



पश्चिम मध्य रेल

No.-WCR/P-HQ/GAZ./Selection/AEN/Gr. B/LDCE- 30%/2021 Dated- 09-05-2022

**SDGM/WCR, PCE, CAO(C),CTE, CBE, CPDE, CE/C-I, CE/C-II, CE/C-III, CE/G
GM-RE,CORE/ALD Sr. DEN(Co)- JBP, BPL, KTT, Dy. CE/C JBP, BPL, KTT, Chattarpur
DRM (P) JBP, BPL, KTT, PCSO/WCR, Sr. DEN(Co.) - JBP/BPL/Kota**

विषय:-सहायक इंजी. (समूह 'ख'), ग्रुप 'बी' (लेवल 8), जीपी-4800, के 30% सीमित
विभागीय प्रतियोगिता परीक्षा के लिए अधिसूचना ।
**Notification for Selection for the post of AEN, Group 'B' (Level 8) GP-4800,
Engineering. Deptt.- 30% LDCE quota.**

संदर्भ:- इस कार्या. द्वारा जारी अधिसूचना पत्र क्रं- WCR/PHQ/GAZ/Selection/AEN/Gr 'B'/
LGS/2021 Dated 28.10.2021

Applications are hereby invited towards AEN (Gr.'B') **Limited Departmental Competitive Examination (LDCE)** for the purpose of promotion from Group 'C' to Group 'B' service in the Civil Engineering Department to empanel **06 (UR- 04 , SC- 01, ST-01)** employees against 30% of the vacancies as assessed with the approval of Competent authority, which is in continuation to reference letter no. WCR/PHQ/GAZ/Selection/AEN/Gr. 'B'/LGS/ 2021 Dated 28.10.2021.

1. Eligibility:-

All the Group 'C' Technical employees of Civil Engineering Department of West Central Railway working in Level 6 and above, in Pay Matrix, with 5 years of non-fortuitous service in Level 6 and above (including non-fortuitous service rendered in the corresponding pre-revised grade pay) as on **21.10.2021** are eligible for the post of AEN/Gr. 'B' against 30% LDCE quota vacancies for the assessed vacancies. (Authority – RBE No. 216/2019). The post of AEN (Gr. B) is a Safety category post. In terms of Railway Board's letter No. E(GP)2019/2/25 dated 16.03.2022, Senior Technicians in Level-6 with requisite length of service are eligible for appearing in the LDCE.

Note-

- In terms of Railway Board's Letter No. E(NG)I-93/PM1/4 dated 18-01-1993, time spent by the Rly. Servant under training immediately before appointment to regular service will be counted as service for the purpose of LDCE.
- Staff whose lien is maintained in W. C. Rly. are only eligible.
- Eligible staff in the Construction/Project Organization on deputation, training and any Ex-cadre Organization and having lien and seniority in WCR, who desire to volunteer for the above LDCE may submit their application through proper channel i.e. their respective Personnel Deptt. officer, where they hold lien.

The concerned Division/Unit should send copy of notice to the staff who are on deputation after being released from last Division/Unit.

- Those Group C employees who have been given financial upgradation in GP-4200 in PB - 2 , Rs. 9300-34800 under MACPs are not eligible to volunteer for the above (LDCE) written examination.
- As per Railway Board's letter No. E(NG)I-2006/PM1/5 dt. 21.03.2006(RBE No 34/2006) and E(GP)2005/2/74 dt. 13.03.2008 (RBE 40/2008), in case of persons

transferred at his own request to a new unit in the same category of post and assigned bottom seniority therein, the service rendered by them in the previous unit may be reckoned for determining their eligibility wherever a minimum length of service which is so allowed to be counted does not exceed the length of service of their immediate senior in the new unit and this benefit of counting of service will be applicable only in those cases where the staff join the new unit on request transfer in the same category of posts. For other cases the length of service shall be derived on the basis of the dates in the seniority list in the relevant grade.

- vi. Those employees who have been transferred on own request/mutual transfer and joined in WCR after the cut off date 21.10.2021 shall not be eligible to the selection.
- vii. As per Railway Board's letter dated 03.10.2006, the provisions of Chapter-II of Indian Railway Establishment Manual, Vol-I (including para 203.2) are applicable only to 70% of selection and **not to 30% LDCE** i.e. if, the junior is eligible, Sr. employee will not be eligible unless he is also fulfilling the conditions of eligibility of 5 years non-fortuitous service in LDCE.
- viii. In case, any candidate is on leave or on deputation to other Railways/Units/office etc., the concerned unit should send necessary advice to the authority under whom he/she is working presently as the case may be, without fail and acknowledgments obtained.

2. Submission of Application:-

Employees eligible as per the above eligibility conditions should submit their **applications in triplicate in the proforma attached** on or before **25.05.2022** to their immediate supervisor and obtain his acknowledgement including serial number of entry of registration of their applications.

The application so received should be entered serially by the nominated supervisor in the register to be opened for the purpose and the serial number should be mentioned while giving the acknowledgement to the employee. One copy of the application may be retained in his office and the remaining two copies forwarded to the Personnel Department of the division (DRM/P). It is the responsibility of the immediate supervisor to ensure that the applications reach to the Personnel Department (DRM/P) on or before **27.05.2022** and acknowledgement is obtained. A specimen form marked 'A' of the register to be maintained in the office of the immediate supervisor/unit in-charge is enclosed.

3. Scrutiny :-

The concerned Personnel Officer should ensure that all the columns of the enclosed proforma are properly filled in before sending the statement to this office. **Signature and date both are compulsory otherwise applications are liable to be rejected.**

The unit in-charge will arrange to register the application so received and 2 copies be forwarded to Division/HQ (as the case may be) through per bearer along with **soft copy in Excel Sheet as per the proforma given below** and with covering letter mentioning names of candidates applied for. **It is the responsibility of the Personnel Officer of divisions/units to certify the correctness of the eligibility of candidates for admission to the examination.** Each excel Sheet in proforma should be signed by the concerned Personnel officer.



