by her/him in the Online Application Form.

h. Online application submitted to OSSC found to be incomplete in any respect shall be liable for rejection without entertaining any correspondence with the applicant on that matter.

i. If at any stage of recruitment or thereafter, it is found that any information furnished by the candidate in her/his Online Application Form is false/incorrect or the candidate has suppressed any relevant information or the candidate otherwise does not satisfy the eligibility criteria prescribed for the post, her/his candidature for the posts shall be cancelled. She/ He may further be debarred either temporarily or permanently from the recruitment examination(s) conducted by the Commission.

j. Commission will adopt a **"Normalisation Formula"** published in Commission's website vide Notice No.2444/ OSSC dated 02.09.2021 for processing the result if any examination is conducted through CBRE (Computer Based Recruitment Examination)/OMR (Optical Mark Reader) mode in multiple batches using different sets of question papers so as to offset the difficulty level that may arise in such use of multiple sets of question papers in

the said examination, and such normalized score will be used to determine the last selection marks of different categories. The Commission reserves the right to conduct the examination either through OMR or through CBRE mode.

k. No Admission Letter for recruitment at any stage shall be sent by post. The candidates are therefore advised to be in touch with the Commission's website www.ossc.gov.in regularly to know updates regarding the date of examination, downloading of Admission Letter and to know the status of their applications etc.

l. **The candidates are advised to submit the Online Application Form well in advance without waiting for the closing date to avoid the last-hour rush.**

m. For those eligible for and applying for more than one post/ service, the Commission will make the final allotment to post/ service on the basis of merit-cum-preference of post/ service given by the candidate and once a post is allotted, no change of posts will be made by the Commission due to non-fulfilment of any post-specific requirements of Physical/medical/educational standards, etc. Candidates thus must ensure that they fulfil all the requirements of the posts before giving their preference/options for any post/ service.

NOTE: Important instructions to candidates about filling up of Online Application and "How to Apply" is enclosed as Annexure-A to this advertisement.

2. a. Category-wise break -up of vacancy position along with reservation thereof:

Sl. No	Name of the Posts/ Services	Name of the Office	Category wise Vacancy				
			UR (Out of which women)	SEBC (Out of which women)	SC (Out of which women)	ST (Out of which women)	Total (Out of which women)
1	Junior Engineer (Civil)	Engineer-in-Civil, Water Resources	16 (w-05)	04 (w-01)	01 (w-01)	03 (w-01)	24 (w-08)
2	Junior Engineer (Civil)	Director, Panchayati Raj, Panchayati Raj & Drinking Water Department	103 (w-34)	137 (w-46)	98 (w-33)	112 (w-37)	450 (w-150)
3	Junior Engineer (Civil)	Director, Municipal Administration	69 (w-23)	Nil	27 (w-09)	36 (w-12)	132 (w-44)
4	Architectural Assistant	Chief Architect, Odisha, Bhubaneswar	07 (w-02)	04 (w-01)	04 (w-01)	08 (w-03)	23 (w-07)
5	Cameraman	Information & Public Relations Department.	01 (w-Nil)	Nil	Nil	01 (w-Nil)	02 (w-Nil)
6	Photographer	Information & Public Relations Department.	Nil	Nil	Nil	01 (w-Nil)	01 (w-Nil)
7	Sound Recordist	Information & Public Relations Department.	01 (w-Nil)	Nil	Nil	Nil	01 (w-Nil)
8	Mechanic	Information & Public Relations Department.	01 (w-Nil)	Nil	Nil	Nil	01 (w-Nil)
9	Video Film Editor	Information & Public Relations Department.	02 (w-01)	Nil	Nil	Nil	02 (w-01)
10	Junior Draughtsman (Civil)	Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	04 (w-02)	01 (w-Nil)	01 (w-Nil)	01 (w-Nil)	07 (w-02)

11	Tracer (State Cadre Field)	Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	02 (w-Nil)	Nil	Nil	01 (w-Nil)	03 (w-Nil)

UR: Unreserved

SEBC: Socially and Educationally Backward Class

SC: Scheduled Caste

ST: Scheduled Tribe

W: Women

NOTE:

1. **Candidates belonging to the Transgender community are also eligible to apply.**
2. **The number of vacancies and other conditions of vacant posts to be filled up on the basis of this recruitment are subject to change without any prior notice as per the discretion of the Commission/the Requisitioning Authorities/ the Government.**

b. Reservation of Special Category vacancies:

As per the Social Security & Empowerment of Persons with Disabilities Department, Govt. of Odisha Resolution No.1843/SSEPD Dtd.25.02.2021, the PwD candidates having disability of permanent nature not below 40% in the categories and benchmark disability as shown in table below shall be eligible to get reservation for the posts.

However, as per clarification received vide Letter No. 14864/SSEPD dated 31.12.2025 of Social Security & Empowerment of Persons with Disabilities Department, Government of Odisha, PwD candidates with benchmark disabilities which are **progressive, non-progressive or not likely to improve** as defined under the RPwD Act, 2016, shall be considered **equivalent to "Permanent Disability"** for the purpose of disability certification in terms of RPwD Amendment Rules, 2024 and will be considered for the benefit of reservation under Section 34 of the RPwD Act, 2016.

N.B. i. The certificates having the condition prescribed as **"likely to improve"** under temporary **disability** category will **not be considered eligible** for reservation under PwD category.

ii. Candidates be advised to get them re-assessed as per RPwD Amendment Rules, 2024.

Sl No.	Name of the Posts/ Services	Special Category				
		Ex-Servicemen (ESM)	Sports Person (Out of which women)	Persons with Disability (PwD)		
				Total PwD Vacancy (Out of which Women)	Category, No. of Vacancy & Benchmark of Disability	
1	Junior Engineer (Civil) under Engineer-in-Chief, Water Resources	01	01 (w-Nil)	01	**Cat-I-01**	Low Vision
2	Junior Engineer (Civil) under Director, Panchayati Raj, Panchayati Raj & & Drinking Water Department	14	05 (w-01)	18 (w-05)	**Cat-01-05**	Low Vision
					Cat-II-05	Deaf & Hard of Hearing
					Cat-III-05	Locomotor Disability OA-One arm affected (R/ L) BA-Both arms affected OL-One leg affected (R/L) BL- Both legs affected but not arms (Mobility not be restricted) Dw- Dwarfism AAV-Acid Attack Victim
					Cat-IV-03	Specific Learning Disability, Mental Illness, Multiple disabilities from amongst persons specified in Category-I, II and III above.
3	Junior Engineer (Civil) under Director, Municipal Administration	08	03 (W-Nil)	06 (W-02)	**Cat-I-02**	Low Vision
					Cat-II-02	Hard of Hearing
					Cat-III-01	One Arm, One Leg, Dwarfism, Acid Attack Victim
					Cat-IV-01	Multiple disabilities from among disabilities specified in Category- I, II and III above.
4	Architectural Assistant under Chief Architect, Odisha, Bhubaneswar	01	Nil	01 (W-Nil)	**Cat-II-01**	Hearing Impaired with suitable aid
5	Cameraman under Information & Public Relations Department.	Nil	Nil	Nil	**Nil**	Nil
6	Photographer under Information & Public Relations Department	Nil	Nil	Nil	**Nil**	Nil
7	Sound Recordist under Information & Public Relations Department	Nil	Nil	Nil	**Nil**	Nil
8	Mechanic under Information & Public Relations Department	Nil	Nil	Nil	**Nil**	Nil

9	Video Film Editor under Information & Public Relations Department	Nil	Nil	Nil	**Nil**	Nil
10	Junior Draughtsman (Civil) under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	Nil	Nil	Nil	**Nil**	Nil
11	Tracer (State Cadre Field) under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	Nil	Nil	Nil	**Nil**	Nil

N.B.- Candidates belonging to PwD, Ex-Servicemen & Sports Persons, when selected as per reservation provided for them, shall be adjusted against the categories to which they belong, which means that the PwD/Ex-Servicemen/Sports Persons, if belonging to Scheduled Caste will claim the vacancy reserved for S.C., if belonging to Scheduled Tribe will claim the vacancy reserved for S.T. and so on. Thus, the PwD/Ex-Servicemen/Sports Persons, who do not belong to any of the reserved communities i.e. S.C./S.T./S.E.B.C., would claim the unreserved vacancies.

As per the Social Security & Empowerment of Persons with Disabilities Department, Govt. of Odisha Resolution No.1843/SSEPD Dtd.25.02.2021, the PWD candidates having disability of permanent nature not below 40% in the following categories and types of disabilities who are suitable to apply for the posts are shown below: -

Sl No.	Name of Post	Types of Disability and Functional Classification	Physical Requirement
1	Junior Engineer (Civil) under EIC Water Resources	Cat-I - Low Vision Cat-II- Deaf & Hard of Hearing Cat-III-Locomotor Disability OA-One arm affected (R/ L) BA-Both arms affected OL-One leg affected (R/L) BL- Both legs affected but not arms (Mobility not be restricted) Dw- Dwarfism AAV-Acid Attack Victim Cat-IV- Specific Learning Disability, Mental Illness, Multiple disabilities from amongst persons specified in Category-I, II and III above.	S, ST, W, BN, MF, RW, SE, H, C
2	Junior Engineer (Civil) under Director, Panchayati Raj, Panchayati Raj & Water Resources & Drinking Water Department		

3	Junior Engineer (Civil) under Director, Municipal Administration	Cat-I- Low Vision Cat-II-Hard of Hearing Cat-III- One Arm, One Leg, Dwarfism, Acid Attack Victim Cat-IV- Categories of PwDs having combination of disabilities from Categories of I, II and III only.	S, ST, BN, MF, RW, SE, H, C
4	Architectural Assistant under Chief Architect, Odisha, Bhubaneswar	Cat-II- Hearing Impaired with suitable aid	S, H, RW, MF, SE, C
5	Cameraman under Information & Public Relations Department	Cat-II- Hard of Hearing with suitable aid Cat-III- One arm affected, One leg affected	MF, ST, W, SE
6	Photographer under Information & Public Relations Department	Cat-II - Hard of Hearing with suitable aid Cat-III-One arm affected, One leg affected	ST, W , SE, MF
7	Sound Recordist under Information & Public Relations Department	Cat-I- Low vision Cat-II - Hard of Hearing with suitable aid Cat-III- One arm affected, One leg affected	MF, ST, W SE, H
8	Mechanic under Information & Public Relations Department	Cat-II - Hard of Hearing with suitable aid Cat-III- One arm affected ,One leg affected	MF, PP, L, BN, ST, SE
9	Video Film Editor under Information & Public Relations Department	Cat-II -Hard of Hearing with suitable aid Cat-III- One leg affected, Both Leg Affected (Mobility not be Restricted)	SE, S, MF
10	Junior Draughtsman (Civil) under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	Category-II-HI (With suitable aid) Category-III- OL-One leg affected (R / L) BL(MNR)-Both legs affected but not arms (Mobility not be restricted)	SE, S, MF, BN, RW
11	Tracer (State Cadre Field) under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	Category-II-HI (With suitable aid) Category-III- OL-One leg affected (R and/or L) BL(MNR)-Both legs affected but not arms (Mobility not be restricted)	SE, S, MF, BN,

Note:- i. The working condition in respect of the O/o Director Municipal Administration is that the work is performed both inside and outside. Work place is often hot and dusty. Jobs in the field are hazardous but designing work in office does not involve any hazard . The worker works alone in office and in a group in the field. Mobility of incumbent should not be restricted. The incumbent should be considered with aids and appliances wherever necessary.

ii. The working condition for the post of Junior Engineer (Civil) in respect of the O/o Engineer-in Chief, Water Resources involves Civil Engineer, General plans, organizes and supervises construction and repair of buildings, highways, dams, bridges, tunnels, canals, aerodromes, towers, laying of pipe lines, railway tracks etc. with or without assistance of Architect or other specialized civil engineers. Prepares or gets sketches, plans etc. of project

prepared by Architect according to the requirements of authority concerned. Visits area(s) for preliminary survey, selection of size, and collection of necessary data such as measurements, soil condition, availability of materials, labour etc. with or without assistance of specialized Civil Engineers, Overseer and Estimator. Prepares and gets them approved by his client or authority designs, detailed drawings and estimates of cost with assistance of Draftsmen, Civil or himself and concerned. Arranges for required materials, machinery, labour and commencement of work at site. Ensures correct execution of work according to specifications at every stage of progress. Checks at site, measurements taken by overseer for preparation and Payment of Bill.

iii. Candidates belonging to Category-I and Category IV are not suitable for the posts of Tracer and Junior Draughtsman under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar.

Physical Requirement

Abbreviations:-

Code	Physical Requirements
MF	Work performed by manipulating (with fingers)
PP	Work performed by pulling and pushing
L	Work performed by lifting
KC	Work performed by kneeling and crouching
BN	Work performed by bending
S	Work performed by sitting (on bench or chair)
ST	Work performed by standing
W	Work performed by walking
SE	Work performed by seeing
H	Work performed by hearing / speaking
RW	Work performed by reading and writing
C	Work performed by Communication

c. Provision of assistance of Scribe and availing compensatory time

PwD candidates with disabilities not less than 40% of permanent nature and limitations in writing have the option to use her/his own scribe with due permission of the Commission. The intending candidates must give option for scribe in the appropriate place while filling up the Online Application Form and will have to submit the required certificate/ documents prescribed in the Advisory Notice No.3453/OSSC dated 24.10.2019 published by the Commission which is available on the website of the Commission "www.ossc.gov.in". They should also state whether they intend to avail the benefit of compensatory time for the examination.

d. PwD candidates must ensure that they possess permanent disability certificate issued online and must upload the scanned copy of the original (not photocopy) of the disability Certificate/UDID Card issued by the competent Medical Authority.

e. In case of non-availability of eligible/suitable Women candidates belonging to the respective categories, the unfilled vacancies of that category shall be filled up by eligible suitable male candidate(s) of the same category.

f. The number of vacancies and reservation of Vacancies to be filled up on the basis of this recruitment are subject to change without any prior notice as per the discretion of the Commission/ the Requisitioning Authorities/ the Government.

3. Eligibility:

a. General criteria of eligibility: -

Candidates applying for the above post should be

- a citizen of India,
- of good character,
- of sound health, good physique and free from organic defects or bodily infirmity. However, the eligibility of candidates claiming PwD should be in conformity with Clause-2(b) of the advertisement.
- If married, must not have more than one spouse living: Provided that the State Government, if satisfied that such marriage is permissible under the personal law applicable to such person or there are other grounds for doing so, exempt any person from the operation of this order.
- Must be able to read, write and speak Odia fluently and:-

i. Must have passed Middle School Examination with Odia as a language subject, or

ii. Must have passed HSC Examination or equivalent examination with Odia as Medium of examination in non-language subject, or

iii. Must have passed in Odia as language subject in the final examination of Class-VII or above from a school or educational institution recognised by the Govt. of Odisha or the Central Govt., or

iv. Must have passed a test in Odia in Middle English School standard conducted by the School and Mass Education Department, Govt. of Odisha.

b. Educational Qualification required for the posts:

Sl No.	Name of Post	Educational Qualification
1	Junior Engineer (Civil) under Engineer-in-Chief, Water Resources	The candidate must have possessed a Diploma in Civil Engineering or an equivalent qualification from the Institution recognized by the Odisha Council of Technical Education & Vocational Training.
2	Junior Engineer (Civil) under Director, Panchayati	

	Raj, Panchayati Raj & Drinking Water Department	
3	Junior Engineer (Civil) under Director, Municipal Administration	The candidate must have Diploma in Civil Engineering from an institution recognised by the Directorate of Technical Education of Odisha and must be a computer literate.
4	Architectural Assistant under Chief Architect, Odisha, Bhubaneswar	The candidate must possess Diploma in Architectural Assistantship from an Institution recognized by Odisha State Council of Technical Education & Vocational Training.
5	Cameraman under Information & Public Relations Department	The candidate must have passed atleast Higher Secondary (+2) with Diploma/ Degree in Cinematography from any recognized University and have skills in multi camera set up and AV production.
6	Photographer under Information & Public Relations Department	The candidate must have passed at least Higher Secondary (+2) with Diploma in Cinematography from recognized institutions and have skills in Digital Photography, Photo editing, use of various related software and storage of digital images.
7	Sound Recordist under Information & Public Relations Department	The candidate must have passed at least Higher Secondary (+2) with Diploma/ Degree in Sound Recording & TV Engineering/ Sound Recording & Design from any recognized institute/ University and have skills in both field and studio recording with knowledge of digital sound Recording and sound mixing and maintenance of audio equipment and accessories.
8	Mechanic under Information & Public Relations Department	The candidate must have passed at least Higher Secondary (+2) with Diploma in Electronics from any recognized institution and have skills in repairing of audio visual equipment.
9	Video Film Editor under Information & Public Relations Department	The candidate must have passed at least Higher Secondary (+2) with Diploma/Degree in Video editing/ Film Production from recognized Institute/ University with skills in AV production, Multimedia and AV Archival.
10	Junior Draughtsman (Civil) (HoD Cadre) under Engineer-in-Chief-I, Rural	The candidate must possess HSC with NTC pass in Draughtsman (Civil) from institutions affiliated by

	Works, Odisha, Bhubaneswar	NCVT and knowledge in Computer Application & AutoCAD.
11	Tracer (State Cadre Field) under Engineer-in-Chief-I, Rural Works, Odisha, Bhubaneswar	The candidate must have passed/possess the following qualification- i. High School Certificate examination or such other qualification as are equivalent to HSC examination and ii. NTC (Draughtsman Civil) from a recognised institution and iii. Certificate towards Basic Computer Skill from a recognised institution and iv. Certificate towards Auto CAD Course from a recognised institution.

