

Disclaimer

This question bank is only for guidance of candidates to understand and the nature and type of questions that are generally asked. It does not mean that questions will be asked from this question bank only. The examiner may or may not ask questions from this question bank, either partially or wholly. Candidates should prepare the relevant subjects thoroughly and should be prepared to answer any question on the concerned subjects.

अस्वीकरण

यह प्रश्न बैंक केवल उम्मीदवारों के मार्गदर्शन एवं प्रकृति समझाने प्रश्नों के प्रकार के लिए है जो आमतौर पर पूछे जाते हैं। इसका मतलब यह नहीं है कि इस प्रश्न बैंक से ही प्रश्न पूछे जाएंगे। परीक्षक इस प्रश्न बैंक से आंशिक रूप से या पूर्ण रूप से प्रश्न पूछ सकता है या नहीं भी पूछ सकता है। उम्मीदवारों को संबंधित विषयों को पूरी तरह से तैयार करना चाहिए और संबंधित विषयों पर किसी भी प्रश्न का उत्तर देने के लिए तैयार रहना चाहिए।

Question No. 1- Attempt any five of the following:-

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- A. What are the various temporary engg. Indicators required for temporary restrictions?
- B. What is the procedure for blocking the track for carrying out normal & emergency repairs to track?
- C. What action is a SSE (P.Way) (PWI in-charge) required to take in case of a derailment on the section where sabotage or miscreant activity is the prima facie cause of accident?
- D. What are the records that a SSE (P. Way) (PWI in-charge) required to carry with him during the rear window inspection of his section by the Principal Chief Engineer.
- E. Briefly describe the string line method of curve realignment.
- F. What are General & Subsidiary Rules of a railway and what are the issues concerning Engg. Deptt. mentioned in the same.
- G. How is the good running on level crossing, points & crossings to be ensured?
- H. What is the difference between push trolley, Motor trolley and material lorry? How the material lorry is loaded with rails to be worked out and how is push trolley to be worked in section with poor visibility.

Question No. 2- Describe in details the duties of ADEN (open line) in particular reference for

Maintenance & upkeep of:-

30

- A. Railway track
- B. Bridges
- C. Colonies
- D. Expenditure Control
- E. Large scale renewals of track.

Question No. 3- An open web turnout steel bridge of 250 ft. (76m) span is to be launched from abutment to abutment. There is no intermediate support possible. Describe with sketches the method of launching the same & the main item of checks and cautions to be observed.

30

OR

Describe in details the procedure of detailed technical inspection of 7x250ft (76m) open web girder bridge. This open web girder is rivetted and the bearing are cast steel roller & rocker types.

Question No. 4-

A. What are the main hydraulic, mechanical and electrical systems in a Unimat points & crossing. Give purpose of each in brief.

6

B. Describe working of track machines in track circuited and in electrified areas.

6

C. What are the daily, weekly and other periodic inspection & maintenance schedules of a CSM, 09-32. How these are done and who is responsible for the same.

6

D. What are the main differences between ballast cleaning machine, shoulder ballast cleaning machine and points & crossing ballast cleaning machine.

6

E. Describe the working of T-28 machines with example of a renewal of one point in single line electrified sections.

6

Question No. 5- Indicate the following Schedule of Dimension (SOD). Draw sketch wherever necessary.

A. Minimum height of a heavy overhead structure (say ROB) above rail level in electrified territory.

5

B. What are minimum and maximum clearances between check rails and running rails on a BG level crossing?

4

C. Height above rail level for a BG high level and medium level passenger platform.

4

D. Horizontal distance between the centre of a track and edge of coping of high level platform on BG.

5

E. What is the slope at the end of a high level passenger platform given to taper of the platform.

4

F. What is the minimum distance between centre of BG track and the nearest pier of abutment of a ROB in a running track?

4

G. Maximum gradient of track in a BG passenger yard for normal speeding of train.

4

Question No. 6- Describe with the help of sketches the prescribed method of carrying out distressing of track for:-