Excel Sheet Proforma

S.	Name (S/Shri)	Desig.	Caste	Deptt.	Division	DOB	DOA	DOP in 9300-34800 GP: 4200 (Level 6)	DOP in 9300-34800 GP: 4600 (Level 7)
						DD/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY	DD/MM/YYYY

The Personnel Officer in the Division/Workshops/HQ (as the case may be) will scrutinize the correctness of the eligibility as per the Service Record maintained by them. **After scrutinizing the application, the Division/Workshops/HQ will send one copy of only the eligible application to HQ Personnel Department, Gazetted Section in one bunch (No piecemeal application should be sent) along with the list in the prescribed proforma in excel Sheet (Hard & Soft copy)** before the due date and ensure that these applications reach Dy.CPO(G)/JBP/HQ Office/WCR by **06.06.2022**. Any application received after the cut-off date should be summarily rejected by the Personnel Officer concerned.

Personnel Officers shall scrutinize the candidature of the employee as per the above eligibility conditions/verifying the respective Service Sheets and send the names of the eligible staff only in consolidated statements as per proforma attached.

Names of those staff who have not fulfilled the eligibility criteria as mentioned above need not be forwarded. It may also be noted that incomplete statements furnished by the divisions/units will not be entertained.

A list of not eligible candidates should be prepared by the divisions showing the reasons for ineligibility and the same should be duly communicated and modification, if any, on this account may be communicated before **13.06.2022**.

Under no circumstances, applications will be accepted after the due date.

It may also be noted that application other than in prescribed proforma, having incomplete information or without signed by controlling officer and countersigned by Personnel Department officer will not be entertained.

4. Pre-Selection Coaching/Training -

Employees belonging to SC/ST community should be given Pre- Selection coaching which may kindly be arranged by PCE/WCR at Division/Unit and HQ level before the written examination is held. It is further clarified that this training to SC/ST should be treated as mandatory and refusal, if any, should be taken in writing. On completion of Pre- Selection coaching, a certificate to this effect may please be sent to this office.

PCE/WCR is also requested to nominate a JAG or above officer of Engineering Department as in-charge of Pre-Selection coaching for the SC/ST candidates. The in-charge of Pre-Selection coaching will intimate the date and venue of the Pre-selection coaching to the eligible SC/ST candidates in due course. The controlling officers will ensure that the SC/ST candidates under their control are spared well in time without fail to participate in such coaching.



4.1 Duty of the In-Charge of Pre-selection Coaching (Nominated by PCE)

- (i) To inform in writing through special messenger to the concerned SC/ST employees of the details of date, time & venue of coaching.
- (ii) To obtain in writing unwillingness for coaching, if any, from the concerned SC/ST employees.
- (iii) To arrange sparing of the candidates and liaison with respective Controlling Officers/Supervisors.
- (iv) To chalk out coaching schedule and adhere to it.
- (v) To ensure maintenance of daily attendance of SC/ST candidates on the attendance sheet, who attend the coaching.
- (vi) After completion of such coaching, the in-charge of the Pre-Selection coaching will give a written report along with all supporting documents/papers including attendance sheet of SC/ST participants to Dy. CPO (Gaz.)/WCR/JBP immediately after completion of Pre-Selection coaching for records and further action. On receipt of compliance report of Pre-Selection coaching, written examination will be conducted.

4.2 Duty of Controlling Officer:-

- (i) To spare the candidates under their control well in time without fail with direction to participate in the coaching.

4.3 Duty of concerned SC/ST applicants:-

- (i) To manage their sparing from duty by insisting their controlling officers in their own interest.
- (ii) If any problem occurs in sparing, the candidate should report in writing to concerned in-charge of Pre-Selection coaching on the same date. No representation will be entertained in case of failure to report to the concerned in-charge of Pre-Selection coaching and it will be deemed refusal for such coaching.
- (iii) Failure of concerned SC/ST employees to avail Pre-Selection coaching on any account, including leave etc. will be considered default on their part and will not entitle them to additional coaching classes.
- (iv) No appeal will be entertained by GM (P)/WCR/JBP after completion of Pre-Selection coaching.

5. **Objective and Scheme of Examination-** The examination aims at a comprehensive assessment of knowledge of the candidates related to their Technical subject, Official language policy, Establishment and Financial Rules. The formation of the panel will be on the basis of 'Merit'. Selection of candidates for empanelment is based on (i) Written Examination, (ii) Viva-voce (with prior Medical Fitness test) and assessment of records by the Selection Committee vide Para- 204.1 of IREM Vol. 1. The following procedure as outlined in RBE No. 53/2019 and in para- 10 & 11 of Master Circular No. 68 will be followed in the written test, viva-voce and evaluation of record of service.



6. **Scheme of Examination-** In terms of Railway Boards L. No. E(GP)2018/2/31 dated 19.03.2019 (RBE No. 53/2019) there will be two-tier written examinations, i.e., Pre-Qualifying Examination and Main Examination.

(A) **Pre- Qualifying Examination-** There shall be a Pre-Qualifying single paper examination of 100 marks which shall have 100% Objective type Multiple Choice Questions only.

