

Railway & Bridge

Question Set - 1

INTRODUCTION TO RAILWAY

* Short Questions :

(2 marks)

- ① what do you mean by gauge? State the different types of gauge used in India.
- ② Define sleeper density.
- ③ what do you mean by saddle plate?
- ④ Define points & crossing in Railways?
- ⑤ what do you understand by signalling?
- ⑥ what is coning of wheel?
- ⑦ Define cant. Also what is cant deficiency.
- ⑧ what do you mean by ballast & sleeper?
- ⑨ what do you mean by ballast crib?
- ⑩ Define Hauling capacity?

* Short-Long Questions :

(5 Marks)

- ① write Political Advantages of Railways.
- ② write Economical Advantages of Railways.
- ③ Explain the three classifications of Indian Railway.
- ④ Explain Points & crossing, Ruling gradient & coning of wheels.
- ⑤ Differentiate between Ballast and Ballast crib.

* Long Questions

(10 marks)

① Explain the classification of Railways.
Also state the advantages of Railways.

② Define the following terms:

(a) Point & crossing.

(b) Station yard

(c) Derailing switch.

(d) Sleeper crib.

(e) Turnout.

(f) Locomotive.

(g) Fish plates.

(h) Tongue & stock rails.

(i) Level crossing.

(j) Creep of Rails.

Question Set - 2

PERMANENT WAY

* Short Questions

(2 Marks)

- ① Define Gauge.
- ② Explain what is Permanent way?
- ③ State the types of gauges used in India?
- ④ What do you mean by uniformity of gauges?
- ⑤ Define coning of wheels.
- ⑥ State the elements in permanent way?
- ⑦ Mention the requirement of permanent way?
- ⑧ State the functions of permanent way?
- ⑨ What is the function of uniformity of gauges?
- ⑩ State two criteria for suitability of gauges.

* Short-Long Questions

(5 marks).

- ① State all the criteria necessary to check the suitability of gauges?
- ② What are the advantages of uniformity of gauges?
- ③ What is the gauge used in India? What are the types of gauges available?
- ④ State the Requirements of permanent ways?

* Long - Questions

(10 marks)

- ① What is permanent way, show it with a neat sketch? Also state the ~~function~~ requirements of a permanent way.
- ② What is Gauge? State the type of gauges? Also mention the advantages of uniformity of gauges.
- ③ Explain the criteria necessary for selection of the gauge.

Question Set - 3

TRACK MATERIALS

* Short Questions

(2 Marks)

- ①. Define Creep.
- ②. State the types of Rails used in India.
- ③. What are various lengths of rails available
- ④. ~~Types of ballast~~
- ④. Mention the different types of ballast used.
- ⑤. State the different types of sleepers used.
- ⑥. What are the various causes of creep?
- ⑦. State the different types of joints (Rail) available.
- ⑧. Define fish plates & fish bolts.
- ⑨. State the Requirements of a good ballast.
- ⑩. State two effects of creep.

* Short-Long Questions

(5 marks)

- ① Explain the requirements of an Ideal joints.
- ② Explain the Percussion theory of creep.
- ③ State the advantages & disadvantages of wooden sleepers.
- ④ Differentiate between the flat footed & Bull headed rail section.
- ⑤ State the various functions of sleepers.
- ⑥ State the various requirements of Rails.

* Long Questions:

(10 Marks)

① Explain the different types of rail joints with neat sketch.

② Write the advantage & disadvantages of concrete & composite sleepers.

③ Write short notes on i

(i) Creep.

(ii) Ballast.

(iii) Fixtures for rail section.

(iv) Welding joint.

Question Set - 4

GEOMETRIC OF BROAD GAUGE

* Short Questions

(2 marks)

- ① State the various gradients used in India
- ② Define Pusher gradient.
- ③ What do you mean by cant?
- ④ What is grade compensation?
- ⑤ Write maximum super-elevation that can be provided on Broad gauge?
- ⑥ Write the value of grade compensation on Broad gauge & meter gauge?
- ⑦ Define momentum gradient.
- ⑧ Define Pulling gradient.

* Short-long Questions : (5 marks)

- ① Explain why is gradient necessary in Railways?
- ② State the necessity of super-elevation
- ③ Draw the cross-section of BG in Embankment in two ^{lane} ways?
- ④ Draw the cross-section of BG in cutting on single lane?
- ⑤ Differentiate between Pulling & momentum gradient?

* Long Questions : (10 marks)

- ① Explain the geometry of track in cutting of two lane Broad gauge. with a neat sketch.
- ② Explain the various gradients used in railways.
- ③ Write short notes on:
 - (a). Grade compensation.
 - (b). Super elevation.
 - (c). Gradient in station yard.