A. Converting single rail to LWR.

15

- B. For distressing of track required to be done due to unusual occurrences of rail fractures or buckled track in hot weather. 15

Question No. 6-A. Describe the following:- 20

- i. Abstract estimate
 - ii. Detailed estimate
 - iii. Revised estimate
 - iv. Material modification
 - v. Completion Estimate
- B. Describe the various elements of completion certificate and what are the essential elements to be checked before the same is sanctioned/approved. 10

Question No. 7-

- A. What is the difference between Engg. & traffic level Xings. 6
- B. How are the categories C, B & A special class given to a level crossing. What is the criteria. 6
- C. What are the various parameters according to which manning of unmanned Level Xing is prioritized. 6
- D. What are the criteria according to which a level Xing can be considered for replacement by ROB/RUB. 6
- E. If the road authority at any given location approaches to Railways for increasing the width of an existing 7.5m wide level crossing to 2x7.5m wide manned level Crossing, then what is the procedure to be followed. 6

Northern Railway 2006

Question No. 1- Attempt any five of the following:-

- A. What are A, B, C, D, E, D special & E special categories of track. 4
- B. What are criteria for sanctioning a complete track renewal in an existing running line? 4
- C. Describe TSR, TRR, CTR, TWR, TBTR, and TFR in brief and also describe which of these can be done with second hand material. 4

D. What are mechanical methods of carrying out TSR, CTR & turnout renewals. What are the machines in use for above renewal on IR at present. 4

E. Describe with sketch the layout & working of PQRS base Depot. 5

F. Describe the disposal of released material in a CTR (P) of track with CST-09 sleepers with 52kg 72 UTS rails. 4

G. Describe with sketch the various speed restrictions imposed to carry out CTR (P) work with PQRS in a double line section which is being attended with machine tampers. 5

Question No. 3-

A. What is plan table surveying. What do you understand by radiation method, intersection and traversing methods of plan tabling. 10

B. What is fly leveling. How are reduced levels worked out in fly leveling and what are the arithmetic checks for ensuring correctness of the same. 10

C. Describe the procedure for setting out of work for a block of two type – I quarter, also mentioning the checks to be exercised. 10

Question No.4-

A. Design a simply supported rectangular reinforced concrete beam of span 6m. The beam has to carry a load of 8000 N/M including self weight. Show by sketch the reinforcement required. 20

B. What is slenderness ratio in a column and describe what is effective length of a column. 10

Question No. 5-

A. Describe controlled concrete and also the procedure of designing concrete mix for a particular strength say M 40. 10

B. How is prestressed concrete different from plain reinforced concrete. Give in brief merits & demerits of both and the main usages of prestressed concrete. 10

C. How is water cement ratio important in any type of concreting. How can we achieve high workability of concrete with low water cement

ratio and under what circumstances is this needed.

10

Question No. 6-

A. For water supply arrangements what is chlorination of water and super chlorination of water.

8

B. Describe with sketches the difference between a tube well and a Ranney well (infiltration galleries).

8

C. Describe with sketch the most commonly adopted type of bio-latrines & also a bio-gas plant (unit).

7

D. Show with sketches the differences between P trap & S trap in an European type water closet (WC).

7

Question No. 7-

A. Describe with sketch the method of conducting plate load test to determine the bearing capacity of the soil at a certain depth.

10

B. Briefly describe the SPT (Standard Penetration Test) and what characteristics of the soil it can determine.

10

C. What are the main features of the blanket material required for a railway embankment and what are the most essential aspects to be complied with before it is allowed to be used as per present guidelines.

10

Question No. 8- Describe in brief the following. Use sketches wherever necessary.

A. Difference between roller & rocker and rocker bearing in a simply supported open web steel girder.

6

B. Camber given in an open web steel girder.

6

C. Submerged arc welding for the manufacture of a welded girder. Bring out the main advantages of the same and the necessary precautions to be taken.