Note- The candidates must possess the Certificates, Marksheets of educational qualification and all relevant valid documents by or before the last date of submission of Online Application Form.

c. Age:

Minimum Age as on 01.01.2025	Maximum Age as on 01.01.2025
21 Years	42 Years

However, the upper age limit is relaxable by 5 years for candidates belonging to SEBC, SC, ST & all Women candidates, 10 years for candidates belonging to PwD category & the total period of service rendered in defence service in case of Ex-servicemen. PwD candidates in the ST & SC category shall be entitled to cumulative age relaxation of ten years over & above the normal relaxation specified for the category. However, a candidate who comes under more than one category shall be eligible for only one benefit of age relaxation as per rule which will be most beneficial to her/him. To be eligible, candidates not enjoying any relaxation of upper age limit, must not have been born earlier than **2nd January 1983** and not later than **1st January 2004.**

d. Note for Ex-Servicemen- Once an Ex-Serviceman has joined the Govt. Service in civil side after availing the benefit as an Ex-Serviceman for his re-employment, his ex-serviceman status for the purpose of re-employment in Govt. Jobs shall cease to exist. He can avail age relaxation only. However as per clause-4 of the O.M. No. 36034/2014-Estt. (Res) dt.14 August 2014 of Ministry of Personnel, Public Grievances and Pensions, Department of Personnel & Training, Government of India, if an Ex-Serviceman applies for various posts before joining any civil employment, he/she can avail of the benefit of reservation as ex-serviceman for any subsequent employment, provided the applicant as soon as joins any civil employment, should give self-declaration/undertaking to the concerned employer about the date-wise details of application for various posts for which he/she had applied for before

joining. The applicant should furnish the copy of above declaration duly endorsed by the employer on the date of Document Verification for consideration of the claim under Ex-Serviceman category.

(**NOTE:** Border Security Force, Indian Coast Guard, CRPF and other Para Military Forces are not within the definition of Ex-Servicemen.)

e. Candidates currently serving in the Defence Forces who have more than six months remaining before retirement or discharge, as of the date of online application registration, are not eligible to apply under the ex-serviceman category for the post. The persons in Defence Forces who are to retire within six months from the last date of Online Application form are eligible to apply on obtaining NOC from the Appropriate Authority indicating there-in the date of enrolment and expected date of discharge and year of service rendered in Defence Forces. They should note that they must submit the discharge certificate on the date of certificate verification.

f. Sports person candidates claiming reservation must submit sports ID Card issued by Director of Sports & Youth Service Department, Government of Odisha.

g. Only Date of Birth entered in the High School Certificate Examination by the Board of Secondary Education, Odisha or equivalent Certificate issued by the recognised Board/Council/ by an Indian University as equivalent there to shall be acceptable by the Commission.

h. A candidate who claims change in her/his name after having passed the High School Certificate Examination is required to furnish a copy of the publication of the changed name in a local leading daily newspaper as well as a copy of notification in the Odisha Gazette in support of her/his change of name.

4. Examination fee and Mode of Payment:

As per Odisha payment of recruitment examination fees and Refund Rules, 2025 published vide Government in GA & PG Department Notification No. 34124-GAD-SC-rules2020/2025/Gen. dated 10th October 2025, the candidates other than SC, ST and PwD category shall have to pay the Examination fees. The candidates other than SC, ST and PwD category shall deposit the examination fee amounting to Rupees Five hundred (₹ 500/-) only through online mode in Odisha Treasury portal linked with the online application form. The examination fees paid shall be refunded to those candidates who actually appear in the first stage of the recruitment examination. Applications without payment of examination fees (except SC/ST/PwD candidates) will be taken as incomplete and shall be liable for rejection.

All candidates must clearly mention their bank account details i.e. Account Number, IFSC Code, Name of the Account Holder and Name of the Bank branch in the required field in the online application form for receiving the refundable examination fee (Rs.500/-). The Bank Account must be a valid/active one. The responsibility for furnishing the correct bank account details lies with the candidates and the Commission (OSSC) shall not entertain any correspondence from any candidate in this regard.

5. a. Plan and Pattern of Examination:

The recruitment examination shall comprise of the following three stages.

(i) Preliminary Examination
(ii) Main Written Examination
(iii) Certificate verification

Stages of Examination	Type of Examination	No. Of Paper & Marks	Total Marks	Duration	Remarks
Stage-I	Preliminary Examination	<u>One Paper</u> • Arithmetic– 10th standard • Data Interpretation (Chart, Graph, Table, Data Sufficiency etc.) – 10th standard • Logical Reasoning and Analytical Ability, General Mental Ability. • Current Events of National and International Importance. • Computer / Internet Awareness	150 (One hundred fifty marks)	150 minutes	• The question will be of MCQ type. • The examination will be conducted either through OMR mode or in CBRE mode. • **There shall be negative marking @ 0.25 marks for each wrong answer.** • **A minimum of five (05)** times the number vacancies post wise and category wise shall be shortlisted for the Main Written Examination. • However, if the number of vacancies in any post/category is less than ten (10), then candidates numbering ten (10) times the number vacancies category-wise shall be shortlisted for the Main Written Examination.
Stage-II	Main Written Examination	Technical Paper (The syllabus of Technical Paper for different posts is annexed as **Annexure-D**)	200 (Two hundred marks)	2 hours (120 minutes)	• The Technical Paper for different posts will be different. However, the Technical Paper for the post of Junior Draughtsman (Civil) and Tracer will be the same. • Candidates numbering **1.5 times of the vacancies advertised** (post-wise and category-wise) shall be shortlisted for Certificate Verification based on the marks secured in the Main Written Examination (Technical Paper). However, if the number of vacancies in any post/category is less than ten (10), then candidates numbering three (3) times of the vacancies advertised (Post Wise and category-wise) shall be shortlisted for Certificate Verification.
Stage-III	Certificate Verification				The candidature of candidate, who remain absent in certificate verification shall be cancelled. No request for a change of date of

					certificate verification ordinarily shall be entertained. In case, during the stage of Certificate Verification, the Commission observes that the vacancy (ies) for a particular category of post(s) is/are not getting filled up completely, an additional number of candidates who have qualified in the order of merit may be called **only for one more time, at the discretion of the commission** for filling up the number of vacancies not getting filled up.

The candidature of the candidates will be rejected /not considered for selection if she/he fails to attend any of the tests/examinations/Certificate Verification.

Note: In pursuance of GA & PG Department Notification No-29246, Dated-18th October 2022, the question paper of Preliminary and Main Examination, shall be both in Odia version and English version. The candidate shall exercise his/her option for medium of examination in the online application form. All may note that the option once given cannot be changed.

i. There shall be no provision for re-evaluation/ re-checking of the scores. No correspondence in this regard shall be entertained.
ii. There will be a penalty (Negative marking) for wrong answers marked by the candidate in examinations consisting of Multiple Choice Questions. The Quantum of penalty/ negative marking will be **1/4 of the total** mark for each wrong answer if four options are there, **1/3 of the total marks** if three options are there and so forth.
iii. **The candidature of the candidates will be rejected /not considered for selection if she/he fails to attend any of the tests/examinations/Certificate Verification.**
iv. The candidates who fail to appear at any stage of the recruitment process will not be considered for final selection and their names will not be included in the merit list.
v. Any complaint on the conduct of the examination must be sent to the commission by email "ossc.od@nic.in" within 05(five) days of completion of examination.

6. Place and Date of examination:

The Date, Time and Venue of the Preliminary Examination, Main Written Examination and Certificate Verification will be conveyed to the candidates through OSSC website as well as in the Admission Letter(s) in due course. The Admission Letters can be downloaded by the eligible candidates by accessing the Commission's website from time to time.

7. **Option/Preference of Candidates:**

Candidates should give preference only for such post/service for which they are eligible. Allotment to a post or service will be made on the basis of merit-cum-preference. If allotted to a service/post where vacancies of different HoD/Departments are collated, allotment to a particular HoD/Departments will also be made on the basis of merit-cum-preference. The decision of the Commission in allotment of the post/service/Department/office will be final and binding.

8. **Certificate verification and submission of Detailed Application Form (DAF):**

Candidates shall be shortlisted for Certificate Verification based on the marks secured in the Main Written Examination (Technical Paper). **In case during the stage of Certificate Verification the commission observes that the vacancy (ies) for a particular category of post(s) is/are not getting filled up completely, an additional number of candidates in order of merit may be called only for one more time at the discretion of the Commission so as to fill up the number of vacancies.**

The candidates will be required to produce their Original Academic Certificates, Mark sheets, caste certificate, special category certificate, NOC in case of State/Central Govt. servants/PSU employees and other documents as intimated in the admission letter for verification along with a set of self-attested photocopies of the same and OSSC copy of the online application form duly signed by the applicant. (**Details are enclosed in Annexure-B**).

NOTE: Candidates who fail to appear for document verification will not be considered for final selection.

9. **Admission Letter:**

a. The Admission Letters for all stages of recruitment (Preliminary Examination, Main Written Examination and Certificate Verification) will be made available by the Commission on its website www.ossc.gov.in for the convenience of the candidates. The candidate has to download the admission letter and take a printout copy of the same.

b. Admission of a candidate for the written examination and other tests shall be provisional and shall be on the basis of the information furnished by her/him in the online application form.

c. The admitted candidates will have to produce the print out of the admission letter at the venue allotted for appearing in the examination/test.

d. The admission letter contains date, time and venue of the examination, and bears the photo and signature of the candidate and facsimile signature of the Secretary of Commission.

10. **Merit List:**

The Merit list of the candidates who are found suitable in certificate verification shall be prepared in order of merit, category-wise equal to the vacancies advertised, based on their marks secured in the main written examination. Allotment to posts or services shall be made on the basis of merit-cum-preference, subject to availability of vacancies and the preferences exercised by the candidates.

A common Merit list shall be prepared for more than one service or post, if there is a common Technical Paper for such service(s)/post(s). The names of candidates shall be arranged in the order of merit.

Resolution of Tie Cases: In the event of tie in scores of candidates, merit will be decided by applying following criteria, one after another in the given order, till the tie is resolved.

(i) Marks in Preliminary Examination.

(ii) Date of Birth, with older candidate placed higher and

(iii) Alphabetical order in which the names of the candidate appear.

Action against candidates found guilty of misconduct/ malpractice:

a. If a candidate is found to indulge at any stage in any of the malpractices/ misconduct listed below, before during or after the conduct of the examination, her/his candidature for this examination will be cancelled and the candidate will be debarred from the examinations of the Commission for a specified period or permanently.

- Taking away any Examination related material such as OMR sheets, Rough Sheets, Answer Sheets (except carbon copy of OMR Answer sheet after completion of the examination) etc. from the examination hall unauthorizedly or passing it on to unauthorized persons during the conduct of the examination.
- Leaving the Examination Venue uninformed during the Examination.
- Misbehaving, intimidating or threatening in any manner the examination functionaries i.e. Supervisor, Invigilator, Security Guard or Commission's representatives etc or any of the functionaries of the Commission (OSSC).
- Obstructing the conduct of the examination/ instigating other candidates not to take the examination.
- Making statements, submitting information in applications which are incorrect or false, suppressing material information, submitting fabricated documents, etc.
- Obtaining support/ influence for his candidature by any irregular or improper means.
- Possession of Mobile Phone during examination.
- Appearing in the same examination more than once in contravention of the rules.
- A candidate who is working on examination-related matters in the same examination.
- Damaging examination-related infrastructure/ equipment.
- Appearing in the Exam with forged Admit Card, identity proof, etc.
- Possession of firearms/ weapons during the examination.
- Submitting more than one application for any recruitment examination.
- Assault, use of force, causing bodily harm in any manner Threatening/ intimidating to the examination functionaries i.e. Supervisor, Invigilator, Security Guard or Commission's functionaries or representatives.
- Using unfair means in the examination hall like copying from other candidates or unauthorized sources such as written material on any paper or body parts, etc.
- Possession of Bluetooth Devices, spy cameras, and any other electronic gadgets in the examination hall.
- Impersonation/Procuring impersonation by any person.
- Taking snapshots, making videos of question papers or examination material, labs, etc.

- Sharing examination terminal through remote desktop software/ Apps/ LAN/ VAN, etc. or attempting the same.
- Attempt to hack or manipulate examination servers, data and examination systems at any point before, during or after the examination.
- Obtaining question paper(s)/Examination-related materials before the due date/time, irregularly.

b. The Commission may also report the matter to Police/ Investigating Agencies, as deemed fit and the Commission may also take appropriate action to get the matter examined by the authorities/ forensic experts concerned.

11. Commission's Decision Final:

The decision of the Commission in all matters relating to eligibility, acceptance or rejection of the applications, penalty for false information/misconduct/malpractice, mode of selection, conduct of examination(s), allotment of examination centres and preparation of merit list & post allocation, debarment will be final and binding on the candidates and no correspondence will be entertained in this regard.

12. Important Instruction/Information to the Candidates: -

a. The candidate has to fill/confirm in the OMR answer sheet or CBRE Screen, as the case may be, correct Roll Number and other data as required in the place(s) indicated therein and darken the appropriate circles properly in Blue or Black Ball Point Pen only properly in case of OMR-based examination. If the information so furnished is incomplete or different from the application form or if appropriate circle is not darkened properly, then zero marks will be awarded.

b. There is no provision for re-evaluation/ re-checking of scores in the Examination. No correspondence in this regard shall be entertained.

c. Sharing of marks with the candidate: Marks obtained by an applicant in Preliminary Examination and Main Examination are proposed to be shared with him/her after final merit list is published.

d. All the posts are State Cadre posts. The candidate, on selection, may be asked to serve anywhere in Odisha.

e. If a candidate scoring more than last selection marks of her/his category at any stage of the examination is not shortlisted/ selected for the subsequent stage/ final selection due to any reason, he/she must represent to the Commission within 05 days of the declaration of the said result through e-mail ossc.od@nic.in.

f. Applicants who are currently employed as Government servants or working in Public Sector Undertakings (PSUs) under the State or Central Government must obtain a "No Objection Certificate" (NOC) from their competent controlling authority and upload it along with the online application form. Where a standing order regarding grant of NOC has been issued by the concerned Government Department, the same may be uploaded in lieu of an individual certificate.

At the stage of certificate verification, such applicants must produce the original NOC or the applicable standing order. Candidates who are not Government servants or PSU employees at the time of application but subsequently join such service must also produce the NOC or standing order during certificate verification.

Any candidate who conceals their status as a Government servant or PSU employee and is found to be so during certificate verification shall not be considered for recommendation. Further, candidates who are selected for appointment must submit a duly accepted resignation letter from their current employer to the Appointing Authority before joining.