(i) **The distribution of marks will be as under:-**

S.No.	Subject	Marks
1.	Section- (A)- Technical Subject: 40 questions (1 marks each)	40 marks
2.	Section- (B)- General Knowledge including optional Question on Official language Policy will consist of 40 questions, out of which General Knowledge consists of 30 questions (1 marks each) and 10 questions on official language policy (1 marks each) as per para 204.3 of IREM Vol. I of Rajbhasha Policy. Candidate needs to attempt 30 questions out of 40.	30 marks
3.	Section- (C)-Establishment and Financial Rules: 30 questions (1 marks each)	30 marks

(ii) **Qualifying Marks-** The candidate scoring 75% marks and above in Pre- Qualifying examination shall be eligible for appearing in the main examination and for this, number of candidates should be restricted to 5 times the number of respective vacancies in order of merit.

(iii) There shall be negative marking for incorrect answers. One-third of the marks allotted for each question will be deducted for every wrong answer. All objective type questions would carry equal marks.

(iv) Ten percent of the 100 marks prescribed for written examination held as part of Selection should be set apart for question on official language policy and official language rules. While the employees should be encouraged to attempt the question on official language policy and official language rules, the question should not be compulsory.

(v) To ensure the authenticity of the answers in Multiple Choice Question, no corrections of any type (viz. cutting, overwriting, scoring off a ticked answer & ticking another answer, erasing, modifying the answer in any way) will be permitted. Zero marks will be awarded in such cases of corrections.

(vi) In the English as well as Hindi version of Question papers, every question should have four options numbered as A,B,C,D (only Capital Letters).

(vii) Candidates should mark their answers on OMR answer sheets and the OMR Sheets will be evaluated manually.

(viii) In case, any candidate answers more than 100 questions, first 100 attempted questions only are to be taken for evaluation.

(B) **Main Examination-** The Pre-Qualifying examination will be followed by one descriptive type paper on professional subject comprising of 100 marks. Qualifying marks in the written examination will be 60% and above.

Note- As per IREM, Vol.-I, Para 204.3, 10% marks of the total marks in the Pre-qualifying examination and main examination will be set apart for question in Official Language. The question on Official Language will not be however, compulsory in nature.



- (i) Written Examination will be conducted according to Syllabus. There shall be no supplementary examination in LDCE selection. (Para 16.2 of Master circular No. 68)
- (ii) The duration of the written examination will be of 02 hrs. (120 minutes) for the Pre-Qualifying and Main Examinations.

7. **Medical Examination:-**

The candidates who qualify in the written test will be subjected to medical examination as per Para 530(a) & 532 (i) of IRMM Vol.I 2000 (IIIrd Edition) and only those candidates who are found medically fit will be allowed to appear for Viva-Voce as per extent rules.

8. **Viva-Voce & Record of Service-**

Sl. No.		Maximum Marks	Qualifying Marks
1.	Viva-Voce	25	30 (including at least 15 marks in the record of service)
2.	Record of Service	25	

9. **Syllabus for professional paper of LDCE :**

The syllabus prescribed by the Board for written examination held as part of 30% LDCE in organized services constitute topics on Paper-I & Paper-II. In view of the aforementioned changes in pattern of the LDCEs, the topics on professional subjects divided in two segments as Paper-I and Paper-II shall be amalgamated and topics may be picked up for the Pre-qualifying and Main examination.

Copy of the combined syllabus issued vide RBE No.140/2016 is enclosed for general guidance purpose.

10. **Tentative Calender:-**

Last date of submission of application in units	25.05.2022
Last date of receipt of application in DRM office	27.05.2022
Last date of receipt of application in HQ	06.06.2022
Issuance of provisional eligibility list by HQ	15.06.2022
Issuance of final eligibility list by HQ	22.06.2022
Training of SC/ST employees to the written test will be conducted by the Division/HQ	From 17.06.2022 for 3 weeks (15 working days) -- to be conducted by department concerned
Date of written test (Pre-Qualifying) Tentative	16.07.2022

11. **Important Instructions:-**

It should be ensured that all the employees concerned are directed with the **identification certificate** for the Written Test on the date and time specified above, without fail. No leave of any kind should be granted to these employees which may result in their absence in the examination. They should also not be sent on line.



List of Emergency Quota

If any of the employees are on deputation and working under central/state/semi-government, undertaking and whose lien is maintained in this Railway, their Controlling Officers should be advised to inform the candidates(s) regarding the examinations provided they fulfill the requisite conditions.

The concerned Personnel Department Officer & Controlling Officers should ensure the submission of service records and ACRs/APARs of last 05 years and DAR/SPE/Vigilance clearance in respect of staff declared qualified for the Viva-Voce in due course immediately after publication of the result of main examination through special messenger to Dy. CPO (Gaz.)/WCR/JBP

If any DAR/Vigilance/SPE case is pending/penalties are in operation/pending against anybody, the details thereof may be advised immediately to this office by the concerned officials.

The concerned Personnel Officers & the Sr. DEN's are advised to give wide publicity to this notification at all major Units under their jurisdiction. The Divisions are advised to submit an undertaking that the notification has been served at all major units where eligible staff are available and their acknowledgement should be obtained. This should be certified by Sr. DEN (Co.)/Dy. CE/C. Secretary to PCE shall be the overall co-ordinating officer at zonal level for smooth conduct of examination and its all stages.

To ensure that the eligible staff avails of the opportunity for appearing for the LDCE, wide publicity should be given by pasting a copy of the notification on the notice Board of the Division Office as well as the subordinate offices. Supervisor-in-charge should bring to the notice of the staff working under them about this LDCE. Copies of this notification should also be given to local branches of both the recognized Unions and Associations for their information.

Wide publicity may be given to the above notification. The final date, time and venue of written test will be intimated separately. Staff should keep themselves in readiness of written examination, even at a short notice.

This notification can also be seen in the WCR website with the address 10.150.2.19.

All the Divisions/Units & applicants are advised to regularly visit WCR website (address 10.150.2.19) for any update in the matter.