6

D. Procedure for metalizing (sheradising) a welded plate girder and the advantages of metalizing over normal painting.

6

E. What is a Dye Penetration test & how is it useful in the inspection/testing of welded steel structure.

6

Question No. 9-

A. Describe procedure of land acquisition for constructing a colony for 1000 units of houses. The land required is about 40 hectares of agricultural land. 10

B. What are main features of an item rate tender documents and what is the procedure of such tender processing.

10

C. What are the most important items to be taken care while preparing tender documents for the design & construction of Road Over Bridge (ROB) fully on viaduct.

10

Part B

(Attempt any 4)

Question No. 1

(A) Write six important items of works to be carried out during each of the following: 10

- (i) Pre-tamping attention
- (ii) Attention during tamping
- (iii) Post-tamping attention

(B) Write main defects on surface of rails along with their causes.

10

Question No. 2

(A) Explain the concept of equilibrium speed, cant excess and cant deficiency on a curve track. 6

(B) Explain briefly the action to be taken in case of an AT weld failure in LWR track during winter season.

6

(C) What are the three different track monitoring systems on IR. How do their output differ from each other.

6

Question No. 3

(A) Why the frequency of angular probes is 2 MHz while that of normal probe is 4 MHz on SRT. 6

(B) Draw a sketch for Ballast profile of BG single line LWR track on. 500m radius curve 6

(C) Write down the precautions to be taken while reconditioning of a CMS crossing. 6

Question No. 4

(A) Draw a sketch for Engg. indicators to be fixed at a BCM work site having 40 kmph speed restriction for 300m followed by 75 kmph restriction for 800m. 10

(B) List the items to be inspected on a manned level crossing. 10

Question No. 5

(A) What are the items to be observed in a derailment of rolling stock with CASNUB bogie & how do these items affect safety. 10

(B) Write a note on Cold Weather patrolling, covering-- 10

- (i) The temperature range for its introduction
- (ii) Beat of Patrolman
- (iii) Equipments to be carried
- (iv) Observations to be made

Question No. 6:- Write Short Notes on- 20

(A) Calculation of Cant on Contrary Flexure Turnout

(B) Role of AEN in case of a mid-section derailment of a passenger train.

(C) Advantages of Rail Grinding.

(D) Specifications of Ballast w.r.t. sieve analysis (Schedule of Payment not required)

Question No. 1 Write short notes on (any four) 20

- i) Chamfering of bolt holes
- ii) Precautions to be taken while working in Track Circuited Areas
- iii) Criteria for rail renewal
- iv) Workability of Concrete
- v) Jacketing of Bridge pier.

Question No. 2:- Answer any two of the following:- (4x5)

- a) Explain in detail the procedure for monsoon patrolling giving details of preparations of patrol charts, patrol books, duties of patrolman & Equipments required for patrolling.
- b) Explain the procedure of regular track maintenance in LWR/CWR Track.
- c) Calculate the super elevation, maximum permissible speed and transition length for a 1.75 degree curve on a high speed BG section route having maximum sanctioned speed of 110 kmph, assuming the equilibrium speed as 80 kmph and booked speed of goods trains as 50 kmph.

Question No. 3

2x10= 20

- a) What are the different points to be examined by BRI during technical inspection of a girder bridge.
- b) Draw standard cross section of a well foundation indicating various components.

Question No. 4 Design a simply supported rectangular beam 250mm wide to carry a live load of 26000 N/m. The clear span of the beam is 4 meter. The bearing at each end is 30 cm. use M20 concrete and Fe 415 steel.

20

Question No. 7 is compulsory and attempt any three questions from the remaining 5

Question No. 7

- a) Define "Family" as per Pass rules.
- b) List out the major penalties as per D&A Rules.

Question No. 8 Answer any three:-

15

- a) What are the different types of estimates used in Indian Railway.
- b) Explain in detail " Revised Estimate'
- c) Explain material modification.
- d) Write about the entitlement of Privilege Passes and PTOs for Gazetted Officers and Non-Gazetted staff.