By Order of the Commission

Secretary

Annexure-A

Important Instructions to Candidates about filling up Online Application:

- Before applying, candidates must go through the instructions given in the notice of examination very carefully.
- Candidates in their own interest should submit online applications much before the closing date and not to wait till the last date to avoid the possibility of disconnection/ inability or failure to login to the OSSC website on account of heavy load on the website during the closing days or for any other reason.
- The Commission is not likely to undertake detailed scrutiny of applications for the eligibility and other aspects at the time of written examination and, therefore, candidature will be accepted only provisionally. Candidates must go through the requirements of educational qualification, age, physical and medical standards etc. and satisfy themselves that they are eligible for the post(s). Copies of supporting documents will be sought at the time of Certificate Verification. When scrutiny is undertaken, if any claim made in the application is not found substantiated, the candidature will be cancelled and the Commission's decision shall be final.
- Candidates seeking reservation benefits available for SC/ ST/ SEBC/ PwD/ ESM/Sports Person must ensure that they are entitled to such reservation as per eligibility prescribed in this advertisement. They should also be in possession of the certificates in the prescribed format in support of their claim.
- Candidates with only **benchmark physical disability** mentioned in Clause-2 of the Advertisement will be considered as Persons with Disabilities (PwD) and entitled to age-relaxation/ reservation for Persons with Disabilities.
- When the application is successfully submitted, it will be accepted 'Provisionally'. Candidates should take the printout of the online Application Form for their own records.
- Only one online application is allowed to be submitted by a candidate for any recruitment Examination, Therefore, the candidates must exercise due diligence at the time of filling their online Application Forms. In case, more than one application of a candidate with different registration numbers is detected, all the applications will be rejected by the Commission and his candidature for the examination will be cancelled. If a candidate submits multiple applications and appears in the examination (at any stage) more than once, his candidature will be cancelled and he may be debarred from all the examinations of the Commission.
- Before submission of the online application, candidates must check that they have filled correct details in each field of the form. After submission of the corrected/ final online application, **no change/ correction/ modification will be allowed** under any circumstances. Requests received in this regard in any form like Post, Fax, Email, by hand, etc. shall not be entertained by the Commission and will be summarily rejected.

- The candidates must write their name, Date of Birth, father's name and mother's name as given in the Matriculation Certificate otherwise their candidature may be cancelled at the time of Certificate Verification or as and when it comes into the notice of the Commission.
- Applications with blurred/ illegible Photograph/ Signature will be rejected.
- Candidates must fill their correct and active e-mail addresses and mobile number in the online application as correspondence may be made by the Commission through e-mail/ SMS.
- Candidates may fill their correct Aadhaar number.
- Candidates must carry two passport size recent colour photographs and one original valid Photo ID Proof such as Aadhaar Card/ printout of E-Aadhaar, Driving License, Voter Card, PAN Card, Identity Card issued by University/ College/ Government, Employer ID Card, ESM Discharge Book issued by Ministry of Defence or any photo-bearing ID card issued by Central/ State Government for entry into the Examination Centre, failing which they will not be allowed to appear for the same. If Photo Identity Card does not have the Date of Birth printed in it, then the candidate must carry an additional original certificate in proof of her/his Date of Birth. In case of mismatch in the date of birth mentioned in the Admission Certificate and Photo ID/ Certificate brought in support of date of birth, the candidate will not be allowed to appear in the examination. PwD candidates availing the facility of scribes shall also be required to carry required Medical Certificate/ Undertaking/ Photocopy of the Scribe's Photo ID Proof, as specified in advisory Notice No.3453/OSSC dated 24.10.2019 available in the website of the Commission.
- In case of fake/ fabricated application/ registration by misusing any dignitaries name/ photo, such candidate/ cyber cafe will be held responsible for the same and liable for suitable legal action under Cyber/ IT act.

How to Apply:

- The applicants should go through the detail advertisement before filling up the online application form.
- The candidate may apply for the post as per her/his eligibility as per terms of the advertisement.
- All eligible candidates have to register themselves by clicking on "APPLY ONLINE" button on the home page of the Commission's website www.ossc.gov.in.
- Those candidates who are applying for the first time have to register for the post by clicking on "NEW USER" button shown on the screen. On submitting the registration form a User Id and Password will be generated.
- On clicking "New user" or "Registered User", instruction for filling up the Online Registration/ Re-registration and Application Forms shall appear on the computer screen. These instructions should be read carefully before proceeding with filling up the Application Form.
- Step-by-step procedure for registration/re-registration can be viewed by clicking on "Instruction to fill up Online Application Form".

Pre-requisites for filling up Online Application Form:

- Applicants should possess and maintain a valid e-Mail Id and Mobile Number for accessing the OSSC web portal and to make Online Registration/Re-Registration and Application Form. Candidates should keep that e-mail Id and Mobile Number (used by them during registration) active so as to receive all important communication from the Commission till publication of the final result of this recruitment examination.
- Recent Passport size Colour Photograph of the Applicant, scanned in "jpg/jpeg" format with file size range of 20 kb to 100kb may be kept handy for uploading during Registration.
- Full Specimen Signature & Left /Right Thumb Impression of the Applicant, scanned in "jpg/jpeg" format ranges up to 20 kb shall be kept handy for uploading during Registration.
- Scanned document must be in "Pdf" format between ranges of 100kb to 500 kb.
- Applicants may keep their required Certificates, Mark sheets, Aadhaar Number & other documents ready while filling up the details of the educational qualification &other fields of Online Application Form.
- **Candidates are required to upload relevant Educational Qualification Certificate & Mark sheet (refer Clause-3(b)). If the relevant Certificate/document is not uploaded or the uploaded Certificate/document is not visible, in such cases their candidature for the post shall be rejected.**
- SC/ST/SEBC category candidates need to submit detail information of the online Caste Certificate issued by competent Authority in the online application form. If the valid online Caste Certificate issued by the competent Authority is not in possession of the applicants at the time of submission of the online application form, she/he must give a self-declaration in the format appended in the online application form.
- Candidate claiming age relaxation under "Ex-Servicemen" category need to upload any one of the Ex-Servicemen Documents i.e. Discharge Certificate/ Identity card/ PPO (wherein the date of entry, date of discharge and period of service rendered in Defence Forces have been reflected). Ex-Servicemen who is going to retire within six months from the closing date of online application may apply for the post by obtaining "No Objection Certificate" from the appropriate authority mentioning therein the date of appointment, date of retirement and years of service rendered in Defence Forces. However, such candidates have to submit the discharge certificate on the date of certificate verification for considering their claims under Ex-Servicemen category. The scanned document must be in "Pdf" format between ranges of 100 kb to 500 kb.
- Candidates claiming reservation/ age relaxation under "PwD (Persons with Disabilities)" category need to upload a valid PwD certificate/ Unique Disability Identification (UDID) issued online by the competent Authority. The scanned document must be in "Pdf" format between ranges of 100kb to 500 kb.
- Candidate claiming reservations under Sports Person category need to **upload sports identity card issued by Director of Sports and Youth Services Department, Odisha**. The scanned document must be in "pdf" format between ranges of 100kb to 500kb.
- **Candidates claiming Special Category (Ex-Servicemen/PwD/Sports Person) must upload their relevant Certificate as mentioned above. If the relevant**

Certificate/document is not uploaded or the uploaded Certificate/document is not visible, in such cases their candidature for the post shall be rejected.

- The candidate should ensure that the scanned Photograph and full Signature, Left/Right Hand Thumb Impression and other relevant documents are clearly identifiable/ visible. Otherwise, the registration and application shall be liable for rejection. No correspondence on this account shall be entertained.
- Applicants who are Government servants or working under PSUs of the State Govt. or Central Govt. should obtain a "No Objection Certificate" from their controlling authority and upload the same with the Online Application form. In case a standing order of NOC is issued by any Department of Govt the same should be uploaded in lieu of an individual certificate.
- Candidates must submit correct data/information in the Online Application Form. If at any stage of recruitment or thereafter, it is found that any information furnished by the candidate in her/his online application is false/fabricated/incorrect or the candidate has suppressed any relevant information or the candidate otherwise does not satisfy the eligibility criteria prescribed for the post, her/ his candidature for the post will be cancelled forthwith.

Annexure-B

Document to be submitted at the time of Certificate Verification:

a. Downloaded copy of Admission letter for Certificate Verification.
b. Downloaded copy of Bio-Data-cum-Attestation form (to be made available on the website before Certificate Verification) duly filled and signed.
c. Copy of the Online Application form legibly signed by the candidate at the appropriate place.
d. HSC Certificate & Mark Sheet or equivalent certificate in support of Date of Birth, issued by the concerned Board/Council.
e. +2 pass certificate & marksheet.
f. NTC in Draughtsman (Civil) pass certificate & Marksheet (for the post of Tracer & Junior Draughtsman (Civil))
g. Diploma Pass Certificate and Marksheet in the relevant discipline, as applicable for the post. However, for the posts of Cameraman, Sound Recordist, and Video Film Editor, candidates may submit either a Diploma or Degree Certificate along with the corresponding Marksheet as applicable for the post.
h. Computer Proficiency Certificate & Auto CAD certificate as applicable for the post.
i. Caste certificate issued by the competent authority for the purpose of employment/service. (In case of ST, SC& SEBC Candidates only) SEBC category candidates must submit a photocopy of a valid SEBC certificate issued by the competent authority which must be within one year prior to the closing date of the Online Application.
j. Certificate either of passing HSC examination with Odia as a compulsory subject, or in lieu thereof a certificate of passing Odia of M.E. standard issued by competent authority.
k. Photocopy of permanent disability certificate (online) issued by Appropriate Medical Authority in case of PwD candidates.
l. Discharge certificate, identity card and document indicating the period of service rendered in defence forces in case of Ex-Servicemen candidates. Besides, an Undertaking as per **Annexure-C** must be submitted to the effect whether utilized the benefit of Ex-Servicemen for employment in State Govt/Central Govt or if utilized whether informed to the employer as per Clause -3. d. of this advertisement.
m. Sports Identity Card issued by Director of Sports & Youth Service Department, Govt. of Odisha in case of sports person candidates.
n. NOC in case of candidates working in Government Service/PSUs of the State Govt. or Central Govt.

ANNEXURE-C

UNDERTAKING

I , Sri _____, bearing Roll No. _____ for the post of _____ claiming Ex-Servicemen status, do hereby declare the following:

I have not utilized the benefit of Ex-Servicemen for employment purposes till date either in State Govt./Central Govt. or any Govt. undertaking/Organization.

OR

I declare that at present I am under employment and working as _____ in _____ Department /Organization, and I have already utilized the benefits of Ex-Servicemen. My candidature for the said post may therefore be considered on merit under my own category i.e. SEBC /SC /ST /UR, as I have availed the benefit of Ex-Serviceman earlier.

OR

(See Clause-3 (d) of the advertisement)

I have availed the benefit of reservation as an Ex-Serviceman and have joined the office of _____ (Office Name) as _____ (Designation). At the time of joining, I submitted a self-declaration/undertaking to my employer (Appointing Authority), providing date-wise details of applications I had submitted for various posts, including the present post, prior to my appointment. The said self-declaration/undertaking, duly endorsed by my Appointing Authority, is enclosed herewith.

(Strike out the portion/paragraph that is not applicable.)

I hereby declare that the statement given above is true and correct to the best of my knowledge and belief. In the event that any part of it is found to be false or incorrect, I shall be liable for action as per the applicable rules, and my candidature for the said post may also be rejected.

Signature of the Candidate:

Name(in full):

Roll No.:

Address:

ANNEXURE-D

Syllabus of Technical Paper relating to the post of Junior Engineer (Civil)

STRUCTURAL MECHANICS

Review Of Basic Concepts

Basic principle of mechanics: force, moment, support conditions, conditions of equilibrium, C.G & M.I, free body diagram, review of C.G and M.I of different sections.

Simple Stresses and Strains

Introduction to stresses and strains: mechanical properties of materials – rigidity, elasticity, plasticity, compressibility, hardness, toughness, stiffness, brittleness, ductility, malleability, creep, fatigue, tenacity, durability, types of stresses -tensile, compressive and shear stresses, types of strains - tensile, compressive and shear strains, complimentary shear stress - diagonal tensile / compressive stresses due to shear, elongation and contraction, longitudinal and lateral strains, poisson's ratio, volumetric strain, computation of stress, strain, poisson's ratio, change in dimensions and volume etc, Hooke's law - elastic constants, derivation of relationship between the elastic constants.

Application of simple stress and strain in engineering field

Behaviour of ductile and brittle materials under direct loads, stress strain curve of a ductile material, limit of proportionality, elastic limit, yield stress, ultimate stress, breaking stress, percentage elongation, percentage reduction in area, significance of percentage elongation and reduction in area of cross section, deformation of prismatic bars due to uni-axial load, deformation of prismatic bars due to its self weight.

Complex stress and strain

Principal stresses and strains: occurrence of normal and tangential stresses, concept of principal stress and principal planes, major and minor principal stresses and their orientations, Mohr's circle and its application to solve problems of complex stresses.

Stresses In Beams and Shafts

Stresses in beams due to bending: Bending stress in beams – theory of simple bending assumptions– moment of resistance – equation for flexure– flexural stress distribution – curvature of beam – position of n.a. and centroidal axis – flexural rigidity – significance of section modulus.

Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.

Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion, torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion.

Combined bending and direct stresses: Combination of stresses, combined direct and bending stresses, maximum and minimum stresses in sections, conditions for no tension, limit of eccentricity, middle third/fourth rule, core or kern for square, rectangular and circular sections, chimneys, dams and retaining walls.

Columns and Struts

Columns and struts, definition, short and long columns, end conditions, equivalent length / effective length, slenderness ratio, axially loaded short and long column, Euler's theory of long columns, critical load for columns with different end conditions.

Shear Force and Bending Moment

Types of loads and beams: Types of loads: concentrated (or) point load, uniformly distributed load (udl), types of supports: simple support, roller support, hinged support, fixed support, types of reactions: vertical reaction, horizontal reaction, moment reaction, types of beams based on support conditions: calculation of support reactions using equations of static equilibrium.

Shear force and bending moment in beams

Shear Force and Bending Moment: Signs convention for S.F. and B.M, S.F and B.M of general cases of determinate beams with concentrated loads and udl only, S.F and B.M diagrams for cantilevers, simply supported beams and over hanging beams, position of maximum B.M, point of contra flexure, relation between intensity of load, S.F and B.M.

Slope and Deflection

Introduction: Shape and nature of elastic curve (deflection curve); relationship between slope, deflection and curvature (no derivation), importance of slope and deflection.

slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by double integration method, Macaulay's method).

Indeterminate Beams

Indeterminacy in beams, principle of consistent deformation/compatibility, analysis of propped cantilever, fixed and two span continuous beams by principle of superposition, S.F and B.M diagram (point load and udl covering full span).

Trusses

Introduction: Types of trusses, statically determinate and indeterminate trusses, degree of indeterminacy, stable and unstable trusses, advantages of trusses.

Analysis of trusses: Analytical method (method of joints, method of section).

GEOTECHNIAL ENGINEERING

Introduction

Soil and soil Engineering, scope of soil mechanics, origin and formation of soil

Preliminary Definitions and Relationship

Soil as a three phase system, water content, density, specific gravity, voids ratio, porosity, percentage ofair voids, air content, degree of saturation, density index, bulk / saturated / dry / submerged density, inter-relationship of various soil parameters.

Index Properties of Soil

Water content, specific gravity, particle size distribution: sieve analysis, wet mechanical analysis, particle size distribution curve and its uses, consistency of soils, Atterberg's limits, plasticity index, consistency index,liquidity index.

Classification of Soil

General, I.S. classification, plasticity chart.

Permeability and Seepage

Concept of permeability, Darcy's law, co-efficient of permeability, factors affecting permeability, constant head permeability and falling head permeability test, seepage pressure, effective stress, phenomenon of quick sand.

Compaction and Consolidation

Compaction: Compaction, light and heavy compaction test, optimum moisture content of soil, maximum dry density, zero air void line, factors affecting compaction, field compaction methods and their suitability.