Question Set 5

POINTS & CROSSINGS

* Short Questions : (2 marks)

- ①. what do you mean by turnout?
- ②. Define split switch.
- ③. Define points & crossing.
- ④. what is a square crossing?
- ⑤. State the various types of switches.
- ⑥. Mention the requirement of points & crossing.
- ⑦. Define Ramped crossing.
- ⑧. State the various types of crossings used in India.
- ⑨. what is a springing crossing?
- ⑩. State the types of points?

* Short-Long Questions : (5 marks)

- ①. Define Point & crossing? state the necessity of points & crossing.
- ②. Draw a neat labeled sketch of points & crossing?
- ③. write short notes on turnouts?
- ④. write the different types of one classification of switches & crossing?
- ⑤. Differentiate between ~~acute~~ acute & obtuse angle crossing?

* Long Questions

(10 marks)

① Explain crossing and its types with neat sketches.

② Define Points & Crossing, with a neat sketch. Also state its requirements.

③ Write short notes on:

(a) Points & Crossing.

(b) Types of switches.

(c) Turnouts.

Question Set 6

MAINTENANCE OF TRACK

* Short Questions :-

(2 marks)

- ① what do you mean by Boxing of track?
- ② what do you mean by packing?
- ③ Define pumping joints.
- ④ what do you mean by Blewing of joints
- ⑤ what do you understand by bulking of joints.
- ⑥ what do you mean by rolling stocks
- ⑦ Define level crossing.
- ⑧ what do you understand by Roaring rails?
- ⑨ State some of the methods involved in maintenance of rails.
- ⑩ State some of the surface defects of rails.

* Short - Long Questions :-

(5 marks)

- ① State the necessity of maintenance of Railway.
- ② Mention the measures of maintenance of track alignment.
- ③ Mention the measures of maintenance of gauge.
- ④ mention the measures of maintenance of proper drainage.

- ⑤ Differentiate between "Daily maintenance & periodic maintenance?"
- ⑥ Differentiate between Through Packing and scissor packing.

* Long Question (10 marks)

- ① Explain the various surface deflection of rail tracks:
- ② Explain the duties of PWT.
- ③ write short notes on maintenance of:
- (a). Tunnels
 - (b). Points & crossing
 - (c). Rolling stock

Question Set 7

* Short Questions BRIDGE

(2 marks)

- ① Define waterway.
- ② What do you mean by Afflux.
- ③ What is a superstructure & substructure?
- ④ What is the maximum length of culvert span of culvert & major bridge?
- ⑤ What do you mean by Economic span?
- ⑥ Define linear waterway.
- ⑦ What is a freeboard?
- ⑧ Mention the classification of bridge based on function?
- ⑨ What do you mean by a semi-Through bridge?
- ⑩ Mention the classification of bridge based on method of connection?

* Long Short Questions

(5 marks)

- ① What do is a bridge? Also define abutment, pier & Embankment?
- ② State the requirements of ideal bridge.
- ③ Draw a flowchart showing the classification of bridge?
- ④ Differentiate between Road bridge & Railway bridge?

⑤. Differentiate between a culvert & a bridge?

* Long Question : (10 marks)

① Explain the various bridge classifications based on superstructure, and material of construction?

② Explain the components of a bridge with a neat sketch (showing the components). Also define them.

③ Write short notes on:-

(a) Through bridge

(b) Movable bridge

(c) Culvert

(d) Skew bridge.

Question Set 8

BRIDGE SITE INVESTIGATION

* Short Questions

(2 Marks)

- ① what do you mean by a viaduct?
- ② Define Free board.
- ③ State the types of bridge alignment?
- ④ what do you mean by economic span?
- ⑤ State four criteria to be considered for the selection of bridge site?
- ⑥ State the data required for design of alignment of bridge?
- ⑦ what is standard clearance to be provided above HFL?
- ⑧ Define skew bridge?
- ⑨ State the necessary data required for design of superstructure data?
- ⑩ State the necessary data required for design of foundation?

* Short-Long Questions

(5 Marks)

- ① what is the essential information required to be collected for the design of the bridge?
- ② State the various criteria essential for the selection of site?
- ③ Explain the various types of bridge alignments?

- ④. What is flood discharge? Explain state the various methods available for determination of flood discharge?
- ⑤. Explain sub-surface investigation?

* Long Questions :- (10 marks)

- ①. Discuss briefly the characteristics of an ideal bridge. Also state the site selection criteria.
- ②. Explain briefly the data collected for the design of bridge.
- ③. Write short notes on:
- (a). Sub surface investigation
 - (b). Flood discharge
 - (c). Economic span
 - (d). Bridge alignment

Question Set - 9

BRIDGE FOUNDATION

* Short Questions :-

(2 marks)

- ① what do you mean by a cofferdam?
- ② Define open caisson.
- ③ Define pile & pier.
- ④ what do you mean by scouring?
- ⑤ what is a batter pile and where is it used?
- ⑥ what do you understand by end bearing pile?
- ⑦ State the various types of foundations used as bridge foundations?
- ⑧ what do you mean by an open foundation?
- ⑨ Explain what is a caisson?
- ⑩ Write the different types of caissons?