Question No. 9

- a) Describe the different types of tenders in brief. 10
- b) What are provisions in Arbitration Act for resolving the dispute and differences that arise between the department and the contractors. Explain briefly. 5

Question No. 10 Write short notes on (Any five)

10

- i) Limited Tender
- ii) Mobilization advance
- iii) Deposit works
- iv) Final location Survey
- v) Procedure for disposal of rail scrap
- vi) Safety precaution at unmanned level crossing

Question No. 11

- a)** Answer any five of the following: 10
- i) To which state of India are the official language (use for official purposes of the Union) Rules, 1976 not applicable.
 - ii) When the Hindi Day is celebrated every year
 - iii) Which are the three regions as per the provisions made in the Official Language Rule.
 - iv) What are the Hindi examinations conducted for the Government officials.
 - v) Write about the order of Language used in Name/Notice Boards.
 - vi) What are the documents coming under section 3(3) of official language Act which are to be issued in Hindi & English in bilingual form.
- b)** List out in Rajbhasha any five important Passenger Amenities covered under "Adarsh Station". 5

North Central Railway

2007

- 1. What is schedule of inspection of SSE (in overall charges. is having concrete sleeper track with mechanized material. 15
- 2. Please write short notes on
 - a) Distance pieces to platform lines 6
 - b) Fouling marks 9
- 3. What precaution is to be taken (maintenance practices following to effectively reduce rive rail deterioration? 15
- 4. What action is to be taken in case of rail/weld failure. 15
- 5. Describe the criteria for realignment of curves. 15

6. What are special precautions to be taken for running of trains when the track is submerged with water during floods.
15
7. What are the duties of track machine operator (Not in-charge of Track machine). 15
8. What action is to be taken in case of failure of the track machine in mid section. 15
9. What precautions are to be followed for safe working running of Track Machine in section involving steep gradients, sharp curves, deep cuttings/ high embankment. 15
10. List out important items to be checked specially by the inspecting officials of Track Machine organization. 15
11. Define loss of camber in steel girders. Write about main reasons attributing loss of camber and rail fractions measures. 15
12. Write short notes on:-
- i) Sliding bearing 5
 - ii) Rocker & Roller bearing 5
 - iii) Elastomeric bearing 5
13. Describe side slewing method for 150 open web girder. 15
14. Write about the erection of triangulated girder in the field. 15
15. Write about the classification & bridge as distressed. 15
16. Write about the causes & remedial measures for the defects associated with the spandrel wall of arch bridge.
15
17. What are the items falling under the preview of colony committee.
18. Please draw a sketch showing the general arrangement at the junction of roof & parapet wall. 15
19. Describe the procedure for collecting samples for testing of water quality.
15
20. Describe the categories of encroachment of railway land.
15
21. please write short notes On:
- i) Budget revised budget 5
 - ii) Final modification Budget 5
 - iii) Budget estimate 5
22. Write short notes on :-
- i) PWP (Preliminary works programme) 5
 - ii) FWP (Final works programme) 5
 - iii) LAW (List of approved works) 5

23. Describe the establishment work being done by the SE/SSE (P.Way/Works/Bridge) for staff under his control. 15
or
24. Write in brief about the classification of Railway employees as per Hours of employment Rules. 15
25. What is the method of exercising control over expenditure? 15
26. Please list out the prescribed penalties under DAR. 15
27. Describe permanent way inspectors section register enlisting the information to be maintained. 15
28. Write about 3 tier system of Track maintenance indicating the jobs to be performed by all three tiers 15
29. What are the precautions to be taken while working in Track circuited areas.
30. What are the precautions to be taken by P. Way staff while working in traction areas. 15
31. What is the criteria for rail renewals in a section. 15
32. Give details speed restrictions to be imposed during various sequences of through sleeper renewal work with machine packing. 15
33. Define the following. 15
- a) Cant or super elevation
 - b) Cant deficiency
 - c) Cant excess
 - d) Cant gradient & cant deficiency gradient
 - e) Maximum permissible speed on curves.
34. What action is to be taken if you are the first Railway supervisor to reach the site of accident? 15
35. What are pre, during & post tamping operation for a tie tamping machine. 15
36. List the important items to be checked by inspecting official of the track machine organization. 15