Consolidation: Consolidation, distinction between compaction and consolidation, Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications.

Shear Strength

Concept of shear strength, Mohr- Coulomb failure theory, cohesion, angle of internal friction, strength envelope for different type of soil, measurement of shear strength;- direct shear test, triaxial shear test, unconfined compression test and vane-shear test

Earth Pressure on Retaining Structures

Active earth pressure, passive earth pressure, earth pressure at rest, use of Rankine's formula for the following cases (cohesion-less soil only)

(i)Backfill with no surcharge (ii) backfill with uniform surcharge

Foundation Engineering

Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches, types of failure (general shear, local shear & punching shear),bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & I.S code formulae for strip, circular and square footings, effect water table on bearing capacity of soil, plate load test and standard penetration test.

BUILDING MATERIALS AND CONSTRUCTIONS TECHNOLOGY

BUILDING MATERIALS

Stone

Classification of rock, uses of stone, natural bed of stone, qualities of good building stone, dressing of stone, characteristics of different types of stone and their uses.

Bricks

Brick earth – its composition, brick making – preparation of brick earth, moulding, drying, burning in kilns (continuous process), classification of bricks, size of traditional and modular bricks, qualities of good building bricks.

Cement, Mortar and Concrete

Cement: Types of cements, properties of cements, manufacturing of cement, importance and application

of blended cement with fly ash and blast furnace slag.

Mortar: Definition and types of mortar, sources and classification of sand, bulking of sand, use of gravel, morrum and fly ash as different building material.

Concrete: Definition and composition- water cement ratio- workability, mechanical properties and grading of aggregates, mixing, placing, compacting and curing of concrete.

Other Construction Materials

Timber: Classification and structure of timber, seasoning of timber - importance, characteristics of good timber, clay products and refractory materials – definition and classification, properties and uses of refractory materials- tiles, terracotta, porcelain glazing iron and steel: uses of cast iron, wrought iron, mild steel and tor steel.

Surface Protective Materials

Composition of paints, enamels, varnishes, types and uses of surface protective materials like paints, enamels, varnishes,distempers, emulsion, french polish and wax polish.

CONSTRUCTIONS TECHNOLOGY

Introduction

Buildings and classification of buildings based on occupancy, different components of a building site investigation – objectives, site reconnaissance and explorations.

Foundations

Concept of foundation and its purpose, types of foundations – shallow and deep.

shallow foundation- constructional details of : spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block.

Deep foundations: Pile foundations-their suitability, classification of piles based on materials, function and method of installation.

Walls & Masonry Works :

Purpose of walls, Classification of walls – load bearing, non-load bearing walls, retaining walls. classification of walls as per materials of construction: brick, stone, reinforced brick,reinforced concrete, precast, hollow and solid concrete block and composite masonrywalls (Concept Only).

Partition Walls : Suitability and uses of brick and wooden partition walls.

Brick masonry : Definition of different terms.

Bond – meaning and necessity: English bond for 1and 1-1/2 Brick thick walls. T, X and right angled corner junctions, Thickness for 1 and 1-1/2 brick square pillars in English bond.

Stone Masonry :

Glossary of terms –String course, corbel, cornice, block-in-course, grouting, mouldings, templates, throating, through stones, parapet, coping, pilaster and buttress.

Doors, Windows And Lintels

Glossary of terms used in doors and windows, doors – different types of doors, windows – different types of windows, purpose of use of arches and lintels.

Floors, Roofs and Stairs

Floors: Glossary of terms ,types of floor finishes – cast-in-situ, concrete flooring(monolithic, bonded), terrazzo tile flooring, cast in situ terrazzo flooring, timber flooring (Concept only)

Roofs: glossary of terms, types of roofs, concept and function of flat, pitched, hipped and sloped roofs

Stairs: Glossary of terms; stair case, winder, landing, stringer, newel, baluster, rise, tread, width of stair case, hand rail, nosing, head room, mumty room, Various types of stair case – straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair, cantilever stair, tread riser stair.

Protective, Decorative Finishes, Damp and Termite Proofing

Plastering – purpose – types of plastering, Types of plaster finishes – grit finish, rough cast, smooth cast, sand faced, pebble dash, acoustic plastering and plain plaster etc., proportion of mortars used for different plasters, preparation of mortars, techniques of plastering and curing

Pointing – purpose –types of pointing

Painting – objectives – method of painting new and old wall surfaces, wood surface and metal surfaces – powder coating and spray painting on metal surfaces.

White washing – colour washing – distempering – internal and external walls.

Damp and Termite proofing – Materials and methods.

Green Buildings, Energy Management and Energy Audit Of Buildings & Project

Concept of green building, introduction to energy management and energy audit of buildings, aims of energy management of buildings, types of energy audit, response energy audit questionnaire, energy surveying and audit report.

ESTIMATION & COST EVALUATION – I

Introduction

Types of estimates – Plinth area, floor area / carpet area, units and modes of measurements as per IS 1200, accuracy of measurement for different item of work.

Quantity Estimate of Building

Short wall long wall method and centre line method, deductions in masonry, plastering, white washing, painting etc., multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grills etc., detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.

Analysis of Rates and Valuation

Analysis of rates for cement concrete, brick masonry in cement mortar, laterite stone masonry in Cement Mortar, cement plaster, white washing, artificial stone flooring, tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel, painting of doors and windows etc. as per O.P.W.D, calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Odisha P.W.D. system (Concept of C.P.W.D./Railways provisions), abstract of cost of estimate.

Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolesce, methods of valuation.

Administrative Set-Up of Engineering Organisations:

Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc. duties and responsibilities of engineers at different positions /levels.

ENVIRONMENTAL STUDIES

The Multidisciplinary nature of environmental studies, definition, scope and importance, need for public awareness.

Natural Resources, Renewable and non renewable resources

Natural resources and associated problems.

Forest resources: Use and over-exploitation, deforestation, case studies, timber extraction mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.

Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity.

Energy Resources: Growing energy need, renewable and non- renewable energy sources, use of alternate energy sources, case studies.

Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

Role of individual in conservation of natural resources, equitable use of resources for sustainable life styles.

Systems

Concept of an eco system, structure and function of an eco system, producers, consumers, decomposers, energy flow in the eco systems, ecological succession, food chains, food webs and ecological pyramids, introduction, types, characteristic features, structure and function of the following eco system: forest ecosystem: aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity and it's Conservation

Introduction-Definition: genetics, species and ecosystem diversity, biogeographically classification of India, value of biodiversity: consumptive use, productive use, social ethical, aesthetic and option values, Biodiversity at global, national and local level, threats to biodiversity: habitats loss, poaching of wild life, man wildlife conflicts.

Environmental Pollution

Definition, causes, effects and control measures of: air pollution, water pollution, soil pollution, marine

pollution, noise pollution, thermal pollution, nuclear hazards, solid waste management: causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, disaster management: floods, earthquake, cyclone and landslides.

Social issues and the Environment

Form unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, water shed management, Resettlement and rehabilitation of people; its problems and concern, environmental ethics: issue and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust case studies, Air (prevention and control of pollution) Act., water (prevention and control of pollution) Act., public awareness.

Human population and the environment

Population growth and variation among nations, population explosion- family welfare program, Environment and human health, human rights, value education, role of information technology in environment and human health.

STRUCTURAL DESIGN – I

Working stress method (WSM)

Objectives of design and detailing, state the different methods of design of concrete structures, introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel, permissible stresses, assumption in W.S.M., flexural design and analysis of single reinforced sections from first principles, concept of under reinforced, over reinforced and balanced sections, advantages and disadvantages of W.S.M, reasons for its obsolescence.

Philosophy Of Limit State Method (LSM)

Definition, advantages of LSM over WSM, IS code suggestions regarding design philosophy, types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875, study of I.S specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.

Analysis and Design of Single and Double Reinforced Sections (LSM)

Limit state of collapse (flexure), assumptions, stress-strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section, concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section, analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections, necessity of doubly reinforced section, design of doubly reinforced rectangular section.

Shear, Bond and Development Length (LSM)

Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement, bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 90^0 bend and 45^0 bend standards lapping of bars, check for development length, numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear, design of shear reinforcement; minimum shear reinforcement in beams.

Analysis and Design of T-Beam (LSM)

General features, advantages, effective width of flange as per IS: 456-2000 code provisions. analysis of singly reinforced T-Beam, strain diagram & stress diagram, depthof neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.Simple numerical problems on deciding effective flange width.

Analysis and Design of Slab and Stair case (LSM)

Design of simply supported one-way slabs for flexure check for deflection control and shear, design of one-way cantilever slabs and cantilevers chajjas for flexure checkfor deflection control and check for development length and shear, design of two-way simply supported slabs for flexure with corner free to lift, design of dog-legged staircase, detailing of reinforcement in stairs spanning longitudinally.

Design of Axially loaded columns and Footings (LSM)

Assumptions in limit state of collapse- compression, definition and classification of columns, effective length of column, specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties, analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only),types of footing,

design of isolated square column footing of uniform thickness for flexure and shear.

HYDRAULICS AND IRRIGATION ENGINEERING

HYDRAULICS

Hydrostatics

Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses

Pressure and its measurements: Intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges.

Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.

Kinematics of fluid flow

Basic equation of fluid flow and their application: Rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential, kinetic & pressure, Bernoulli's theorem and its limitations. practical applications of Bernoulli's equation.

Flow over Notches and Weirs: Notches, weirs, types of notches and weirs, discharge through different types of notches and weirs-their application (no derivation).

Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application

Losses of head of a liquid flowing through pipes: Different types of major and minor losses. simple numerical problems on losses due to friction using Darcy's equation, total energy lines & hydraulic gradient lines (concept only).

Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, best economical section.

Pumps

Type of pumps

Centrifugal pump: Basic principles, operation, discharge, horse power & efficiency.

Reciprocating pumps: Types, operation, discharge, horse power & efficiency.

IRRIGATION ENGINEERING

Hydrology

Hydrology cycle, rainfall: types, intensity, hyetograph, estimation of rainfall, rain gauges, Its types(concept only), concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae.

Water Requirement of Crops

Definition of irrigation, necessity, benefits of irrigation, types of irrigation Crop season, duty,delta and base period their relationship, overlap allowance, kharif and rabi crops, Gross command area, culturable command area, Intensity of irrigation,irrigable area, time factor, crop ratio.

Flow irrigation

Canal irrigation, types of canals, loss of water in canals, perennial irrigation, different components of irrigation canals and their functions, sketches of different canal cross-sections, classification of canals according to their alignment, various types of canallining – advantages and disadvantages.

Water logging and drainage

Causes and effects of water logging, detection, prevention and remedies.

Diversion head works and regulatory structures

Necessity and objectives of diversion head works, weirs and barrages, general layout, functions of different parts of barrage, silting and scouring, functions of regulatory structures.

Cross drainage works

Functions and necessity of cross drainage works - aqueduct, siphon, super-passage, level crossing concept of each with help of neat sketch.

Dams

Necessity of storage reservoirs, types of dams, earthen dams: types, description, causes of failure and protection measures, gravity dam- types, description, causes of failure and protection measures, spillways - types (with sketch) and necessity.

LAND SURVEY – I

Introduction to surveying, linear measurements

Surveying: Definition, aims and objectives, principles of survey-plane surveying- geodetic surveying-instrumental surveying, precision and accuracy of measurements, instruments used formeasurement of

distance, types of tapes and chains, errors and mistakes in linear measurement – classification, sources of errors and remedies, corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.

Chaining and chain surveying

Equipment and accessories for chaining, ranging – Purpose, signaling, direct and indirect ranging, line ranger –features and use, error due to incorrect ranging, methods of chaining –chaining on flat ground, chaining on sloping ground – stepping method, clinometer-features and use, slope correction, setting perpendicular with chain & tape, chaining across different types of obstacles –numerical problems on chaining across obstacles, purpose of chain surveying, its principles, concept of field book. selection of survey stations, base line, tie lines, check lines, offsets – necessity, perpendicular and oblique offsets, instruments for setting offset – cross staff, optical square, errors in chain surveying – compensating and accumulative errors causes &remedies, precautions to be taken during chain surveying.

Angular measurement and compas surveying

Measurement of angles with chain, tape & compass, compass – types, features, parts, merits & demerits, testing & adjustment of compass, designation of angles- concept of meridians – magnetic, true, arbitrary; concept of bearings – whole circle bearing, quadrantal bearing, reduced bearing, suitability of application, numerical problems on conversion of bearings,use of compasses – setting in field-centering, leveling, taking readings, concepts of fore bearing, back bearing, numerical problems on computation of interior & exterior angles from bearings, effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination, errors in angle measurement with compass – sources & remedies, principles of traversing – open & closed traverse, methods of traversing, local attraction – causes, detection, errors, corrections, numerical problems of application of correction due to local attraction, errors in compass surveying – sources & remedies, plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table.

Map reading cadastral maps & nomenclature

Study of direction, scale, grid reference and grid square study of signs and symbols, cadastral map preparation methodology, unique identification number of parcel, positions of existing control points and its types, adjacent boundaries and features, topology creation and verification.

Plane table surveying

Objectives, principles and use of plane table surveying, instruments & accessories used in plane table surveying, methods of plane table surveying – (1) radiation, (2) intersection, (3)traversing, (4) resection, statements of two point and three point problem, errors in plane table surveying and their corrections, precautions in plane table surveying.

Theodolite surveying and traversing

Purpose and definition of theodolite surveying, transit theodolite- description of features, component parts, fundamental axes of a theodolite, concept of vernier, reading a vernier, temporary adjustment of theodolite, concept of transiting –measurement of horizontal and vertical angles, measurement of magnetic bearings, deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite, errors in theodolite observations, methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method, plotting the traverse by coordinate method, checks for open and closed traverse, traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table, numerical problems on omitted measurement of lengths & bearings, closing error – adjustment of angular errors, adjustment of bearings, numerical problems, balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.

Levelling and contouring

Definition and Purpose and types of leveling– concepts of level surface, horizontal surface, vertical surface, datum, R.L., B.M., instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, vertical axis, levelling staff – temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI, field data entry – level book – height of collimation method and rise & fall method, comparison, numerical problems on reduction of levels applying both methods, arithmetic checks, effects of curvature and refraction, numerical problems on application of correction, reciprocal leveling – principles, methods, numerical problems, precise leveling, errors in leveling and precautions, permanent and temporary adjustments of different types of levels, definitions, concepts and characteristics of contours, methods of contouring, plotting contour maps, interpretation of

contour maps, toposheets, use of contour maps on civil engineering projects – drawing cross- sections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure, map interpretation: interpret human and economic activities (i.e.: settlement, communication, land use etc.), interpret physical landform (i.e.: relief, drainage pattern etc.), problem solving and decision making.

Computation of area & volume

Determination of areas, computation of areas from plans, calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule, calculation of volumes by prismoidal formula and trapezoidal formula, prismoidal corrections, curvature correction for volumes.

HIGHWAY ENGINEERING

Introduction

Importance of highway transportation: Importance organizations like indianroads congress, ministry of surface transport, central road research institute, functions of Indian Roads congress, IRC classification of roads organisation of state highway department.

Road Geometrics

Glossary of terms used in geometric and their importance, right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs,formation level, camber and gradient, design and average running speed, stopping and passing sight distance, necessity of curves, horizontal and vertical curves including transition curvesand super elevation, Methods of providing super – elevation.

Road Materials

Difference types of road materials in use: soil, aggregates, and binders, Function of soil as highway subgrade, California Bearing Ratio: methods of finding CBR value in the laboratoryand at site and their significance, testing aggregates: abrasion test, impact test, crushing strength test, water absorption test & soundness test.

Road Pavements

Road pavement: flexible and rigid pavement, their merits and demerits,typical cross-sections, functions of various components, flexible pavements: sub-grade preparation, setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profile of embankment, construction of embankment, compaction, stabilization, preparation of subgrade, methods of checking camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation, sub base course:, necessity of sub base, stabilized sub base, purpose of stabilization (no designs)types of stabilization- mechanical stabilization, lime stabilization, cement stabilization, fly ash stabilization, base course: preparation of base course, brick soling, stone soling and metalling, water bound macadam and wet-mix macadam, bituminous constructions: different types surfacing: surface dressing (i) premix carpet and (ii) semi dense carpet, bituminous concrete grouting, rigid pavements: concept of concrete roads as per IRC specifications.