* Short long Questions :-

(5 marks)

- ① Explain the process of pile driving?
- ② Give a brief description of well foundation?
- ③ Explain the process of sinking of wells?
- ④ what are various types of pile used as bridge pile foundation?
- ⑤ Give a brief description of cofferdams?

⑥. Explain the function of pile frame & pile hammer?

* Long Questions (10 marks)

①. What are the different types of foundations used as bridge foundation? Explain with a neat sketch.

②. What is pile foundation? Explain pile driving, hammer & frame?

③. Write short notes on:-

(a) Cofferdam

(b) Caisson

(c) Pneumatic caisson

(d) Sinking of wells.

(e) Scouring.

Question Set-10

BRIDGE SUBSTRUCTURE & APPROACHES

* Short Questions:

(2 marks)

- ① Define Trestle piers.
- ② what do you mean by Abutments?
- ③ what do you understand by wing wall?
- ④ Define what is Arch abutment?
- ⑤ State the different types of wing walls?
- ⑥ what is the main purpose of splayed wing wall?
- ⑦ Explain what is an approach?
- ⑧ what is the major disadvantage of Tee-abutment?
- ⑨ State the grade of RCC used for pier?
- ⑩ State the main purpose of multiple bent?

* Short-Long Questions:

- ①. State the types of approaches available?
- ②. Differentiate between splayed wing wall and Return wing wall?
- ③ Differentiate between pile Bent & cylindrical piers?
- ④ Explain briefly solid piers?
- ⑤. Differentiate between multiple bent & Trestle piers?

* Long Questions.

(10 marks)

- ① What is the purpose of wing wall? Give a brief description of the types of wing walls with neat sketch?
- ② State the conditions in which the open piers are used? Also explain the types of open piers with a neat sketch?
- ③ Write short notes on:
 - (a). Abutments
 - (b). Wing walls
 - (c). Approaches.

PERMANENT BRIDGES

* Short Questions

(2 marks)

- ① what do you mean by Box girder?
- ② State the functions of movable bridge?
- ③ State the advantages of composite bridges?
- ④ what do you mean by IRC class AA?
- ⑤ what is the major advantage of a prestressed concrete structure?
- ⑥ what are the various types of cantilever bridges.
- ⑦ State the different types of masonry bridges?
- ⑧ what are the different shapes of solid piers?
- ⑨ what is a cable stayed bridge?
- ⑩ when is a suspension bridge adopted?

* Short - long Questions : (5 marks)

- ① Give a brief description of masonry bridges?
- ② State the advantages of steel bridges?
- ③ Explain the standard IRC loading criteria?

- ④ Explain briefly what is prestressed concrete bridges?
- ⑤ State the major advantages of composite bridges?
- ⑥ Differentiate between continuous bridge & balanced cantilever bridge?

* Long Questions (10 marks)

- ① State the various types of steel bridges? Also explain one with a neat sketch.
- ② Give a brief description of the types of RCC bridges, with labeled diagrams?
- ③ Write short notes on:
 - (a). Prestressed concrete bridges
 - (b). Movable steel bridges
 - (c). Cable stayed bridge
 - (d). Box girder
- ④ Explain the types of loading for which the bridge is designed.

Question Set-12

CULVERT & CAUSEWAYS

* Short Questions :

- ① What do you mean by a causeway?
- ② State the criteria for using a culvert?
- ③ Mention the types of causeways?
- ④ Mention the different types of culverts?
- ⑤ If a culvert is designed for _____ loading, it shall also be checked for _____ loading.
- ⑥ State the various types of IRC loadings?
- ⑦ What is the main purpose of providing a ~~area~~ dwarf wall?
- ⑧ What is the maximum height & number of openings in a box culvert?
- ⑨ What do you mean by a culvert?
- ⑩ What do you mean by an Irish bridge?

* Short long Questions : -

- ① Differentiate between low level causeway and high level causeway?
- ② Differentiate between box culvert & pipe culvert?
- ③ Differentiate between culvert & a causeway?

- ④ Differentiate between Arch culvert & Slab culvert?
- ⑤ Draw a neat labelled sketch of a Pipe culvert & a box culvert?

* Long Questions

(10 marks)

- ① Explain what is a culvert. how is it different from bridge? Also give a brief about its types.
- ② What is a causeway? Explain the types of causeways?
- ③ Write a short notes on:
- (a). Slab culvert
 - (b). low level causeway.
 - (c). high level causeway.
 - (d). Pipe culvert.