37. What is the inspection schedule of different types of machines by SSE (Track Machine) & AEN/Track Machine. 15
38. What are the guidelines to be followed for replacement of loose rivets in plate girder. 15
39. What are the precautions to be taken during bridge painting. 15
40. Describe the launching (Erection) of 18.3 M plate girder by diplorry method. 15
41. What are the responsibility of bridge inspectors in respect of Inspection of bridges. 15
42. Write short notes on:-
a) Abstract estimates
b) detailed estimates
c) Revised estimates.
43. Write short notes one:-
a) Lumpsum contract
b) schedule contract.
c) Piece work contract.
44. List out the major & Minor penalties as per D&AR which of the penalties can be imposed by SE/SSE (in-charge) on group C & D employees working under them. 15
45. Write short notes on (in connection with budget) 15
a) August Review
b) Revised Budget
c) Final modification.
46. What should be taken as material modification for a sanctioned work. 15
47. What is the system of monitoring of maintenance of buildings.. 15
48. What is schedule of Inspection for Asstt. Engineer and SE/SSE (W) for steel & timber structures. 15
49. write short notes on:-
a) Checking the verticality of Tube wells.
b) Capacity of pump.
c) Storage capacity
d) Residual pressure.
e) Residual chlorine
50. What are the responsibilities of SE/SSE (works) for verification of land boundaries. 15

East Central Railway

1. Draw any two sketches out of the following:-

10

- a) Cross section of a single line BG track on embankment showing ballast profile, PRC sleepers and rail for LWR track.
- b) Sketch showing guard rail arrangement on girder bridges for BG single line.
- c) Sketch showing key plan of multi-span girder bridge indicating numbering of piers, abutments, wing walls, girders etc. Also indicate direction of flow and direction of increase in km.

2. Calculate the maximum permissible speed on a 3-degree curve on Group "A" route without any restriction on the length of the transition curve. Assume data whatever considered necessary.

OR

Any arch culvert of 1.5 meter span on a BG single line has been washed away in recent floods. It has to be re-built with 2-meter span box culvert. Draw the temporary arrangement for rebuilding of the bridge on the same alignment. Assume height of the bank as 4 m.

3. Draw the bending moment and shear force diagram for a beam of 4 m span simply supported at ends with a concentrated load of 100 kg at centre. Self weight of beam is 10kg per meter. 10
4. How are the emergency and temporary repairs carried out in case of buckling of a LWR track.

OR

What is the residual chlorine in water supply? How is it tested? Describe in brief different methods of chlorination of water.

5. Describe in brief various methods of treatment of leaky roofs.

OR

Describe the procedure for monsoon patrolling of tracks.

6. Describe the procedure of manual de-stressing of LWR track.

OR

Give details of various types of inspections done by a bridge inspector and proforma of registers being maintained by him for such inspections.

7. Write short notes on any two of the followings:-

- a) Summer precautions for maintenance of LWR.
- b) Switch expansion joints.
- c) Meandering of rivers.
- d) Echo-sounders.

8. What is Bio-latrines? Draw the plan and cross section for constructing a bio-latrines.

OR

Describe the procedure of tamping of track with CSM in design mode.

9. Describe the various methods of launching of steel girders.

OR

Describe the procedure of manual deep screening of track.

GROUP-B

Answer any three questions:-

Question No. 1- to be answered in Rajbhasha.

1. List the States of Indian Union falling in region- 'B' under official Language Rules 1976. What official documents should necessarily be issued both in English & Hindi. In what language and sequence should the station name be painted at a railway station in Hindi and Non-Hindi states.

2. Write the full form of the following word in Rajbhasha language.

a) IRCON

b) CBSE

c) NHPC

d) FA & CAO

e) RITES

3. Write the short notes on any three of the following:

a) Budget Review

b) Various types of Estimates.

c) Urgency certificate

d) Work order & Contract agreement

4. Write short notes on any three of the following:-

a) Retirement benefits of railway employees.

b) Maternity leave and leave not due.

c) Types of minor penalties and procedure to impose them under D & A Rules.

d) Types of pass issued by the Railway and eligibility for the same.

