

SOUTH WESTERN RAILWAY

**Main Examination for 30% LDCE Gr."B" selection of
Civil Engineering Department on Date : 19.12.2021.
Time allowed: 03 hours (180 minutes) Max. Marks:100**

Important instructions for candidates attempting Paper and Pen examination

1. Candidate to note the following timings:

Duration of the written examination	Exam Start time	Exam Closing time
03 (three) Hrs.	10.30 Hrs.	13.30 Hrs.

2. The candidates are not allowed to keep Mobile Phones, any other electronic gadgets or any other documents/papers with them in the examination hall.
3. If any candidate is found to be in possession of any such prohibited devices/gadgets in working or in switched off condition, their candidature will be cancelled forthwith and will be debarred from the examination. In addition, such employees are liable to be taken up under Discipline and Appeal Rules.
4. Question paper will be in English as well as in Hindi. In case of any ambiguity, English will be considered authentic.
5. The candidate has to opt a language either Hindi or English by selecting the language on the fly leaf as well as on the evaluation sheet. The candidates shall write answers only in in the opted medium. If any candidate switches his/her medium of writing beyond the opted medium, the answers written in other than opted medium shall not be given credit, except where Hindi is opted and technical words/phrases are written in English.
6. The candidate should use either blue or black ink pen/ball pen only. As the answers should be answered with the same colour of ink used for writing fly-leaf/first page of the answer book. In case of drawing/sketches, only pen can be used and colour pencils are not allowed.
7. The candidates should fill the particulars in own handwriting in the space provided and should not write these particulars anywhere else.
8. Don't write your name or roll number or any other indication/any distinguishing marks anywhere in the Answer Book except fly leaf, otherwise the Answer Book will not be evaluated and will lead to disqualification.
9. The log tables, slide rulers and calculators can be used in this examination.
10. Special instructions, if any, given by the invigilator or written in the question paper should be followed strictly.
11. Wherever choice has been indicated and candidate has attempted more questions than the required one, answers given from beginning in each part/question to the extent required will only be considered for evaluation and other answers will be ignored.
12. Marks for each question is shown against it.
13. After completion of the examination, the candidate has to cross the leftover blank pages and spaces in the answer booklet.

Question Paper

**For Main Examination for 30% Gr'B' Selection Exam, Civil Engg
Department on 19.12.2021**

Section A.

(a) Fill in the blanks (Each question carries 1 mark)

(5x1 marks)

1. The Annual License fees on Railway Land used to lay private sidings is _____ % of land value.
2. In bridges, all bearings should be cleaned and greased at a frequency of once in _____ years.
3. On the routes covered by Rail grinding, Service life of 60 kg 90 UTS rail is _____ GMT
4. For estimated design discharge for Railway Bridges probable recurrence interval of _____ years is considered.
5. The maximum distance covered by a patrolman should not exceed _____ km in a day.

(b) State TRUE or FALSE in the Following statements (Each question carries 1 mark)

(5x1 marks)

1. Temporary occupation of railway land by Hawkers, keeping cattle, cow-dung, refuse etc which does not require action under PPE act is categorized as Category-B encroachment as per IRWM.
2. Max permitted wear on tamping tool of Tamping Machines is 40 % of original surface area
3. If OBS/OBSW defects are noted during USFD testing, PWI has to impose speed restriction of 30 kmph immediately.
4. CRN value of 5 for a bridge indicates that bridge is not inspected.
5. In LWR territory, Level crossing shall not fall within the breathing lengths.

SECTION B (Each question carries 2 Marks)**(10 x 2 marks each)**

1. Define Self-cleansing velocity for sewerage system.
2. Briefly mention the various facilities required to be provided for Divyangjan (Physically Handicapped) at railway stations.
3. Briefly describe 3-tier system for Mechanized track maintenance
4. Mention the various types of patrolling carried out in Indian railways
5. What are the advantages of using DTS (DGS) machine?
6. Briefly explain various methods of prevention of corrosion of Steel Girders?
7. What is OPC and PPC cement and what are the main differences between them?
8. Write short notes on terms at which long term leasing of Railway land given to Government Departments?
9. Mention different types of estimates in Indian Railways ?
10. What is Track Management System (TMS) and mention its advantages?

Section C (Attempt any 8 out of 10 questions, Each question carries 5 Marks)

(8x 5 marks each)

1. Write short note on types and categories of Encroachments in railway land.
2. Briefly describe about actions to be taken in case of rail fractures/weld failures.
3. Mention the Pre-Block operations of T-28 machine.
4. What is Rain Water Harvesting and what are its advantages?
5. What are the various reasons for variations in a contract?
6. Briefly describe various pre-monsoon precautionary measures to be taken.
7. What are the steps to be taken to avoid building up of hydrostatic pressure behind abutment, wing walls and retaining walls?
8. Write a short note on Compensation for Curvature on Gradient. Calculate the gradient to be provided on a curve of 583m radius when the ruling gradient is 1 in 200.
9. Draw a neat sketch showing the protection of line for works of short duration on Single Line in case of Stop Dead Restriction
10. When is destressing carried out as a part of track maintenance? Write in brief.

Section D: (Attempt any 3 out of 5 Question. Each question carries 10 Marks)

(3x10 marks)

1. (i) Explain the Numerical Rating System (NRS) in bridge inspection.
(4 Marks)

(ii) Describe in brief the inspection of various components of bridges.
(6 Marks)
2. (i) What is the bearing capacity of soil ? What is the difference between Ultimate Bearing capacity and Allowable bearing capacity?
(4 marks)

(ii) What is Plate Load Test and how is it performed ? Also mention various equipment required for the test.
(6 marks)
3. (i) Mention the criteria for realignment of curve.
(4 Marks)

(ii) A 1 in 8½ turnout takes off from the outside of Broad Gauge curve of 600 m. Determine the cant to be provided and also the permissible speed on the main line curve. The speed of 30 KMPH shall be provided on turnout.

Take radius of 1 in 8.5 switch – 232.26m

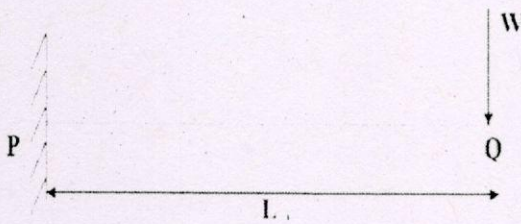
Take maximum cant deficiency – 75mm

(6 Marks)

4 . (i) Explain stress, strain and modulus of elasticity? (4 marks)

(ii) Draw the shear force and bending moment diagram for a weight-less cantilever beam of length $L=10$ mtrs when a concentrated point load

$W= 5$ KN is applied on its free end. (6 marks)



5 . (i) What are the duties of ADEN in maintenance of Land Assets? (4 marks)

(ii) What are the documents of land related records at the end completion of new line projects to be handed over by Construction Organization?

(6 marks)