Hill Roads

Introduction: Typical cross-sections showing all details of a typical hill road incut, partly in cutting and partly in filling, breast walls, retaining walls, different types of bends.

Road Drainage

Necessity of road drainage work, cross drainage works, surface and sub-surface drains and storm water drains, location, spacing and typical details of side drains, side ditches for surface drainage, intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections.

Road Maintenance

Common types of road failures – their causes and remedies, maintenance of bituminous road such as patch work and resurfacing, maintenance of concrete roads – filling cracks, repairing joints, maintenance of shoulders (berm), maintenance of traffic control devices, basic concept of traffic study, traffic safety and traffic control signal.

Construction equipments

Preliminary ideas of the following plant and equipment: hot mixing plant, tipper, tractors (wheel and crawler), scraper, bulldozer, dumpers, shovels,graders, roller dragline, asphalt mixer and tar boilers, road pavers, modern construction equipments for roads.

ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY

Entrepreneurship

Concept /Meaning of entrepreneurship, need of entrepreneurship, characteristics, qualities and types of entrepreneur, functions, barriers in entrepreneurship, entrepreneurs vrs. manager, forms of business

ownership: sole proprietorship, partnership forms and others, types of industries, concept of start-ups, entrepreneurial support agencies at national, state, district level(sources): DIC,NSIC,OSIC,SIDBI, NABARD,commercial banks,KVIC etc., technology business incubators (tbi) and science and technology entrepreneur parks.

Market Survey and Opportunity Identification (Business Planning)

Business planning, SSI, ancillary units, tiny units, service sector units, time schedule plan, agencies to be contacted for project implementation, assessment of demand and supply and potential areas of growth, identifying business opportunity, final product selection.

Project Report Preparation

Preliminary project report, detailed project report, techno economic feasibility, project viability

Management Principles

Definitions of management, principles of management, functions of management (planning, organising, staffing, directing and controlling etc.), level of management in an organisation

Functional Areas of Management

Production management- functions, activities, productivity, quality control, production planning and control, Inventory Management- Need for inventory management, models/techniques of inventory management, Financial Management- functions of financial management, management of working capital, costing (only concept),break even analysis, brief idea about accounting terminologies: book keeping, journal entry, petty cash book, p & l accounts, balance sheets(only concepts), Marketing management- concept of marketing and marketing management, marketing techniques (only concepts), concept of 4Ps (Price, Place, Product, Promotion), Human resource management- functions of personnel management, manpower planning, recruitment, sources of manpower, selection process, method of testing, methods of training & development, payment of wages.

Leadership and Motivation

Leadership- Definition and need/importance, qualities and functions of a leader, manager vs leader, style of leadership (autocratic, democratic, participative).

Motivation- Definition and characteristics, Importance of motivation, Factors affecting motivation, Theories of motivation (Maslow),Methods of Improving Motivation,Importance of Communication in Business, types and barriers of communication.

Work Culture, TQM & Safety

Human relationship and performance in organization, relations with peers, superiors and subordinates, TQM concepts: quality policy, quality management, quality system, accidents and safety, cause, preventive measures, general safety rules,personal protection Equipment(PPE).

Legislation

Intellectual property rights(IPR), patents, trademarks, copyrights, features of factories act 1948 with amendment (only salient points),features of payment of wages act 1936 (only salient points).

Smart Technology

Concept of IOT, how IOT works, components of IOT, characteristics of IOT, categories of IOT, applications of IOT- smart cities, smart transportation, smart home, smart health care, smart industry, smart agriculture, smart energy management etc.

STRUCTURAL DESIGN-II

Introduction

Common steel structures, advantages & disadvantages of steel structures, types of steel, properties of structural steel, rolled steel sections, special considerations in steel design, loads and load combinations, structural analysis and design philosophy, brief review of principles of limit state design.

Structural Steel Fasteners and Connections

Bolted connections, classification of bolts, advantages and disadvantages of bolted connections, different terminology, spacing and edge distance of bolt holes, types of bolted connections, types of action of fasteners, assumptions and principles of design, strength of plates in a joint, strength of bearing type bolts (shear capacity & bearing capacity),reduction factors and shear capacity of HSFG bolts, analysis & design joints using bearing type and HSFG bolts (except eccentric load and prying forces), efficiency of a joint, welded connections, advantages and disadvantages of welded connection, types of welded joints and specifications for welding, design stresses in welds, strength of welded joints.

Design of steel tension Members

Common shapes of tension members, maximum values of effective slenderness ratio, analysis and design of tension members (considering strength only and concept of block shear failure).

Design of steel compression members

Common shapes of compression members, buckling class of cross sections, slenderness ratio, design compressive stress and strength of compression members, analysis and design of compression members (axial load only).

Design of Steel beams

Common cross sections and their classification, deflection limits, web buckling and web crippling, design of laterally supported beams against bending and shear.

Design of Tubular Steel Structures

Round tubular sections, Permissible stresses, tubular compression & tension members, joints in tubular trusses.

Design of Masonry Structures

Design considerations for masonry walls & columns, load bearing & non-load bearing walls, permissible stresses, slenderness ratio, effective length, height & thickness.

RAILWAY & BRIDGE ENGINEERING

RAILWAYS

Introduction

Railway terminology, advantages of railways, classification of Indian railways.

Permanent way

Definition and components of a permanent way, concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions.

Track materials

Rails, functions and requirement of rails, types of rail sections, length of rails, rail joints-types, requirement of an ideal joint, purpose of welding of rails & its advantages, creep-definition, cause & prevention, Sleepers, definition, function & requirements of sleepers, classification of sleepers, advantages & disadvantages of different types of sleepers, ballast, function & requirements of ballast, materials for ballast, fixtures for broard gauge, connection of rails to rail - fish plate, fish bolts, connection of rails to sleepers.

Geometric for broad gauge

Typical cross-sections of single & double broad gauge railway track in cutting and embankment , permanent & temporary land width, gradients for drainage, super elevation- necessity & limiting valued.

Points and Crossing

Definition, necessity of points and crossing, types of points & crossing with tie diagrams.

Laying & maintenance of track

Methods of laying & maintenance of track , duties of a permanent way inspector.

BRIDGES

Introduction to bridges

Definitions, components of a bridge, classification of bridges, requirements of an ideal bridge.

Bridge site investigation, hydrology & planning

Selection of bridge site, alignment, determination of flood Discharge, waterway & economic span, afflux, clearance & free board.

Bridge Foundation

Scour depth, minimum depth of foundation, types of bridge foundations-spread foundation, pile foundation, well foundation, sinking of wells, caisson foundation, coffer dams.

Bridge substructure and approaches

Types of piers, types of abutments, types of wing walls, approaches.

Culvert & Cause ways

Types of culverts- brief description, types of causeways- brief description

WATER SUPPLY AND WASTE WATER ENGINEERING

WATER SUPPLY

Introduction to Water Supply, Quantity and Quality of Water

Necessity of treated water supply, per capita demand, variation in demand and factors affecting demand, methods of forecasting population, numerical problems using different methods, Impurities in water- organic and inorganic, harmful effects of impurities, analysis of water- physical, chemical and bacteriological, water quality standards for different uses.

Sources and Conveyance of Water

Surface sources- Lake, stream, river and impounded reservoir, underground sources- aquifer type &

occurrence- infiltration gallery, infiltration well, springs, well , yield from well- methods of determination, numerical problems using yield formulae (deduction excluded), Intakes- types, description of river intake, reservoir intake, canal intake, pumps for conveyance & distribution- types, selection, installation, Pipe materials- necessity, suitability, merits & demerits of each type, pipe joints- necessity, types of joints, suitability, methods of jointing laying of pipes-method.

Treatment of Water

Flow diagram of conventional water treatment system, treatment process/units, aeration; necessity, Plain sedimentation: necessity, working principles, sedimentation tanks- types, essential features, operation & maintenance, sedimentation with coagulation: necessity, principles of coagulation, types of coagulants, flash mixer, flocculator, clarifier (definition and concept only), filtration: necessity, principles, types of filters, slow sand filter, rapid sand filter and pressure filter- essential features, disinfection: necessity, methods of disinfection, Chlorination- free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break point chlorination, super-chlorination, softening of water- necessity, methods of softening-lime soda process and ion exchange method (concept only).

Distribution system and Appurtenance in distribution system

General requirements, types of distribution system- gravity, direct and combined, methods of supply- intermittent and continuous, distribution system layout- types, comparison, suitability, valves- types, features, uses, purpose- sluice valves, check valves, air valves, scour valves, fire hydrants, water meters.

W/s plumbing in building

Method of connection from water mains to building supply, general layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S code.

WASTE WATER ENGINEERING

Introduction

Aims and objectives of sanitary engineering, definition of terms related to sanitary engineering, systems of collection of wastes-conservancy and water carriage system-features, comparison, suitability.

Quantity and Quality of sewage

Quantity of sanitary sewage-domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage, computation of size of sewer, application of Chazy's formula, limiting velocities of flow: self-cleaning and scouring, general Importance, strength of sewage, characteristics of sewage- physical, chemical & biological, concept of sewage- sampling, tests for- solids, PH, dissolved oxygen, BOD, COD.

Sewerage system

Types of system- separate, combined, partially separate, features, comparison between the types, suitability, Shapes of sewer- rectangular, circular, avoid- features, suitability, laying of sewer- setting out sewer alignment.

Sewer Appurtenances and Sewage Disposal

Manholes and Lamp holes- types, features, location, function, inlets, grease & oil trap- features, location, function, strom regulator, inverted siphon- features, location, function, disposal on land- sewage farming, sewage application and dosing, sewage sickness- causes and remedies, disposal by dilution- standards for disposal in different types of water bodies, self purification of stream.

Sewage treatment

Principles of treatment, flow diagram of conventional treatment, Primary treatment- necessity, principles, essential features, functions, Secondary treatment- necessity, principles, essential features, functions.

Sanitary plumbing for building

Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage, Plumbing arrangement of single storied & multi storied building as per I.S. code practice, sanitary fixtures- features, function, and maintenance and fixing of the fixtures- water closets, flushing cisterns, urinals, inspection chambers, traps, anti- syphonage pipe.

ESTIMATION & COST EVALUATION-II

Detailed estimate of culverts and bridges

Detailed estimate of a RCC slab culvert with right angled wing walls with bar bending schedule, RCC hume pipe culvert with splayed angled wing wall.

Estimate of irrigation structures

Detailed estimate of simple type of vertical fall to given specification, detailed estimate of drainage siphon to given specification.

Detailed estimate of roads

Detail estimate of a water bound macadam road, detailed estimate of a flexible pavement in cutting/filling, detailed estimate of septic tank and soak pit for 50 users.

Miscellaneous estimates

Tube well, piles and pile cap, Isolated and combined footing.

PWD Accounts works

Works, classification of work- original, major, petty, repair work, annual repair, special repair, quadrantal repair, concept of method of execution of works through the contractors and department, contract and agreement, work order, types of contract, piece work agreement, Accounts of works – explanation of various terms- administrative approval, technical sanction, tender, preparation of notice inviting tender, quotations, earnest money, E-tendering, security deposit, advance payment, Intermediate payment, final payment, running bill, final bill, regular and temporary establishment, cash, major & subhead of account, temporary advance (imprest money), supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts, measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity, Muster roll: Its preparation & use for making payment of pay & wages, Acquaintance Roll: Its preparation & use for making payment of pay & wages, labour & labour report, method of labour payment, use of forms and necessity of submission, classification of stores, receipt/ issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks, shortage and excess, building BY LAWS and regulatory bodies, development authorities, types and their levels, RERA etc.

LAND SURVEY– II

Tacheometry

Principles, stadia constants determination, Stadia tacheometry with staff held vertical and with line of collimation horizontal or inclined, numerical problems,Elevations and distances of staff stations – numerical problems.

Curves

Compound, reverse and transition curve, purpose & use of different types ofcurves in field, elements of circular curves, numerical problems, preparation of curve table for setting out, setting out of circular curve by chain and tape and by instrument angular methods (i) offsets from long chord, (ii) successive bisection of arc, (iii) offsets from tangents, (iv) offsets from chord produced, (v) Rankine's method of tangent angles (no derivation), obstacles in curve ranging – point of intersection inaccessible.

Basics on scale and basics of map

Fractional or ratio scale, linear Scale, graphical scale, what is map, map scale and map projections, how maps convey location and extent, how maps convey characteristics of features, how maps convey spatial relationship, classification of maps, physical map, topographic map, road map, political map, economic & resources map, thematic map, climate map.

Survey of India map series

Open series map, defense series map, map nomenclature, quadrangle name, latitude, longitude, UTM's, contour lines, magnetic declination, public land survey system, field notes.

Basics of aerial photography, photogrammetry, dem and ortho image generation

Aerial Photography

Film, focal length, scale,types of aerial photographs (oblique, straight).

Photogrammetry

Classification of photogrammetry, aerial photogrammetry,terrestrial photogrammetry.

Photogrammetry Process

Acquisition of imagery using aerial and satellite platform, control survey,geometric distortion in imagery, application of imagery and its support dataorientation and triangulation, stereoscopic measurement,19.9.1 X-parallax,19.2.2 Y-parallax.

DTM/DEM Generation

Ortho Image Generation

Modern surveying methods

Principles, features and use of (i) Micro-optic theodolite, digital theodolite, working principles of a total station (set up and use of total station to measure angles, distances of points under survey from total station and the co-ordinates (X,Y & Z or northing, easting, and elevation) of surveyed points relative to total station position using trigonometry and triangulation.

Basics on GPS & DGPS and ETS

GPS:- Global Positioning System, working principle of GPS,GPS signals, errors of GPS, positioning methods.

DGPS:- Differential Global Positioning System, base station setup, rover GPS set up, download, post-process and export GPS data, sequence to download GPS data from flashcards, sequence to post - process GPS data, sequence to export post process GPS data, sequence to export GPS time tags to file.

ETS:-

Electronic Total Station, distance measurement, angle measurement, leveling, determining position, reference networks, errors and accuracy.

Basics of GIS and map preparation using GIS

Components of GIS, integration of spatial and attribute information, three views of information system, database or table view, map view and model view, spatial data model, attribute data management and metadata concept, prepare data and adding to arc map, organizing data as layers, editing the layers, switching to layout view, change page orientation, removing borders, adding and editing map information, finalize the map.

CONSTRUCTION MANAGEMENT

Introduction To Construction Management

Aims and objectives of construction management, functions of construction management, the construction team components- owner, engineer, architect, contractor-their functions and interrelationship and jurisdiction, Resources for construction management-men, machines, materials, money.

Constructional Planning

Importance of construction planning, developing work breakdown structure for construction work, construction planning stages-pre-tender stage, post-tender stage, construction scheduling by bar charts-preparation of bar charts for simple construction works, preparation of schedules for labour materials, machinery, finance for small works, limitation of bar charts,construction scheduling by network techniques-defination of terms ,PERT and CPM techniques, advantages and disadvantages of two techniques, network analysis, estimation of time and critical path, application of PERT and CPM techniques in sample construction works.

Materials and Stores Management

Classification of stores-storage of stock, Issue of materials-indent , invoice, bin card.

Construction Site Management

Job lay out- Objectives, review plans, specifications, lay out of equipments, location of equipment, organizing labour at site, job lay out for different construction sites, principle of storing material at site.

Construction Organization

Introduction – Characteristics, structure, importance, organization types-line and staff, functions and their characteristics, principles of organization- meaning and significance of terms- control, authority, responsibility, job & task, leadership-necessity, styles of leadership, role of leader,human relations-relations with subordinates, peers, supervisors, characteristics of group behavior, mob psychology, handling of grievances,absenteeism, labour welfare, conflicts in organization- genesis of conflicts, types-intrapersonal,interpersonal, intergroup, resolving conflicts.