5. Write full form of the following word:-

a) PNM, PTO, PREM, SBF, IRICEN, RSC, RDSO, IPWE, CRS, CLW, CPDE, BIS, CMM, CFTM, SAIL, RITES, LDCE (in Railway terminology), SECR, SERC, CAT, PERT, GRPS, AD, MOST, DFCCIL, IRC

6. Explain any two in details:-

10

a) Bulking of sand

b) Maximum dry density

c) Ph value of water

d) GTS bench mark

7. Note:- All the 3 questions carry equal marks and are compulsory. (50/3)

a) While constructing a building underside of lintels 'A' was taken as BM (RL 8.057m) & following readings were recorded.

Reading on inverted staff on BM 'A': 1.986m

Reading on Peg B on ground: 1.124 m

Change of instrument

Reading on Peg B on ground: 1.506 m

Reading on inverted staff on portico underside 'C'

Enter these readings in a level book page & calculate the RL of underside of portico 'C'

b) A straight Tunnel is planned between Points 'A' & 'C' with a vertical shaft at mid point 'B' but it is impossible to measure along A C directly & position of shaft is to be fixed from a point 'D'. Following information for co-ordinates & bearings is available:-

Point	Co-ordinates	
	N	E
A	0	0
C	3014	256
D	1764	1398

Calculate:-

i) Co-ordinates of point 'B'

ii) Length of 'BD' & its bearings

iii) Angle ADB if bearing of AD is $38^{\circ}24'$ E of N

8. a) Calculate the area of steel required for a short RCC column 400mmx450mm in cross section to carry an ultimate load of 1680KN. Assume concrete of grade M20 and steel of grade Fe250. Would 4 bars of 22mm diameter be sufficient.

b) ----- ?

c) Draw shear force & bending moment diagram for the beam forces shown below, also work out maximum bending moment & shear force.

Add sketch-----

9. a) What do you mean by "self cleaning velocity" of a sewer. A circular sewer of 30 cm diameter is laid at a gradient of 1 in 100. Using $N=0.013$ in manning formula, calculate the velocity & discharge when the sewer is running full.

b) A cantilever retaining wall of 7m height retains sand. The properties of sand are-

Specific Gravity (G) = 2.7

$$\begin{aligned} \text{Void ratio (e)} &= 0. \\ \text{Angle of friction (}\phi\text{)} &= 30^\circ, \text{ given } \sin \phi = 0.5 \end{aligned}$$

Using Rankine's theory of earth pressure, calculate active earth pressure at the base of retaining wall when back fill is i) dry & ii) saturated.

Note:- There are 6 question in this section, answer any 3 question, all questions carry equal marks.

10. Draw a neat sketch of a bridge well foundation and show its various components. Define.
 - a) Scour depth
 - b) Catchment area & run off
 - c) Afflux & free board
11. What are coffer dams. What different type of coffer dams are generally used. Illustrate any one type of coffer dam in details with sketch.
12. A) How the weak formation stretch of railway track is identified. Describe in brief any method of formation treatment.
 B) Indication with labeled sketch slope, bank & toe failure in embankment, give brief reason for each such failure.
13. write short notes on the following:
 - a) Need of transition curve.
 - b) Degree & versine of curve.
 - c) Relation between radius & versine of curve.
 - d) Permanent adjustment of dumpy level.
14. i) What are different methods of rain water harvesting. Describe one in details.
 ii) How do you find out yield of a deep well.
 iii) What type of equipment are used for compacting following type of soils.
 - a) Cohesionless soil
 - b) Moderate cohesive soil & c) Clayey soil
- iv) How do you work out allowable load for: Single pile, and a group of piles. Give example. 17
15. Write short notes on the following:

- a) Slump test of concrete
- b) Advantages of ready-mixed concrete
- c) Disinfection of water
- d) OMC of soil & factors affecting compaction of soil.