**Encl/- 1. Form A, Form B & Form C
2. Syllabus**


09/5/2022
(Anil Kumar Sinha)
APO(Gaz.)/WCR/JBP
For Principal Chief Personnel Officer

Copy to:

Secretary (E) Ministry of Railways, Railway Board, New Delhi.

Secy. to GM/WCR & AGM/WCR for information.

Genl. Secy./ WCREU, WCRMS,

Zonal Genl. Secy. All India SC/ST & All India OBC Employees Association JBP for information.

WEST CENTRAL RAILWAY**FORM 'C'****PROFORMA**

(It is mandatory to fill each and every column with correct information.)

Application for AEN Post Group 'B' 30% Limited Departmental Competitive Examination in the
Engineering Department.

(Ref: PCPO/WCR/JBP's L.N.- WCR/P-HQ/GAZ./Selection/AEN/Gr. B/LDCE- 30%/2021
Dt. 09.05.2022)

1	Name in full (Block letter)	
2	Designation & station	
3	Working under	
4	Divn. /Unit where lien held	
5	PF No./ NPS No.	
6	Date of Birth	
7	Date of Appointment to Railway Service a) Designation b) Grade Rs. (RSRP)	
8	Date of appointment/promotion to grade Rs. 5000-8000/ GP 4200/Level 6.	
9	Date from which working in regular basis Rs. 5000-8000/ GP 4200/Level 6.	
10	Total Non fortuitous service in Gr.Rs.5000- 8000/ GP-4200/Level 6.(As on 21.10.2021) *	
11	Date of appointment/promotion to grade Rs. 6500-10500/GP 4600/Level 7 on regular basis	
12	Community (SC/ST/UR)	
13	Period of training undergone before Appointment/Promotion to working	
14	Mob. No.	

*Note- In case of transfer from other Railway to WCR, please specify the date of joining in WCR.

Signature of the applicant: _____

Date:- _____

Name of the applicant: _____

Memo No.
(Forward Controlling Officer)

Paste Passport
size Photograph
here (Photo
Attested with
Controlling
officer.)

Date : _____
Office of _____
Place : _____

Signature of the
Immediate Supervisor with date
Place : _____
Date : _____

Memo No.

Office of _____

Place : _____

Forwarded to Principal Chief Personnel Officer, West Central Railway, Jabalpur. The particulars given above by the employee have been scrutinized and found correct & the above named employee is eligible to appear for the AEN 30% LDCE.

Signature of the
Sr.DPO/DPO/SPO/APO

Date:- _____

WEST CENTRAL RAILWAY

FORM 'A'

FORM OF REGISTER TO BE MAINTAINED IN THE OFFICE OF THE IMMEDIATE SUPERVISOR (Form A) and DRM(P)/APO-Admn./HQ (Form B) REGARDING 30% LDCE OF ENGINEERING DEPARTMENT.

(Ref: PCPO/WCR/JBP's L.N.- WCR/PHQ/GAZ/Selection/AEN/Gr 'B'/LDCE/2021
Dt. 09-05-2022)

Sr. No.	Name of the employee	Designation	Place of work	Letter No. & Date under which the application has been sent to the DRM(P)/ APO (Admn.)/ HQ	Sr. No. & date by which application is sent to DRM(P)/ APO (Admn.)/ HQ
1	2	3	4	5	6

WEST CENTRAL RAILWAY

FORM 'B'

(Ref: PCPO/WCR/JBP's L.N.- WCR/PHQ/GAZ/Selection/AEN/Gr.'B'/LDCE/2021
Dt. 09-05-2022)

Sr. No.	Name of the employee	Designation	Place of work	Letter No., Sr. No. & Date under which the application has been received in the office from the Immediate supervisor	Date of receipt of the application in the office of the (DRM/P)/APO (Admn.)/HQ with ref. to Col.5	Sr. No. of the registration and date by which application is forwarded to PCPO/WCR
1	2	3	4	5	6	7



GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

RBE NO.: 40/2016

No.E(GP)2008/2/06

New Delhi, dt: 25.11.2016

The General Managers,
All Indian Railways and Production Units.

Sub: Syllabus for professional papers for 30% LDCE for promotion to
Group 'B' post of AEN in Civil Engineering Department of
Railways/Production Units.

Ref: Railway Board's letter No. E(GP)2008/2/6 dated 09.08.2012 &
24.06.2014.

A revised syllabus for professional papers for 30% Limited Departmental
Competitive Examination for promotion from Group 'C' to Group 'B' posts of AEN in Civil
Engineering Department of Railways/Production Units is enclosed herewith for
guidance. The revised syllabus may be given wide publicity and circulated amongst the
eligible candidates.

2. The revised syllabus shall be effective from the date of issue of this letter.
However, LDCEs for which written examinations have already been held or which are at
an advanced stage, need not be disturbed.

3. Please acknowledge receipt.

Encl: As above

M. Saluja
29/11/16
(MEENAKSHI SALUJA)
DY. DIRECTOR ESTT.(GP)III
RAILWAY BOARD

Syllabus for professional papers for 30% LDCE for Promotion to Gr. B
Post of AEN in Civil Engineering Department

Paper-I

(A) Paper I – Civil Engineering (General)

1. Surveying

(a) Types

i) Chain and Compass survey –

Basic principles; base lines; check lines; tick lines; perpendicular and oblique offsets; conventional signs; plotting of survey; true and magnetic bearings; open and closed traverses; recording plotting of traverse, closing errors.

ii) Plane Table Survey –

Techniques of using Distomat and total stations. Method of setting layouts & curves using these equipment.

iii) Levelling –

Level Lines – datum, bench marks, simple leveling, fly leveling; recording the levels in field book; method of reducing levels; arithmetical check; longitudinal and cross-section contouring.

iv) Theodolite Survey –

Types of theodolites; measurement of horizontal angles, vertical angles, magnetic bearings and deflection angles; prolonging a straight line; traversing by method of included angles; balancing the survey – closing errors; calculations of latitude and departure

v) Curves –

Elements of simple circular curves; setting out simple circular curves; different

vi) Set out works –

Setting out buildings, culverts, Central line of Railway alignment. Usage of GPS technology in setting out Centre line of Railway alignments.