Construction Labour and Labour Management

Preparing labour schedule, essential steps for optimum labour output, labour characteristics, wages & their payment, labour incentives, motivation- classification of motives, different approaches to motivation.

Equipment Management

Preparing the equipment schedule, identification of different alternative equipment, importance of owning & operating costs in making decisions for hiring & purchase of equipment, inspection and testing of equipment, equipment maintenance.

Quality Control

Concept of quality in construction, quality standards- during construction, afterconstruction, destructive & non destructive methods.

Monitoring Progress

Programme and progress of work, work study, analysis and control of physical and financial progress corrective measures.

Safety Management in Construction

Importance of safety, causes and effects of accidents in construction works, safety measures in work sites for excavation, scaffolding, formwork, fabrication and erection, demolition, development of safety

consciousness, safety legislation- workman's compensation act, contract labour act.

Role of Vulnerability Atlas of India in construction projects

Introduction to vulnerability atlas of India, concepts of natural hazards and disasters and vulnerability profile of India. definition of disaster related terms, earthquake hazard and vulnerability, magnitude and intensity scales of earthquake, seismic zones, earthquake hazard maps, types of structures and damage classification, effects in housing and resistant measures, wind / cyclone hazard and vulnerability, wind speed and pressures, wind hazard and cyclone occurrence maps, storm surveys and cyclone resistant measures, flood hazard and vulnerability, flood hazard and flood prone areas of the country, general protection of habitants and flood resistant construction, landslides, tsunamis and thunderstorm hazards and vulnerability, landslide & thunderstorm incidence maps, measures against tsunami hazards, housing vulnerability risk tables and usage of vulnerability atlas of India, inclusion of vulnerability atlas in tender documents.

ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT

Advanced construction materials

Fibers and Plastics-

Types of fibers- steel, carbon, glass fibers, use of fibers as construction material, properties of fibers, Types of plastics- PVC, RPVC, HDPE, FRP, GRP etc. colored plastic sheets.use of plastic as construction material, Artificial timbers- Properties and uses of artificial timber, types of artificial timber available in market, strength of artificial timber, Miscellaneous materials – Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, artificial sand, bonding agents, adhesives etc.

Prefabrication

Introduction, necessity and scope of prefabrication of buildings, history of prefabrication, current uses of prefabrication , types of prefabricated systems, classification of prefabrication, advantages and disadvantages of prefabrication, the theory and process of prefabrication, design principle of prefabricated systems, types of prefabricated elements, modular coordination, Indian standard recommendation for modular planning, earthquake resistant construction, building configuration, lateral load resisting structures, building characteristics, effect of structural irregularities-vertical irregularities, plan configuration problems, safety consideration during additional construction and alteration of existing buildings, additional strengthening measures in masonry building-corner reinforcement, lintel band, sill band, plinth band, roof band, gable band etc., retrofitting of structures, seismic retrofitting of reinforced concrete buildings, sources of weakness in RC frame building, classification of retrofitting techniques and their uses, building services, cold water distribution in high rise building, lay out of installation, hot water supply – general principles for central plants-layout, sanitation-soil and waste water installation in high rise buildings, electrical services – i) Requirements in high rise buildings ii) Layout of wiring -types of wiring iii) Fuses and their types iv) Earthing and their uses, Lighting – requirement of lighting, measurement of light intensity, ventilation - methods of ventilation (natural and artificial systems of ventilation)problems on ventilation, mechanical services- lifts, escalator, elevators – types and uses.

Construction and earth moving equipments

Planning and selection of construction equipments, study on earth moving equipments like drag line, tractor, bulldozer, power shovel, study and uses of compacting equipments like tamping rollers, smooth wheel rollers, pneumatic tired rollers and vibrating compactors, owning and operating cost – problems, soil reinforcing techniques, necessity of soil reinforcing, use wire mesh and geo-synthetics, strengthening of embankments, slope stabilization in cutting and embankments by soil reinforcing techniques.

Syllabus of Technical Paper relating to the post of Architectural Assistant

HISTORY OF ARCHITECTURE

European Architecture

1.0 **Egyptian Architecture**
- 1.0.1 Architectural characteristics and details of features.
- 1.0.2 Sketch of Mastaba, Great Pyramid of Giza, Temple of Khons at Karnak, The Great Sphinx of Chepheren.

1.1 **Greek Architecture**
- 1.1.1 Architectural characteristics and details of features
- 1.1.2 Sketch of Greek classical orders of Doric, Ionic, and Corinthian. Temple of Parthenon at Athens.

1.2 **Roman Architecture**
- 1.2.1 Architectural characteristics and details of features
- 1.2.2 Sketch of Roman orders: Doric, Ionic, Corinthian, Composite, Tuscan order. Temple of Saturn at Rome

2.0 Indian Architecture

2.1 **Buddhist Architecture**
- 2.1.1 Architectural characteristics and detail features
- 2.1.2 Sketch of the Great Stupa of Sanchi, Chaitya Hall and Vihara.

2.2 **Temple Architecture (Indo Aryan Style)**
- 2.2.1 Architectural characteristics and detail features of Odishan Temple
- 2.2.2 Sketch of the Sun Temple at Konark, the Lingaraj Temple at Bhubaneswar

2.3 **Muslim Architecture**
- 2.3.1 Architectural characteristics and detail features
- 2.3.2 Sketch of Juma Masjid, Tajmahal and the Qutab Minar

3.0 Contemporary Architecture

3.1 Contemporary structures: Eiffel Tower, Bahai Temple and Burz -al-Khalifa

3.2 Works of famous architects: Frank Lloyd Wright, Le Corbusier, B.V.Doshi and Charles Correa

BUILDING MATERIALS

1.0 Stone:
- 1.1 Classification of stones
- 1.2 Properties of good quality building stone
- 1.3 Uses of building stone

2.0 Brick:
- 2.1 Classification of bricks
- 2.2 Properties of good quality of bricks

3.0 Cement:
- 3.1 Ingredients of cement
- 3.2 Types of cement

3.3 Properties of good cement
3.4 Uses of cement

4.0 Concrete and R.C.C.

4.1 Components of concrete.
4.2 Characteristics of concrete.
4.3 Use of concrete and R.C.C.
4.4 Distinguish between plain cement concrete and R.C.C

5.0 Timber:

5.1 Constitution and properties of timber (showing cross section)
5.2 Use of woods for different engineering purpose
5.3 Characteristics of a good timber

6.0 Paints, Varnish, Distemper:

6.1 Composition of paints varnishes and distempers.
6.2 Qualities of good paints, varnishes and distempers.
6.3 Uses of paints, varnishes and distemper.

7.0 Ferrous and non-ferrous metals:

7.1 Type ferrous and non-ferrous metals
7.2 Properties of good ferrous non-ferrous metals
7.3 Uses of steel in engineering applications

8.0 Plastics/PVC.

8.1 Types of plastic.
8.2 Uses and advantages of plastic

9.0 Glass:

9.1 Types of glass
9.2 Properties of glass

10.0 Aluminum:

10.1 Commercially available channels and sections
10.2 Application in buildings

BUILDING CONSTRUCTION

1.0 Stone masonry

Types of stones used in building construction, Types of stone masonry, Types of stone dressing, Principles of stone masonry

2.0 Brick masonry

Types of bricks used in masonry, Principles of brick masonry, Types of bonds in brick masonry

2.0 Cement concrete construction

2.1 Materials used in cement concrete construction.
2.2 Mixing, placing and compacting of cement concrete.
2.3 Curing of cement concrete work
2.4 Types of cement concrete construction - Caste-in-situ and precast.
2.5 Advantages of cement concrete.
2.6 Use of reinforcement in cement concrete work.

2.7 Defects in cement concrete construction and their removal

3.0 Foundation

3.1 Foundations for load bearing walls and piers.
3.2 Isolated & combined foundation in R.C.C.
3.3 Raft foundation
3.4 Pile foundation

4.0 Carpentry & Joinery

5.1 Tools used in carpentry works
5.2 Joineries used in timber works

6.0 Doors & Windows

6.1 Ledged and braced door
6.2 Ledged and framed door
6.3 Ledged, framed and braced door
6.4 Framed and paneled door and flush doors.
6.5 Types of windows

7.0 Roofs

7.1 Classification of roofs
7.2 Construction method and details of pitch roofs.

8.0 Stairs

8.1 Definitions
8.2 Types of staircase
8.3 Wooden staircase
8.4 RCC Staircase

9.0 Floors

9.1 Types of floors
9.2 Methods of laying floors
9.3 Finishing of floors with different floor finishes like cement, mosaic, terrazzo, tiles, marble and PVC/Linoleum

10.0 Form work

10.1 Function of formwork
10.2 Materials used in form work.
10.3 Formwork for columns, floors, walls& stairs

11.0 Pointing& plastering

11.1 Methods and types of pointing
11.2 Plastering: Material and methods
11.3 External finishes

SURVEYING

Chain Survey

1.1 State and explain the principles of chain surveying .Instruments used their description and checking their correctness.
1.2 State and explain the ranging and chaining of a line.
1.3 State and explain the errors in chaining and solve problem.
1.4 State and explain the offsets.

1.4.1 State and explain the average ordinate method.
1.4.2 State and explain the Trapezoidal rule.
1.4.3 State and explain the Simpson's Rule.

2. **Compass Survey:**
3.1 Describe and explain the prismatic compass, and its use.
3. **Bearings:**
3.1 Explain W.C.B and R.B and conversion from one to another.
3.2 Explain fore and back bearings and their conversion.
3.3 Explain computation of angles from bearings and bearing from angles.
3.4 Explain Local attractions, its determination and necessary correction to the bearings.
4. **Leveling:**
4.1 Conduct the study of levels (Dumpy level).
4.2 Explain the principles of leveling.
4.3 Describe the temporary adjustment of dumpy level.
4.4 Describe the leveling by H.I method and rise and fall method.
5 **Contouring.**
5.2 Explain the contour line, contour internal, horizontal equivalent.
5.3 Explain the various characteristics of contouring.

ENVIRONMENTAL STUDIES

1. The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

2. Natural Resources

Renewable and non-renewable resources:

a) Natural resources and associated problems.
- Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
- Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.

- Food Resources: World food problems, changes caused by agriculture and

over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .

- Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.
c) Equitable use of resources for sustainable life styles.

1. Systems

- Concept of an eco system.
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco system

Ecological succession.

- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco system:
- Forest ecosystem:
- Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

2. Biodiversity and it's Conservation

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
- Biodiversity at global, national and local level.
- Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

3. Environmental Pollution.

Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution
e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.
Disaster management: Floods, earth quake, cyclone and landslides.

4. Social issues and the Environment

Form unsustainable to sustainable development.

- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.

- Resettlement and rehabilitation of people; its problems and concern.
- Environmental ethics: issue and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Public awareness.

5. **Human population and the environment**

- Population growth and variation among nations.
- Population explosion- family welfare program.
- Environment and human health.
- SDF Human rights.
- Value education
- Role of information technology in environment and human health.

GRAPHIC DESIGN

1. **Free hand drawing study**

1.1 Basic Architectural Graphics.

1.1.1 Line
1.1.2 Plane
1.1.3 Texture
1.1.4 Tone
1.1.5 Colour

1.2 **Geometrical forms**

1.2.1 Geometrical solid composition
1.2.2 Abstract three dimensional composition

The above exercise will be done by composing forms and planes for showing
(1) Symmetry and Asymmetry (2) Rhythm (3) Unity in diversity (4) Solid and Void composition.

1.3 **Anthropometrics and furniture sketches.**

1.3.1 Human dimensions and proportions
1.3.2 Residential furniture drawing with dimensions as per anthropometric

1.4 **Parts of building**

1.4.1 Sketches of door and window openings, columns, parapet, boundary wall of residential building.
1.4.2 Entrance door of restaurant and office
1.4.3 Entrance gate

2. Scaled drawing

1.5 Measured drawing of simple objects drawn in appropriate scale.
(Furniture, watchman cabin, garden shelter etc.)

BUILDING CONSTRUCTION

Building Construction

1.1. Types of stone masonry (plan, elevation, section).
1.2. Different shapes and types of bricks
1.3. English bonds & wall junctions.
1.4. Flemish bond & wall junctions.
1.5. Rat-trap bond.
1.6. Foundations in bricks.
1.7. RCC foundations.
1.8. Arches and its details.
1.9. Details of different types of doors and windows
1.10. Details of RCC Staircase
1.11. Details of Pitched roof
1.12. Details of A.S, terrazzo, marble and tile flooring.

SURVEYING PRACTICAL

1. Chain survey

1.1 Do the Ranging of a line more than 100 Mt. Length and measuring its correct length applying chain corrections.
1.2 Take offsets of objects on both sides of line plotting the above details.
1.3 Explain how to overcome the obstructions in chaining in the following cases.
1.31 Vision free, but chaining obstructed (pond, river etc.).
1.3.2 Chaining free, vision obstructed (Raised ground, hills etc.).

2. Compass Survey

2.1 Set the instrument and how to take readings.
2.2 Find the bearings of line and applying check.
2.3 Find the angles.
2.4 Demonstrate the closed traversing of a small plot.
(Without interior details).

3. Leveling

3.1 Demonstrate the temporary adjustments of a dumpy level and reading the staff.
3.2 Find the exact level different between two stations visible from the centre of instrument station.
3.3 Demonstrate the fly leveling between two stations with three setting.

4. Contouring

Demonstrate the contouring of a small plot and plotting the contour by various methods (Direct & Indirect).

AutoCAD

1.0 Introduction

1.1 State and compare AutoCAD with manual drafting

2.0 Getting started.

2.1 AutoCAD screen
2.2 Working platform
2.3 Methods of command entry
2.4 Coordinate system
2.5 Selection of Units
2.6 Selection of working area
2.7 Types of commands

3.0 Draw commands

Arc, Circle, Ellipse, Donut, Polygon, Line, Pline

4.0 EDIT COMMAND

ERASE,OOPS,TIRM,COPY,MOVE,OFFSET,ARRAY,BEAK,STRETCH,EXPLODE, MIRROR,FILLET,CHAMFER,PEDIT,EDIT,HATCH,U, SCALE.

5.0 DISPLAY COMMANDS

PAN, REDRAW, REGEN, ZOOM

6.0 UTILITY COMMANDS

End, LIMITS, QUIT, SAVE, UNITS

7.0 LABLE COMMANDS

DIMENSION, HATCH, TEXT

8.0 INQUIRY COMMAND

AREA, DIST, HELP, ID, LIST

9.0 DRAWING AIDS

OSNAP, TRAKING, SNAP

10.0 SPECIAL COMMANDS

10.1 BLOCK, INSERT, LAYER, LIME TYPE, LT SCALE, WB BLOCK

Analysis Of Structure

1.0 Introduction:

Aim, object and scope of study the subject.

2.0 Solution of determinate beams.

- 2.1 Define a beam
- 2.2 Explain various types of supports.
- 2.3 Explain various types of beams.
- 2.4 State and illustrate the concept of shear force, bending moment, shear force and bending moment diagram in case of cantilever and simply supported beam subjected to concentrated load and U.D.L acting separately.

3.0 Bending stress in beams.

- 3.1 Show the use of pure bending equation (No derivation) for followings.
  - a. Rectangular solid.
  - b. Circular, solid.

4.0 Slope and deflection of beams by double integration method.

- 4.1 State and explain the differential equation of elastic curve
- 4.2 State and explain the sign conventions for slopes and deflection.
- 4.3 State and explain the slope and deflection calculation for simply supported beam subject to single concentrated load at mid span and U.D.L over entire span.

ESTIMATION AND SPECIFICATION

1.0 Introduction:

State and explain the aim and objective of the subject.

1.1 Discuss what an estimate is.
1.2 Explain in detail different types of estimate: Rough estimate, detailed estimate, quantity estimate.
1.3 Explain the methods used in plinth area calculation with an example.

2.0 Units of measurement.

3.0 **Method of building estimates**.

State and explain the **centerline method of** estimation of a building.

4.0 Estimate of buildings.

4.1 Estimate the detailed quantity of a single roomed building.
4.2 Estimate detailed quantity of a single roomed building with provision for one kitchen, one toilet and front verandah.