Engineering Department

1. Indicate the specified frequency for the following:-
 - a. Lubrication of bridge bearing.
 - b. Inspection of SEJs by SSE (P.Way).
 - c. USFD testing of rails on section having 35GMT.
 - d. Inspection of points & crossings by SSE /JE (P.Way).
 - e. Overhauling of track.
 - f. Overhauling of level crossing.
 - g. Painting of steel work of girder bridge.
 - h. Building inspection by SSE/W.
 - i. Inspection of high level storage tanks by SSE/W.
 - j. Verification of railway boundaries by SSE (P.Way).
 - k. Inspection of arch bridges by AEN.
 - l. Traffic census at level crossings.
2. What are the systems being followed for alignment of track during tamping works. Describe the single chord lining system by 3-point lining method.
3. What are the pre-requisite for introduction of tamping machines for maintenance of track. What are the pre-tamping operations to be carried out before tamping of track.
4. When is destressing of LWR necessary. Describe the procedure for destressing of LWR without use of rail tensors.
5. Describe the procedure and precautions to be followed for rectification of rail fracture in a LWR section.
6. During sleeper renewal, track alignment of a portion of a circular curve was disturbed. The versions of disturbed track are as tabulated below. Work-out the slews for re-alignment of the curve.
7. Describe the procedure to be adopted for replacement of arch of a 1x6.1m span masonry bridge by PSC slab under traffic when abutments of the bridge have to be retained.
8. a) Describe the special precautions to be observed for maintenance of track in electrified
9. and track circuited areas.
 - b) Mention the various works on track, requiring sanction of CRS.
10. During deep screening of track, the following speed restrictions exist in a single line section. Indicate the locations of various Engineering indicators to

be fixed at the site. If a permanent speed restriction of 30 kmph already exists (as shown). Add sketch

East Central Railway

2014

1. Describe in detail procedure for imposing Major penalty on a railway servant. 15
2. Write short notes on any two of the following:-
15
 - a) Encashment of LAP
 - b) D.C.R.G.
 - c) House Building Advance
3. Write short notes on:- 3x5=15
 - i) Stock Verification sheets
 - ii) Expenditure chargeable to Demand No. 4
 - iii) Price Variation clause.
4. Distinguish between the following (any two)
2x5=10
 - a) Works contract and stores contracts.
 - b) Vitiating & Variation in contracts.
 - c) Planned expenditure Vs. Revenue expenditure.

All questions are compulsory

5. Write laid down duties of Assistant Divisional Engineer for inspection of
 - a) Permanent Way, b) Works and c) Bridges. Also write, laid down duties for one of inspection of, a) Permanent Way (Overall In-charge), b) Works, and c) Bridges, for inspection of a) Track, b) Works, and c) Bridges, respectively.
6. Calculate the cost of carriage of 4500 CUM of sand for a distance of 20 kms by truck with carrying capacity of 3 CUM per trip. The rates quoted for carrying sand are:-

1 st Km	-	RS 200 per CUM/KM
2 nd Km	-	RS 40 per CUM/KM
3 rd Km to 9 th Km	-	Rs 30 per CUM
10 th to 20 th Km	-	Rs 250 per CUM
21 st to 30 th Km	-	Rs 240 per CUM

Rebate offered 1%, if lead is more than 25 km

What is net amount payable the deductions for SD @ 10% and income Tax @ 2%
7. A. Select the most suitable options answer:- 3x1 =3

- i) For design of bridge foundations the increase in design discharge for a catchment area of 500 sq Km is – a) 10% b) 0% c) 30%
d) No. increase.
- ii) The standard width of a single line BG embankment is -----
a) 3550mm b) 5300mm c) 6850mm d) 7100mm
b) Write down the inspection schedules of an AEN-
(Max. Marks=5)
i) RAW ii) SEJ iii) Water Tanks iv) Steel structures v)
Level Xing