Care & Custody of Survey Instruments-

Handling of instruments – Transport and protection; permanent adjustments; repairs and periodical overhaul

2. Strength of Materials, Structural Designs & Drawings

(a) Strength of Materials :

Stress, strain, Hooke's Law, working stress, factor of safety; bending moment and shear force in simply supported beams and cantilevers; simple theory of bending; moving loads on simply supported beams; influence lines for bending moment and shear force in statically determinate beams; short columns, long columns – empirical formulae.

(b) Structural Design & Drawings syllabus to be rearranged

(i) Drawings

Different sizes of paper, folding and storage of drawing, plan, elevation, sections, isometric view.

(ii) RCC Structures

RCC, methods of design Working Stress Method and Limit State Method. Design of singly and doubly reinforced rectangular beams including T and L beams. Design of slabs. Design of columns. IRS Code of Practice for RCC (Concrete Bridge Code), Use of computer aided software such as STADD, FEM based software. Basic requirements for usage of these software.

(iii) Steel Structures

Rivets and welds. Sketch and detailing of connections. Different types of joints and strength determination. Design of tension member and compression member. Plate Girders. IRS Code of Practice for Steel Structures.

3. Construction materials :

Description, specification, properties and uses of building materials – stones, sand, timber, bricks, cement, lime, building hardware, paints varnishes, glasses, tiles.

4. Foundation & Construction Engineering

(a) Soil Mechanics

Different type of Soil, Three phase diagram and their relationships, IS classification of soil, index and engineering properties of soil, compaction, consolidation, shear strength, earth pressure theories, slope stability. Specification and construction of earthwork in embankment and cuttings.

(b) Foundation Engineering

Functions of foundation, different type of foundations, open foundations well foundations and pile foundations, determination of safe bearing capacity, stress and settlement analysis, methods of reducing differential settlements

5. Hydraulics & Hydrology

a) **Hydraulics -**

Elements of hydraulics - Open Channel flow, flow in pipes, frictional loss, empirical formulae

b) **Hydrology**

Rainfall and run-off; rainfall statistics; rain gauges, run-off calculations by empirical methods, flood discharge estimation; measurement of flood discharge-current meter.

c) **Hydraulic structures**

Design of bridges - alignment, number of spans; economic spans; waterway calculations; scour depth afflux; clearance; depth afflux; clearance; depth of foundations; BOX and Pipe Culverts, river training works-spurs, groynes, aprons, levees. Water way calculations (i.e. estimation of design discharge based on para 4.3.4 of sub structure code namely using RDSO report RBF-16 for catchment size less than 25 sqkm and using flood estimation report (Synthetic unit hydrograph concept) for catchment size 25 sqkm to 2500 sqkm). In the sub topic river training works the following should be added. Guide bunds including launching aprons & protection works " drop wall & curtain wall i.e protection measures for minor bridges).

6. PUBLIC HEALTH ENGINEERING

a) Water Supply

- i) Standards of Quality of drinking water-physical, chemical and bacteriological standards of water; water-borne diseases; water demand- methods of forecasting; sources of water; Method of treatment of water- aeration, sedimentation, filtration (slow and rapid sand filters); disinfection, hardness- methods of removal.

ii) **Conveyance and Distribution:-**

Preparation of Schemes for New Water Supply/Augmentation of Existing Water Supply; Estimating Requirements of Water; Types, Selection & Installation of Pumps; Capacity of Pumping, Conveyance of Water; rising mains; systems of distribution, residual pressure; different types of pipes and fittings; testing of pipes, Pipe Laying and Fitting of Valves and Meters. Storage tanks; Capacity, maintenance and Cleaning of Storage Tanks, Water-Supply Plans.

- iii) Planning & design of layouts for rain water drains. Principles of rain water harvesting, methods, estimation of capacity of rain water harvesting pits/salient etc.

iv) **Water Audit and water Management :-**

Conservation of Water, water reuse, water recycling, water recycling plant, flow measurement system, identification of losses & leakages.

b) Sewerage:

Preparation of Schemes of Sewerage, Sewage & waste water-collection and carriage; design of sewers, house connections; storm water drains; disposal of sewage - river pollution and control; sewage treatment; land irrigation, septic tanks, primary clarifier, sludge and scum removal, trickling filters, activated sludge process, sludge digesting, principles of anaerobic digestion, sludge gas, sludge drying and disposal.

Paper-II

(B) Civil Engineering (Railways)

1. Railway Surveys & Construction

Provisions in Engineering Code regarding - Classification of Surveys, Terms of Reference, Principles governing Railway alignment, Ruling gradients, Grade compensation for curves, Horizontal and vertical curves, ; Hill Surveys, Catch sidings, tunnels, preparation of various maps and drawings, preparation of Survey reports for RECT, PECT and FLS, Project estimates.