5.0 Analysis of rate.

5.1 Analyse the rates of cement concrete work (1:4:8 and 1:2:4).
5.2 Analyse the rates of Brick work with (1:6) cement mortar.

6.0 Specifications.

6.1 Plain cement concrete in foundation.
6.2 Brick work in foundation and super structure.
6.3 R.C.C work in foundation and super structure.
6.4 Plastering.
6.5 Flooring (A.S flooring, terrazzo flooring, marble, tile)
6.6 Painting.

BUILDING AND ENVIRONMENTAL SCIENCE

1.0 Climatic condition.

1.1 Introduction to Climatology and its effect on human comfort.
1.2 Brief study of world climatic zones, tropical climate in particular.
1.3 Elements of climate:
Solar Radiation, Temperature, Humidity, Wind and Precipitation data and measurement
1.4 Influence of topography and vegetation on climatic design

2.0 Climatic control in building.

2.1 Shading devices: vertical devices and horizontal devices.
2.2 Ventilation and air flow principles, principles of natural ventilation
2.3 Design and Orientation of building, building material and construction in warm humid climate.
2.4 Brief idea about different means of mechanical control for heating, ventilation, cooling, air-conditioning.

3.0 Introduction to landscape design.

3.1 Definitions(Different types of Open spaces, e.g. Park, Natural Green areas, Playground)
3.2 Factors that influence landscape design.

4.0 Principles of landscape design.

5.0 Different landscape style and historic landscape(only sketch.)

5.1 Japanese
5.2 Mughal
5.3 English

6.0 Properties and Behaviour of sound

6.1 Brief Introduction to architectural acoustics-characteristics and measurement of sound, frequency, intensity, decibel scale(only defination).
6.2 Source, path receiver, reflection and absorption.
6.3 Reverberation time calculations using Sabine's formula. (with the example of an auditorium)
6.4 Definition of dead room, live room and diffusion.
6.5 Definition of echo, flutter echo, creep and focusing.
6.6 General brief description of acoustical materials –acoustical tiles, fibre board, acoustic plaster and composite materials

BUILDING SERVICES

1.0 Water supply:

1.1 Principles of water supply system (Standards adopted for water supply as per NBC recommendation.)
1.2 Basic idea of water treatment process.
1.3 Water distribution system from reservoirs (Methods of laying out of distribution pipes).
1.4 Municipal connections and positions
1.5 Elements of domestic water supply (sump, overhead tank, types of taps, types of valves, pipe size and pipe fittings)

2.0 Sanitation:

2.1 Importance of sanitation in relation to public health.
2.2 Refuse types, collection and disposal Separate, combined and partially separated methods.
2.3 Elements of domestic sanitation.
2.4 Septic tank.
- 2.4.1 Types of septic Tank
- 2.4.2 construction of septic tank
- 2.4.3 Volume calculation

2.5 Soak Pit
2.6 Manhole
2.7 Inspection chamber
2.8 Sanitary connections and fittings (wash basin, showers, kitchen sink, water closet, Flushing cistern, Bidets and Urinals)
2.9 Traps (P-trap, Q-trap and S-trap)
2.10 Anti siphon and ventilation pipes, Soil pipe and waste pipe

3.0 House drainage and Sewerage
3.1 Laying of simple house drainage systems and sub-soil drains.
3.2 Laying of sewers

ARCHITECTURAL DESIGN

1.0 Design a small single family residence (single storied)

1.1 Background study (Self Study)- anthropometrics, activity analysis, bubble diagram, functional requirement, area analysis.
1.2 Single line conceptual drawing.
1.3 Double line plan and elevations (preliminary drawings).
1.4 Presentation drawings.
- Site Plan
- Ground Floor Plan
- Two Elevations
- Two Sections
- Terrace Plan

2.0 A duplex bungalow.

Design to include all the above steps of chapter -I
2.1 Site analysis
2.2 Presentation drawing
- Site plan
- Ground floor plan showing interior arrangement
- First Floor Plan
- Two Elevations
- Two sections
- Terrace Plan

3.0 Design of a multi-storied building

Secondary school, students' hostel, tourist home, Kalyan Mandap, Office complex, commercial complex, hotel, apartment

3.1 Background self- study- anthropometrics, activity analysis, bubble diagram,

functional requirement, area analysis.

3.2 Case Study of any related building
3.3 Site analysis
3.4 Single line conceptual drawing.
3.5 Double line plan and elevations (preliminary drawings).
3.6 Presentation drawings.
   a. Site Plan
   b. Ground Floor Plan
   c. Other floor plans
   d. Two Elevations
   e. Two Sections
   f. Detail plan showing interior arrangement
   g. Terrace Plan
   h. Perspective view

LANDSCAPE DESIGN

Fundamentals of site planning

Explain with drawings and sketches.

1. Landscape Details.
   1.1. Paving
   1.2. Boundary wall with entrance gate
   1.3. Retaining wall
   1.4. Water body
   1.5. Planter box
   1.6. Lamp post
   1.7. Seating

2. Design of Parking lots
3. **Design of Open Spaces**

   3.1. Parks (Neighborhood or city level)
   3.2. Boulevards and pavement

WORKING DRAWING-I

DESCRIPTIVE GEOMETRY

1.0 Surface development

1.1 Development of the surface of geometrical solids (Cube, Cuboids, Pyramid, Prism, Cylinder and Cone.)

1.2 Development of the surface of geometrical solids cut by sectional planes

2.0 Isometric view of the following

2.1 Geometrical forms.

2.2 Cubical forms.

2.3 Complex forms

3.0 Axonometric view of the following

3.1 Group of solids

3.2 Interior view of a small building.

4.0 Perspective view

4.1 One point perspective.

Interior of a kitchen or any other room

4.2 Two point perspectives of solid geometrical forms

4.3 Measuring point method of solid geometrical forms

AUTO CAD

1.0 complete working drawing of a duplex bungalow

2.0 Introduction to 3D Modeling
- 2.1 State and explain wire frame model
- 2.2 State and explain solid modeling

3.0 Isometric VIEW/perspective VIEW
- 3.1 Isometric drawings
- 3.2 NE – Isometric view
- 3.3 NW – -do-
- 3.4 SE – -do-
- 3.5 SW- -do-
- 3.6 Top view
- 3.7 Bottom view
- 3.8 Perspective drawing

4.0 Coordinate System.
- 4.1 WCS
- 4.2 UCS
- 4.3 UCS ICON

5.0 3D entities and commands
- 3D PLAN
- 3D ELEVENTION
- 3D LINE
- 3D FACE

5.1 3D SOLIDS
5.2 BOLEAN operation
5.3 Union subtraction and intersection

5.4 ROTATE.
- a. REVOLVE
- b. REGION
- c. EXTURDE

6.0 3D Viewing & Editing
- 6.1 HIDE, SHADE, V POINT PLAN VIEW
- 6.2 3D VIEW CAMERA
- 6.3 SOLID EDITING

7.0 RENDERING

Illustrate with light and shade, sky, background and trees.

ENTREPRENEURSHIP and MANAGEMENT & SMART TECHNOLOGY

DETAILED CONTENTS

1. Entrepreneurship
   - Concept /Meaning of Entrepreneurship
   - Need of Entrepreneurship
   - Characteristics, Qualities and Types of entrepreneur, Functions
   - Barriers in entrepreneurship
   - Entrepreneurs vrs. Manager
   - Forms of Business Ownership: Sole proprietorship, partnership forms and others
   - Types of Industries, Concept of Start-ups
   - Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
   - Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. Market Survey and Opportunity Identification (Business Planning)
   - Business Planning
   - SSI, Ancillary Units, Tiny Units, Service sector Units
   - Time schedule Plan, Agencies to be contacted for Project Implementation
   - Assessment of Demand and supply and Potential areas of Growth
   - Identifying Business Opportunity
   - Final Product selection

3. Project report Preparation
   - Preliminary project report
   - Detailed project report, Techno economic Feasibility

- Project Viability

4. Management Principles
   - Definitions of management
   - Principles of management
   - Functions of management (planning, organising, staffing, directing and controlling etc.)
   - Level of Management in an Organisation

5. Functional Areas of Management
   a) Production management
      - Functions, Activities
      - Productivity
      - Quality control
      - Production Planning and control

   b) Inventory Management
      - Need for Inventory management
      - Models/Techniques of Inventory management

   c) Financial Management
      - Functions of Financial management
      - Management of Working capital
      - Costing (only concept)
      - Break even Analysis
      - Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

   d) Marketing Management
      - Concept of Marketing and Marketing Management
      - Marketing Techniques (only concepts)
      - Concept of 4P s (Price, Place, Product, Promotion)

   e) Human Resource Management
   - Functions of Personnel Management
   - Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. Leadership and Motivation
   a) Leadership
      - Definition and Need/Importance
      - Qualities and functions of a leader
      - Manager Vs Leader
      - Style of Leadership (Autocratic, Democratic, Participative)

   b) Motivation
      - Definition and characteristics
      - Importance of motivation
      - Factors affecting motivation
      - Theories of motivation (Maslow)
      - Methods of Improving Motivation
      - Importance of Communication in Business
      - Types and Barriers of Communication

7. **Work Culture, TQM & Safety**
   - Human relationship and Performance in Organization
   - Relations with Peers, Superiors and Subordinates
   - TQM concepts: Quality Policy, Quality Management, Quality system
   - Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)

8. Legislation
   a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
   b) Features of Factories Act 1948 with Amendment (only salient points)
   c) Features of Payment of Wages Act 1936 (only salient points)

9. Smart Technology
   - Concept of IOT, How IOT works
   - Components of IOT, Characteristics of IOT, Categories of IOT
   - Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

DESIGN OF RCC STRUCTURE

1.0 Introduction

Aim, objectives and scope of the subject

2.0 Analyze the single reinforced section

2.1 Define the terms related to single RCC section.
2.2 State and explain the properties of reinforced concrete, grades of concrete and steel.
2.3 Discuss the basic assumptions.
2.4 Discuss the Modular ratio.
2.5 Discuss the distribution of stress in steel and concrete.
2.6 Discuss the Equivalent concrete area.
2.7 Discuss the stress and strain diagrams.
2.8 Discuss the Neutral axis and its location.
2.9 Discuss the balance, under reinforced and over reinforced.
2.10 State with examples of problems - Moment of resistance calculation.

3.0 Analysis of double reinforced section

3.1 Discuss the necessary of double reinforced section
3.2 State and explain the Moment of resistance calculation

4.0 Share stress in beams

4.1 Discuss the effect of shear in R.C beams.
4.2 Discuss shear failure of beams.
4.3 Discuss shear resistance of concrete without shear reinforcement.
4.4 Discuss shear reinforcement

5.0 Design of slabs

5.1 Explain the design of one way slabs.
5.2 Explain the design of two way slabs (I.S code method only).

6.0 Design of axially loaded columned.

6.1 Find out the effective length of a column.
6.2 Find out the long and short column.
6.3 Find out the safe load on column.
6.4 State and explain the design of square and rectangular column.

PROFESSIONAL PRACTICE

1.0 Contracts

1.1 Types of contracts: lump-sum contract, labour contract, item rate contract, Negotiable contract and plinth area rate contract.
1.2 The contract document, administrative approval, Technical sanction, contingency budget, tender earning money, security deposit, Advance payment, Intermediate payment, on account payment, final payment, running bill and final bill.
1.3 The drafting notice inviting tender, preparing quotation, and tender documents comparative statement, and procedure and allotting contracts term and form of agreement, termination of contract, penalty for damage.
1.4 Contract work

Classification of work-original, major, minor, petty, annual quadrennial, and special, repair method of execution, setting out of works, work order and related paper, work organization of work preparation a general program, forecast of requirements, in terms of information, plant, transport, labor and materials accessing, progress of work. Introduction to application of network planning and scheduling technique in construction management.

2.0 Supervision

2.1 Duties and responsibility of Jr. Engineers.
2.2 The architect's role in a construction project.
2.3 The duties and responsibility of Architect and Architects' instructions.
2.4 Certificate of virtual completion of work.
2.5 Measurement book and methods of making entries and checking.
2.6 Maintaining material inventory at the site.
2.7 Recording and checking common irregularities.
2.8 Heads of Accounts.
2.9 Survey report, Estimate of expenditure in disposal of surplus unusable materials.

3.0 Valuation

3.1 Meaning of valuation
3.2 Purpose of valuation.
3.3 Different terms related to valuation:
Gross increase and Net increase, Repairs, taxes, sinking fund, scrap value, salvage value, market value, book value, capital cost and capitalized value

3.4 Depreciation and valuation of building
3.5 Rent fixation for building.

4.0 Building Byelaws

Application of prevailing building byelaws for residential and commercial buildings as per the provision of Local Development Authority.

HUMAN SETTLEMENT PLANNING

1.0 Introduction to Urban and Rural Planning

1.1 Scopes and Objectives of Urban and Rural Planning
1.2 Physical Characteristics
1.3 Urban and Rural Inter relationship

2.0 City Master Plan

2.1 State and explain the Master Plan
2.2 Need of a Comprehensive Development Plan
2.3 Objective, Process and Method of developing City Master Plan

3.0 Survey
3.1 Purpose of surveying
3.2 Surveying methods

4.0 Zoning

4.1 Zoning regulation

5.0 Housing

5.1 Housing and Neighborhood units
5.2 Commercial centers

6.0 Traffic and transport system in towns and cities

7.0 Appraisal of Master Plan of Bhubaneswar

WORKING DRAWING

1.0 Measured of a G+2 storied building
1.1 Plan
1.2 Elevations
1.3 Sections
1.4 Study of existing plumbing and sanitation system
1.5 Study of existing electrical system

2.0 Working drawing of the same building

Apartment, Hostel, Guest house, Commercial building, Office building, etc. (Any one to be developed manually & presented in AutoCAD.

1.1 Excavation plan and section.
1.2 Foundation plans and sections.
1.3 Ground floor plan in detail.
1.4 First floor plan in detail
1.5 Second and third floor plan in detail
1.6 Lintel level plan of all the floors
(Showing details of lintel and chhajja)
1.7 Roof / Terrace plan.
1.8 Four sides working elevation
1.9 Sections (through staircase and toilet)
1.10 Plumbing/sanitary lay out with specification

1.11 Electrical layout
1.12 Local authority approval drawing
as per the building Bye-Laws.

INTERIOR DESIGN

1.0 Interior design of a residence/ office/commercial space
Bungalow, Restaurant, small office space or shop (Any one of these)

1.1 Background self- study: anthropometrics, space organization with furniture, study of standard size of furniture as per functional requirement.
1.2 Study of interior finishes: walls, floors and ceiling,
1.3 Study of types of materials available and their market rate
1.4 Single line plan showing interior layout
1.5 Conceptual design of furniture units
1.6 Presentation Drawings
- Floor plans showing interior layout
- Sectional Elevations of each room showing interior space, furniture and walls
- Details of furniture units
- Electrical layout showing lighting system
- Brief report on materials and colour scheme to be used

2.0 Estimate of the interior scheme

2.1 Calculation of quantity of material and rate analysis
2.2 Cost Estimate of the interior scheme (with specifications, quantity and market rate)

PROFESSIONAL TRAINING
REMOTE SENSING AND GIS

1.0 Remote Sensing

1.1 Definition & Concept of Remote sensing
1.2 Physics of remote sensing ----- Electromagnetic radiation , Radiation Law, Electromagnetic spectrum, Relation between wave length & frequency, Visible spectrum , Infrared micro waves, Interaction of earth features with EMR.
1.3 Aerial photography – scale of aerial photographs Height measurements, concept of stereo photography, concept of photogrammetric
1.4 Different platform used in remote sensing.
1.5 Different Sensors used in satellite remote sensing and working concept of sensor.
1.6 Details of Remote sensing satellites---IRS series land sat, Spot, Envisat, Quick Bird, IKONS, ORBVIEW, Geoeye, etc.
1.7 Digital characteristics of satellite image, concepts of spectral, spatial, Radio metric & Temporal Resolution
1.8 Digital Image Processing (D I P) Geometric correction of satellite image.
1.9 D I P—Enhancement technique of satellite image.
1.10 D I P –Unsupervised & supervised classification.
1.11 Fundamental concept of land features mapping from satellite image of different Resolution.