Answer the following in one sentence only:-

1. Why does a piece of iron get rusted, if left exposed in the open.
 2. Ice packed in saw dust does not melt quickly. Why.
 3. Why is one's breath visible in winter, but not in summer.
 4. Why it is easier to roll a barrel than to pull it along the road.
 5. Why an airoplane approaching at a speed of 1600 kmph is not heard.
 6. Thick glass tumbler often crack when ever hot liquid is poured into it. Why.
 7. Why does a straight thick look bent when partly immersed in water.
 8. Why does a man fall forward when he jumps out of running train.
 9. Which type of soil is most common in the northern plain.
 10. Why graphite is used as lubricant.
 11. Which form of iron has got the highest carbon content.
 12. What level of noise is considered permissible in human habitats.
 13. Which is India's highest national award.
 14. Who appoints a judge of a High court.
 15. Why red light is used as danger signal.
2. What precautions do you observe using a dumpy level having collimation error, in case you do not know how to adjust the error.
3. The following readings have been taken during leveling. If height of instrument at station '6' be 124.18m, find out R. L. of various stations.
4. To find-out height of a tower located at T on other side of a river, a surveyor selected two points A and B at a distance of 233.57m. The $\angle TAB$ and $\angle TBA$ as measured by him were $70^{\circ}17'20''$ and $68^{\circ}33'40''$ respectively. If the angles of elevation of top and bottom of tower from B be $39^{\circ}56'0''$ and $0^{\circ}18'40''$ respectively, find out the height of the tower.
5. Two tangents intersect at chainage 1192.00m, the deflection angle being $20^{\circ}30'$ calculate the necessary data for setting out a curve of 700m radius to connect the two tangents, if it is intended to set-out the curve by Rankine's

method of tangential angles. If the theodolite has a least count of 20", tabulate the actual readings of deflection angles to be set out. Take peg interval of 25m.

8. Describe "Plate load test" to determine bearing capacity of soil.
9. Describe field compaction methods for various types of soils.
 - (a) What do you mean by "self cleansing velocity" of a sewer.
 - (b) A circular sewer of 30cm diameter is laid at a gradient of 1 in 100. Using $N=0.13$ in Manning's formula, calculate the velocity and discharge when the sewer is running full.
 - (c) How you will find-out yield of a deep tube well.

1. Indicate the specified frequency for the following:

- a) Lubrication of bridge bearings.
 - b) Inspection of SEJs by SSE (P.Way)
 - c) USFD testing of rails on section having 35GMT.
 - d) Inspection of points & Crossings by SSE/SE/JE (P.Way).
 - e) Overhauling of track.
 - f) Overhauling of level crossing.
 - g) Painting of steel work of girder bridge.
 - h) Building inspection by SSE/W.
 - i) Inspection of high level storage tanks by SSE/W.
 - j) Verification of railway boundaries by SSE(P.way).
 - k) Inspection of arch bridges by ADEN.
 - l) Traffic census at level crossings.
- a) What is the chord length for measuring lead curvature of a turnout.
 - b) What should be the height of a high level passenger platform above rail level.
 - c) What is the maximum distance of trolley refuges on ballasted deck bridge.
 - d) What is the maximum clear distance between two consecutive sleepers on a bridge on BG.
 - e) What is the equilibrium speed on a curve.
 - f) What will be the minimum width of an island platform provided with the stair of a FOB of 3m width.
 - g) Name of equipment used for measuring velocity of flow of water in an open channel.
 - h) The scale of daily supply of water for house hold consumption for staff per head is liters/day.
 - i) What is the weight of 18.3m standard BG plate girder.
 - j) What should be the minimum residual chlorine available at the farthest end of the domestic water supply.
 - k) What total GMT can be carried on 90UTS 60Kg rail.

- l) What is the vertical wear limit for recommending rail renewal on 60kg rail section.
 - m) What is the minimum distance of gate posts from centerline of track on A class level crossing on BG.
 - n) What is the range of distressing temperature for 52kg rails.
 - o) What is the minimum cushion specified over a box culvert.
1. Draw the plan and cross section for construction a bio-latrine. Where will you recommend construction of a bio-latrine.

OR

Calculate the minimum permissible