2. Railway Track

Sl. No.	Existing Syllabus	Suggested Syllabus	Remarks
1	2. <u>Railway Track:-</u> Description, specifications and functions of the structure elements; Rails, sleepers, fastenings ballast, formation and other sub-structures; points and crossings; geometry and design features Track layouts.	2. <u>Railway Track:-</u> Description, specifications and functions of the structural elements; Rails, sleepers, fastenings, ballast, blanket, formation (embankment/cutting), drainage system and other sub-structures; points and crossings; geometry and design features, and Track layouts.	Minor changes

3. Maintenance of Permanent Way:-

a) Duties:-

Duties of Assistant Divisional Engineers; duties of SSE/JE (P Way); SSE/JE (Works), SSE/JE (Bridges), Gangmates, Keymen, Trackmen, Gatekeeper.

b) Maintenance of Permanent way:-

Methods of maintenance; Beater packing, Machine packing, Systems of maintenance; (conventional and mechanized), overhauling, systematic through packing, picking up slacks, Directed Track Maintenance; Miscellaneous works; lifting and lowering of track, shallow/deep screening of ballast; Maintenance of drains, lubrication of rail joints; adjustment of creep, maintenance of level crossings, Maintenance of points and crossings, track on bridges;

c) **Special Maintenance Works:**

Maintenance of short welded rails, long welded and continuous welded rails; maintenance of Switch Expansion Joints, maintenance in electrified section; special precautions; maintenance of track circuited sections; special precautions.

d) **Design, Maintenance of curved track and realignment of curves:** Curvature, transitions, super elevation of curves, safe speeds, cant deficiency, speed on curves with turnouts, Realignments of curves: method, extra clearances on curves

e) **Testing Monitoring of track with by track recording car,** frequency of recording based on category, OMS frequency, and category, interpretation of track recording charts results and exception reports; analysis of the charts TRC reports to improve track parameters. The allowable limits of parameters category-wise, prioritization of attention to track defects etc.

f) Heavy axle traffic and different types, precautions and checks to ensure safety of track and bndges

g) Maintenance and working of various track machines.

h) Formation treatment works for Railway embankments - various methods, and their advantages and disadvantages. of the methods.

4. **Maintenance of Bridges**

a) **Maintenance of bridges:** Responsibility of the engineering officials. Action to be taken after inspection of bridges; Maintenance of foundations; Protective works and waterways - maintenance of foundations, maintenance of protective works, maintenance of waterways; Maintenance of substructure - abutments, piers, wing walls and return walls, Maintenance of arches, Dismantling of arches, Details of common repair techniques - Cement pressure grouting, Epoxy grouting, Shotcreting / Guniting; Maintenance of RCC & PSC super structures - periodical maintenance, Common defects and repair/strengthening techniques; Maintenance of super structure steel girders - loss of camber in steel girders, cracks in steel works, strengthening of weak girders, replacement of loose rivets, maintenance of HSFG bolts, corrosion and its prevention, protective coatings by painting - periodicity and precautions, patch painting, ordinary paints – for severe and no severe corrosion, metallising & epoxy based paints, Maintenance of welded girders; Action taken for maintenance of composite girders; Various defects of bed blocks and their remedies; Bearings; Precautions while carrying out maintenance works on bridges.

b) **Inspection of bridges:** Classification of bridges – major, minor, important; Inspection of Bridges by Permanent Way and Works Inspectors, by Bridge Inspectors (SSE/JE-P Way, Works, Bridges) - Periodicity schedule and details of inspection, Record of Bridge Inspection, Registers to be maintained by the Bridge Inspectors, Certificate of Inspection. By Assistant Divisional Engineers - Bridge Inspection Register, Numerical Rating System (NRS), Unique Rating Number, Condition Rating Number, Overall Rating Number, Certificate by the Assistant Engineer.

Details of Inspection of a Bridge - Flooring and foundations, Masonry in substructure, Under-water substructure inspection, arch bridges, Protective works and water ways, Girder alignment and seating, Structural condition of girders, Track on the bridge approaches, Trolley and safety refuges, Foot paths, Painting, marking HFL and Danger level, providing foundation particulars and bridge name boards, Flood records at important bridges, Road over/under bridges, Concrete bridges, Health Monitoring of Very Important Bridges, Special Inspection During Monsoon, Equipment Required For Inspection of Bridges.

Works connected with maintenance of bridges; Laying of bridge sleepers; Replacing cracked bed blocks; Painting of steelworks.

5. Inspection and Maintenance of Tunnels and Deep Cuttings:

a) **Tunnels** - Inspection by Engineering Inspectors, Items to be covered in the Inspection, Record of Inspection, Mobile staging for Inspection, Details of tunnel inspection, Ventilation of tunnels, Leakage in tunnels and methods of correction Works connected with the maintenance of tunnels.

b) **Deep Cuttings** – General, Inspection Register of Vulnerable Cuttings, Points to be noted during inspection of cuttings, Action to be taken in the case of boulder drops, Action to be taken after inspection of cutting, Guarding of Vulnerable Cuttings.

6. Inspection and maintenance of turntable and weigh-bridge pits:

Coordination for satisfactory working of turntable; adjustments and overhauling of turntable; inspection and maintenance; erection and dismantling of turntables; Weighbridge pits and approaches – responsibility of engineering staff; inspection and maintenance of weigh bridge pits; drainage of weighbridge pits; construction of new weighbridges.

6.1 **Track Management System:-** Salient feature of TMS, pre-requisites for introducing TMS in division, advantage of TMS etc.

6.2 **Mobility Index:-** Concept, principles, methods of evolution etc.

7. Inspection & Maintenance of buildings & structures other than Bridges

The following is in addition to existing syllabus on this topic.

- Vacant Railway Buildings,
- Building Registers,
- Periodical maintenance of Works including repairs to leaky roof/water proofing of roofs,
- Standard Measurement Registers for Buildings,
- Dismantling of buildings/structures.
- Retro-fitting / structural repairs of existing weak buildings/structures,
- Seismic retro-fitting and repairs/strengthening of buildings/structures.