2.0 Geographic Information System

2.1 Definition and concept of GIS.
2.2 Concept of Database Management System, example of spatial and Attribute.
2.3 Concept & comparison between vector and raster data, raster/ vector conversion.
2.4 Basic features in spatial database generation—point, arc, (line) node & polygon, topology.
2.5 Concept of coverage, shape files and eco files.
2.6 Digitization method, weed tolerance, node snap, arc snap fuzzy tolerance, tic matching.
2.7 Identification of errors – under shoot, over shoot, intersection errors, missing or multiple label points in polygons etc.
2.8 Joining of spatial and attribute data.
2.9 Spatial analysis—Boolean operation, clipping, intersection, buffer analysis.
2.10 Surface modeling—contour/lattice generation, T I N formation, slop/ aspect determination, cross section / profile generation etc.
2.11 Attribute Editing ---1 lecture.
2.12 Use of GIS in surface features and real world database linking & modeling with respect to survey & mapping.

3.0 Global Positioning System (G P S)

3.1 Need of GPS based surveys and introduction to GPS
3.2 Earth Coordinate System: concept of latitude and longitude, fundamental of projection system, definition of datum
3.3 Concept and working of GIS
3.4 Sources of errors in GPS observation

3.5 Current & Future satellite based Navigation system
3.6 Concept and working of differential GPS

REVIT ARCHITECTURE

1.0 Getting Started with Revit Architecture

1.0 Introduction.
2.0 Starting a new project.
3.0 Setting units.
4.0 Snap settings.
5.0 Saving a project.
6.0 Using Zoom tools.

2.0 Using Basic Building Components-I

2.1 Creating walls.
2.2 Adding doors.
2.3 Adding windows.

3.0 Using the Editing Tools

3.1 Moving and coping elements.
3.2 Trim and extend.
3.3 Rotating elements.
3.4 Mirroring elements.
3.5 Creating an offset.
3.6 Creating an array of elements.
3.7 Matching elements.
3.8 Aligning elements.
3.9 Split element.
3.10 Grouping elements.
3.11 Scaling elements.

4.0 Working with Datum and Creating Standard Views

4.1 Working with levels.
4.2 Working with grids.

5.0 Using Basic Building Components-II

5.1 Creating Floors.
5.2 Creating roofs.
5.3 Creating ceilings.

6.0 Using Basic Building Components-III

6.1 Adding components.
6.2 Adding Stairs.
6.3 Creating Railings.
6.4 Creating ramps.
6.5 Adding curtain grids.

7.0 Adding Site Features

7.1 Creating top surface.
7.2 Splitting a top surface.
7.3 Merging top surfaces.

7.4 Adding property line.
7.5 Creating building pads
7.6 Adding side components.

8.0 Using Massing Tools

8.1 Creating an extrusion.
8.2 Creating a revolved geometry.
8.3 Creating a sweep.
8.4 Creating a blend.

9.0 Adding Annotation and Dimensions

9.1 Adding tags.
9.2 Adding dimensions.

10.0 Creating Project Details

10.1 Creating callout view.
10.2 Adding text notes.
10.3 Creating a model text.

11.0 Creating Drawing Sheets

11.1 Adding a drawing sheet to a project.

12.0 Creating 3D Views

12.1 Creating orthographic view.
12.2 Generating perspective view.

PHOTOSHOP

1.0 Introduction to Photoshop

1.1 What is Photoshop?
1.2 System requirements
1.3 Image size and resolution
1.4 Creating working space
1.5 Scanning images
1.6 Saving images
1.7 Opening images
1.8 Importing images
1.9 Placing files

2.0 Introduction to tools

2.1 Tool box
2.2 Tool option bars
2.3 Tools presets
2.4 Selection tools
2.5 Selection menu

3.0 Working with layer

3.1 What is a layer?
3.2 Blending Modes
3.3 Features of an adjustment layer
3.4 Working with layers

4.0 Creating shapes and mat painting

- 4.1 Painting
- 4.2 Drawing
- 4.3 Pen tool
- 4.4 Work path
- 4.5 Painting tools
- 4.6 Brush presets

5.0 Transforming and retouching

- 5.1 Cropping images
- 5.2 Working with canvas size
- 5.3 Transforming objects
- 5.4 Working with clone stamp tools
- 5.5 Retouching the image

6.0 Colour and tonal adjustments

- 6.1 Colour corrections
- 6.2 Sharpening images
- 6.3 Colour models
- 6.4 Colour gamuts
- 6.5 Adjusting colour display for cross-platform
- 6.6 Variation
- 6.7 Changing Screen mode

7.0 Filters

- 7.1 Distorting with liquefy command
- 7.2 Pattern maker
- 7.3 Filter Gallery
- 7.4 Filters

8.0 Text

- 8.1 Text tool
- 8.2 Creating text effects using filters

9.0 Working with channels and masking

- 9.1 Channels and bit depth
- 9.2 Converting between bit depths
- 9.3 Converting between modes
- 9.4 Features of mask
- 9.5 Working with alpha-channels

Syllabus of Technical Paper relating to the post of Cameraman

1. **Basics of Camera Operation**
   - Types of cameras: DSLR Mirror less, broadcast, cinema cameras
   - Camera parts and functions: lens, Sensor, viewfinder, Aperture, shutter
   - Understanding focal length, depth of field, and fleld of view
   - Manual vs automatic settings: focus, exposure, white balance

2. **Cinematographic Techniques**
   - Shot composition: rule of thirds, leading lines. Framing, proportion
   - Camera movements: pan, tilt. zoom, dolly, crane, handheld
   - Types of shots: wide, medium, close-up, over-the-shoulder, POV
   - Lighting principles: three-point lighting, natural vs artificial light, Mix light principles

3. **Technical Knowledge**
   - Resolution and frame rates: HD, 4K, 24fps, 30fps, 60fps, Interlace, Progressive
   - Color temperature and white balance settings
   - File formats and codecs: MOV, MP4, AVI, RAW
   - Battery types, memory cards, and data management

4. **Audio-Visual Integration**
   - Basics of sound recording with camera setups
   - Use of external microphones and audio Sync
   - Monitoring audio levels and avoiding distortion
   - Types of audio used: Dialogue, narration, Music

5. **Equipment Handling and Safety**
   - Tripod and rig setup
   - Cable management and power safety
   - Maintenance and cleaning of camera gear & accessories
   - Transport and storage protocols

6. **Visual Storytelling**
   - Role of the cameraman in narrative construction
   - Continuity and matching shots
   - Working with directors and production teams
   - Capturing emotion and mood through visuals

7. **Digital Workflow and Post-Production Awareness**
   - Transferring footage to editing systems
   - Organizing and labeling clips
   - Basic understanding of editing software (Premiere Pro, Final Cut),
   - Metadata tagging and archiving

8. **Industry Standards and Ethics**
    - Copyright and usage rights of footage
    - Ethical considerations In filming (privacy, consent)
    - Professional conduct on set

Syllabus of Technical Paper relating to the post of Photographer

1. **Fundamentals of Photography**

- History and evolution of photography.
- Types of cameras (DSLR, mirror less, prosumer, point and shoot) and lenses
- Exposure triangle: ISO, shutter speed, aperture
- Composition techniques: rule of thirds, leading lines, framing, Symmetry

2. **Digital Photography Concepts**

- Image censor: CCD vs. CMOS
- Resolution: pixel density, bit depth and aspect ratios
- File formats: JPEG, RAW, PNG, TIFF
- Image compression and quality management

3. **Basics of Photography**
   - Framing and shot composition, camera movement
   - Lens prime Vs. Zoom lens, Focal lens, depth of field, Focal length Vs. Sensör size
   - Lighting techniques, mood creation, Use of flash light
   - Storyboarding and visual storytelling principles

4. **Photo Editing and Software Skills**
   - Introduction to editing software: Adobe Photoshop, Light room, GIMP
   - Color correction, retouching, cropping, masking.
   - Use of layers, filters, and adjustment tools
   - Batch processing and use of presets
   - Ethical considerations in photo manipulation

5. **Digital Image Storage and Management**
   - Metadata tagging and cataloging
   - Organizing files and folders for efficient Workflow
   - Backup strategies: cloud storage, external drives
   - Copyright laws-and image licensing
6. **Visual Communication and Aesthetics**
   - Principles of design: balance, contrast, emphasis, unity
   - Use of color theory In photography
   - Understanding viewer perception and emotional impact
   - Typography and layout basics for photo presentation

7. **Emerging Trends and Technologies**
   - Mobile photography and editing apps
   - Drone photography and aerial imaging
   - Al-powered editing tools and automation
   - Social media optimization and digital portfolios

Syllabus of Technical Paper relating to the post of Sound Recordist

1. **Fundamentals of Sound and Acoustics**
    - Nature and properties of sound: frequency, amplitude, wavelength, harmonics, Sound power and Sound intensity, Inverse square law
    - Psychoacoustics and human hearing range- pitch, loudness & SPL
    - Room acoustics and soundproofing techniques-. Reverberation time, Resonance & standing wave
    - Signal flow and audio chain basics (both analog & digital)
2. **Microphones and Recording Techniques**
    - Types of microphones: dynamic, condenser, ribbon, shotgun
    - Polar patterns and their applications
    - Important responses of microphone- Frequency response, sensitivity, impedance etc.
    - Mic placement for vocals, instruments, amblent sound
    - Field recording techniques and challenges
3. **Studio Recording Practices**
    - Multitrack recording workflow
    - Use of audio Interfaces, mixers and preamps
    - Monitoring systems and headphone mixes
    - Recording protocols for voiceovers, music and dialogue
    - Use of processor- Time domain, amplitude domain & frequency domain
4. **Digital Sound Recording and Editing**
    - Fundamentals of digital recording-Sampling, quantization bit-depth
    - DAWs (Digital Audio Workstations): Pro Tools, Logic Pro, Cubase, Audacity, Neundo
    - Audio formats and bit depth: WAV, MP3, AIFF, FLAC
    - Editing Techniques: trimming, cross fades, time-stretching
    - Use of plugins: EQ compression, reverb, delay
5. **Sound Mixing & Mastering**
    - Balancing levels and panning
    - Equalization and dynamic range control
    - Mixing for stereo and surround sound
    - Final mastering and export settings
    - Encoders & decoders
6. **Audio equipment and Maintenance**
    - Setup and calibration of studio gear
    - Troubleshooting signal issues
    - Maintenance of cables, connectors and hardware
    - Safety protocols and equipment handlings

7. **Sound for Visual Media**
    - Syncing sound with video: timecode, slate, clapperboard, Tentacle
    - Foley recording and sound effects creation
    - ADR (Automated Dialogue Replacement) techniques
    - Mixing for broadcast standards and cinema

8. **Emerging Technologies and Trends**

    - Digital audio networking (Dante, AES67)
    - Portable recording setups and mobile apps, gaming
    - Al-assisted sound editing tools
    - Cloud-based collaboration and remote recording.

9. **Professional Ethics and Industry Standards**
    - Copyright and licensing of audio content
    - Ethical recording practices in public and private spaces
    - Collaboration with directors, producers, and artists
    - Documentation and metadata tagging
    - Online and digital strategic for audio marketing- pitching your content in streaming platform.

Syllabus of Technical Paper relating to the post of Mechanic

1. Basic Electronics

- Semiconductor theory: diodes, transistors, thyristors, ICs
- Analog circuits: amplifiers, filters, oscillators
- Digital electronics: logic gates, flip-flops, counters, multiplexers
- Power supplies: linear and switch-mode (SMPS)
- Voltage regulation and protection circuits

2. Audio-Visual Equipment Technology

- Types of AV equipment: projectors, amplifiers, mixers, microphones, speakers, cameras
- Signal types and transmission: analog vs digital, HDMI, VGA, XLR, RCA, optical
- AV system integration and setup
- AV control systems and remote interfaces
- Audio signal processing: equalization, mixing, gain staging
- Video signal formats: PAL, NTSC, HD, 4K
- **Video & Audio Editing Software**
- **Functionality of different Cameras**
- **Application of various sensors.**

3. Repair & Maintenance Techniques

- Fault diagnosis and isolation
- Reading and interpreting circuit diagrams and service manuals
- Soldering/desoldering techniques and PCB repair
- Common AV faults and remedies (e.g., no signal, distorted audio, dead pixels)
- Preventive and corrective maintenance procedures

- Component-level troubleshooting

4. Measurement & Testing Instruments

- Multimeter, oscilloscope, signal generator
- Audio analyzers and spectrum meters
- LCR meter, logic analyzer
- Calibration and testing procedures
- Safety protocols while using test equipment

5. Electrical Fundamentals (as applicable to AV systems)

- AC/DC basics
- Electrical safety and earthing
- Power distribution for AV setups
- UPS and stabilizer systems
- Load calculation and cable selection

Syllabus of Technical Paper relating to the post of Video Film Editor

1. **Fundamentals of Film Editing**
    - History and evolution of film editing.
    - Role of the editor in Story telling.
    - Types of cuts: straight cut, jump cut, match cut, cross cutting
    - Editing grammar: continuity, montage, parallel editing
2. **Video Editing Techniques**
    - Non-linear editing principles
    - Scene transitions and pacing.
    - Editing for different formats: short films, documentaries, advertisements
    - Working with multi-camera footage and syncing audio
3. **Software Proficiency**
    - Over view of industry-standard tools: Adobe Premiere Pro, Final Cut Pro, Davinci Resolve
    - Timeline organization and clip management
    - Use of effects, transitions, and filters.
    - Capturing, Trans coding and Export to different codec
4. **Audio-Visual Synchronization**
    - Basics of sound design and mixing
    - Syncing dialogue, music, and ambient sound
    - Use of Foley and sound effects
    - Audio levels, EQ and noise reduction
5. **Visual Composition and Aesthetics**
    - Principles of visual storytelling
    - Color grading and correction
    - Framing and Selection of shots
    - Mood creation through editing choices
6. **Post-Production Work flow**
    - Input and output devices, File management and backup strategies
    - Metadata tagging and archiving
    - Collaboration with directors and cinematographers
    - Version control and project delivery
7. **Film Theory and Appreciation**
    - Understanding genres and editing styles
    - Influence of global film movements (e.g., Soviet montage. French New Wave);
    - Case studies of iconic edited sequences
    - Ethics in editing and representation

8. **Emerging Trends in Video Editing**
    - AI-assisted editing tools
    - Editing for social media and mobile platforms
    - 360^0 video and VR editing
    - Remote collaboration and cloud-based workflows

Syllabus of Technical paper relating to the post of Junior Draughtsman (Civil) and Tracer

Basic drawing (consisting geometrical figure, symbols & representations). Drawing of different scales, projections, drawing of shoring, scaffolding, stone and brick masonry, foundation, damp proofing, arches/lintel etc. and observation of all safety aspects. The safety aspects covers components like OSH&E, PPE, Fire extinguisher, First Aid and in addition 5S. Different site surveys (using Chain & tape, Prismatic compass, Plane table, Levelling instrument, Theodolite), field book entry, plotting, mapping, calculation of area, Drawing of carpentry joints and Electrical wiring, drawing of floors, slabs, vertical movements (viz. stair, lift well, ramp and escalator), drawing of different types of roof truss.

Single storied building plan in traditional drawing. Knowledge and application of Computer Aided Drafting. Workspace creating drawing using toolbars, commands, and menus. Plotting drawing from CAD. 2D drafting of Doors, Windows, hand railing, wash basin, and plumbing joints. Preparing library folders by creating blocks of regularly used items. Preparation of a sanction plan of double-storied RCC flat roof residential building using CAD. Preparation of a drawing of public building by framed structure using CAD. Preparation of Bar bending schedule. Drawing of different steel structure joints using CAD. Detail drawing of sanitary fittings and sewerage arrangements using CAD. Detail and sectional drawing of Roads, Bridges, culverts, railway tracks and embankments, Dams, Barrages, Weir and cross drainage works using CAD, schematic diagram of hydro electric project using CAD, Estimating and Cost analysis of different types of buildings and structures, preparation of map using Total Station and location of station point using GPS.