8. Maintenance of sanitary and hygienic conditions in station yards and railway colonies; water supply, drainage and sewerage:

a) Sanitation:

Formation of sanitation committee; inspection by sanitation committee, sanitary arrangements in stations and colonies, drinking water wells-protection; Cleaning of wells; disinfection; prevention of infectious diseases; disinfection of quarters.

b) Water supply:

Source of water supply; water sample analysis; open wells – sizes; pumping capacity, improving yield; shallow tube wells; deep tube wells; impounding reservoirs; storage capacity; flood discharge; record of water levels in wells; rainfall registers; high level

storage tanks; precaution against pollution, pumps – types, selection, installation; aqueducts and pipelines-types, selection, laying, estimating requirements of water; layout of distribution systems; water supply from outside sources; maintenance and operation of water supply installation – responsibilities of Engineering department, and Mechanical department and Electrical Department

c) Drainage and Sewerage:

Drainage systems, waterborne sewerage; sizes of sewers; sewage treatment systems; sewage disposals; sewage purification systems; surface drainage – layout, size of drains; disposal of sullage effluent; drainage of latrines; maintenance of sewerage and drainage systems; maintenance of open sullage drains; storm water drains; house connections; conservancy and sanitary arrangements; responsibilities of engineering staff.

9. Acquisition, management and disposal of land:

General code/ Manual rules:

Ownership of Railway land; sanctioning authority for acquisition and relinquishment; Principles of acquisition and relinquishment; Procedure for acquisition and relinquishment; Land plans and schedule; Documents of Handing over and taking over Railway Land ; Land Records- Responsibility and procedure for demarcation , verification of railway boundary , land plan etc. maintenance of right of way; religious structure. Management of railway Land – leasing, licensing of land, way leave facility and easement rights, grow more food. Leasing licensing for merchants and vendors at stations, bulk oil installation. Encroachment and responsibly ; Rules of permission for construction of building near Railway land; instructions regarding cutting/ trimming and sale of natural product like mature tree, dry trees within and outside railway boundary, near electric or telegraph lines , sale of grass right etc.

10. Large Scale Permanent Way renewals:

Classification of routes and tracks; track renewal programmes, factors governing permanent way renewal; preparation for relaying; preliminary work; systematic operation for complete relaying; speed restrictions to be observed during relaying; post relaying work; classification and disposal of released materials.

11. Rehabilitation of Bridges

Reasons for Rehabilitation, Special Strengthening, Imposition of speed restriction, Priority for rehabilitation of bridges, Special Inspection, Site Data, Execution of rehabilitation works, Precautions when working on bridges; rebuilding of alterations to bridges – design and execution of bridge works; temporary arrangements; false work for erection of girders; assembly and erection of girders; cranes for erection of girders; testing of girders; proposal for strengthening existing girder spans; methods of regirding major bridges; Strengthening of foundations, Strengthening / rebuilding of substructure, Shaken/displaced/ cracked bed blocks, Distressed arch bridges, Replacement of non standard girders, Replacement of pipe culverts, Distress in parapets, Replacement of small opening, Distress in superstructure, Replacement of Meter Gauge Bridges.

12. Works Affecting Railway Safety and Opening New Works

General – Reference to rules; works requiring sanction of the CRS and notice there for; application to the CRS – execution of works and Safety Certificates; documents to

accompany application; submission of Safety Certificate; deviations from plans approved by CRS; applications for running of new types of locomotives and/or rolling stock and for increase in speed; notification to railway officials when opening works; works arising out of accidents including breaches; opening of new lines; Infringements to Schedule of Dimensions – condonation; procedure thereof; movement of ODCs – types and procedure for sanction for movement, precautions during movements.

13. Railway Operation :

a. General :

Reference to G.&S.R.; types of signals and their significance; rules for working of trains; block working rules – types, introduction of temporary single line working.

b. Engineering restrictions and indicators :

General – Definitions; Responsibility of the Inspector incharge; works of short duration; protection of line in block section and procedure for passing trains; works of long duration; temporary engineering fixed signals; arrangements prior to commencement of work; protection in block section for speed restrictions; procedure for blocking lines for engineering purposes; works at times of poor visibility; temporary signals in emergency; periodical notices of engineering restrictions; permanent speed restriction indicators; review of permanent speed restrictions; indicators – General.

c. Level Crossings :

General – Classification, Standard Specifications; normal position of gates; level crossing equipment, traffic and engineering gates; siding gate lodges; appointment of gatemen; duties of gatemen; maintenance of level crossings; examination of gate equipment and gatemen in rules; level crossings register; road traffic census; manning/demanning of level crossings.

d. Working of Trolleys

General Instructions; rules for working; distinction between trolleys, lorries and motor trolleys; Certificate of competency; officials permitted to use trolleys and lorries; responsibility for safe working; working at night or in bad weather; working on track circuited sections; conveyance of non-railway officials; trolley permits for private sidings; trolley refuges; protection; equipment on trolleys and lorries; working of trolleys and lorries; in block sections, in station limits.

e. Ballast and material trains

General – Rules for working; Restrictions in running; ordering of ballast trains; issue of "fit to run" Certificate; equipment; testing of brake power; working in block sections; running on Ghat section; loading and unloading from hopper wagons; planning of ballast and material train movements; training out materials and daily reports of ballast train working; charges for ballast trains; register of engineering vehicles.

14. Accidents :

General – Observance of rules; intimation of accidents by station masters; duties and responsibility of the engineering officials in the event of accident impairing through traffic action at site, reporting details of accident – provisions of Accident Manual; action in case of derailments; examination of site and preparation of sketches; recording track and rolling stock measurements – accident procedure; use of recorded data; restoration of through running; procurement and arrangement of labour and equipment; temporary arrangements at site of accident; transshipment; funds required during emergencies;

attendance of police at accidents; driver's reports on defects in track; action on receipt of reports of defective track; abnormal occurrence attributable to oscillation of locomotives; accidents not impairing through traffic; records of accidents.

15. **Rivers & Floods, pre-monsoon precautionary measures and patrolling of Railway lines:**

Rivers and Floods: General – Behavior of rivers; Past History of Bridges, Danger level at Bridges, Watchman at important bridges, Duties and Equipment of Bridge watchmen; Special Inspection during Monsoon, Action to be taken in the case of weather warning, pitching stone, boulder and monsoon reserve; vigilance during floods; flood records during and after the monsoon; survey of the course of river; river protection works; types, design, repairs and maintenance records – rivers and floods. Flooded Causeways / Dips. Special precautions when track is submerged. Rivers and flood register, Flood Reports, Rainfall data, Provision of Anemometer on Bridges.

a) **Pre-monsoon precautionary measures:**

General precautions to be taken before monsoon, Vulnerable sections; materials for anticipated emergencies; monsoon emergency rakes; equipment tools, rail clusters, temporary bridge spans; protective works; Railway affecting works and tanks; R.A.W. tablet, joint inspection of WAR/RAT, inspection and vigilance over railway affecting tanks during heavy rain; pre-monsoon, during monsoon.

b) **Monsoon and emergency patrol:**

Types of Patrolling, keymen's daily patrol, gang patrol during abnormal rain; night patrolling during monsoon, Security patrolling during civil disturbances and for movement of VIP specials, Hot weather patrolling for LWR/CWR, stationary watchman at vulnerable points; Protection of line in case of Emergency, Commencement and termination, Preparation of Patrol Charts, Distribution of Patrol Charts, Patrol Books and Systematic Patrolling, duties of patrolmen and their equipment, review of patrolling systems and vulnerable locations, Selection of Patrolman, Certificate to be submitted by P.W.I. (JE/SSE(P.Way)), Duties of Patrolmen, reporting damage & obstruction on track to Station Masters; Action by A.E.N. and P.W.I. on receipt of information regarding Damage to the Line, check over patrolling; inspection of equipment; surprise checking at night, Responsibility of Engineering Officials in the matter of Patrolling, Vulnerable locations (Points).

16 **Preparation of Plans and Estimates:**

Preparation of plans:

General procedure, plan for other departments; size of drawings; titles and numbering of drawings; scale of drawings; details on drawings; symbols and colours of in drawings; RDSO drawings; CE's plan; Plans in Divisional/Asstt. Engineer's/Inspector's Offices; Completion drawings; care and filing of tracings/Ferro/Prints; Preparations of estimates – code rules; technical details, rates and quantities; schedule of rates and price – listing of stores; report – and justification; rent statement for staff quarters; special features of estimates for remodelling of station yards, track renewal works, deposit works; Urgency Certificate; Supplementary Estimates, Revised Estimates.

17 Contracts and Execution Of Works

a) Contracts

General – Code reference for contracts; schedule of rates; Analysis, non schedules rates, tenders, types; tender documents, drawings and specifications, tender committees, acceptance of tenders, contracts, types, contract documents, General and special condition of contract, measurement and measurement books – code reference; recording measurements, 'on account' and final measurements, standard measurements Books; responsibilities of Inspectors/JE/SSE) and Asst Engineers for measurement of works; ballast measurement, computation of quantities; preparation of abstract in measurement books, submission of bills; checking of bills, bill registers, Variations; PVC; Basics Of Arbitration.

b) Execution of Works:

General instructions – Code rules; agencies for executing works; responsibilities of executive officers; deposit works; excess and savings on estimates; attention to public interests; prevention of accidents; planning – activity, milestone, barcharts, critical path networks, PERT; departmental execution of work – record; progress reports, charges for stores and labour, execution of works in Engineering workshops, contracted works; issue of work orders, completion documents; zonal works.

18 Miscellaneous:

a) Engineering plant:

General – code rules; engineering plant reserve, plant register; valuation of plant; maintenance; storage and repairs; requisitioning of plants; use of plant at site; maintenance of log books; hiring out of engineering plant; examination of boilers of the engineering department.

b) Explosives:

General – Issue of instructions on use of explosives; observance of rule of carriage of explosives; commonly used explosives; selection of explosives; storage and conveyance to work site; blasting operations; boring holes; amount of charge; preparation of charge; electrical and safety fuses; precaution to be observed during blasting; misfires; protection of trains and railway property; destruction of explosives; detonating signals – care and custody, use of detonators and test, competency certificates for handling explosives.

c) Management of Engineering Stores:

General – Reference to code and Rules; procurement of stores; requisition; receipt and issue of challans; claims of short receipts; etc.; custody of stores – classification, handling and storage, Account head of stores – operation, records and returns; disposal of released and surplus stores – return to stores Depot, disposal by auction; verification of stock and adjustment for shortage/excesses.

d) Law and Order

Railway Police, lodging complaints, cooperation with railway police; cognizable offences; non cognizable offences, powers of arrest by railway staff, warrant against railway staff, action by railway staff in case of attempted sabotage; answering of court summons;

prevention of trespass; disposal of human bodies found run over; disposal of cattle found dead on the line

19. Track Machines

- i) Provisions of Indian Railway Track Machines Manual.
- ii) Working principles and performance parameter of various Track Machines on Indian Railways
- iii) Controls and working systems of various Track Machines.
- iv) Working of various Track Machines: Pre- requisites, pre- block preparatory works, and operations during block, post-block attention works.
- v) Working of tamping machines in design mode
- vi) Performance and quality parameters in tamping, squeezing pressure, squeezing time, vibration pressure and tamping depth.
- vii) Maintenance schedules of various track machines.
- viii) Troubleshooting
- ix) Rules for movement and working of track machines.
- x) Types of small track machines required for maintenance of track and their maintenance systems.