

22403

12425

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. Attempt any FIVE of the following :

10

- (a) State role of transportation in development of nation.
- (b) State two merits of roadway over railway.
- (c) Enlist any two factors affecting alignment of railway.
- (d) List four types of yards.
- (e) List the types of culvert.
- (f) State the duties of permanent way inspector.
- (g) State any two purpose of tunnel lining.

2. Attempt any THREE of the following :

12

- (a) Explain any two causes of creep of rail with a neat sketch.



- (b) Suggest the suitable fixtures and fastening for following situation :
- (i) For fixing rail to rail
  - (ii) For fixing rail to wooden sleepers
  - (iii) For fixing rail to chair
  - (iv) For fixing wooden sleepers to bridge girder
- (c) Classify the bridges based on :
- (i) Span of bridge
  - (ii) Purpose of bridge
- (d) Discuss the factors affecting selection of rail gauge.

**3. Attempt any THREE of the following :**

**12**

- (a) State any four factors affecting selection of site of bridge.
- (b) Explain the functions of bridge bearing.
- (c) Draw a neat labelled sketch of plan of bridge showing all of its components.
- (d) Define :
  - (i) Waterway
  - (ii) Effective span
  - (iii) Afflux
  - (iv) Scouring

**4. Attempt any THREE of the following :**

**12**

- (a) Differentiate temporary bridges with permanent bridges w.r.t. :
  - (i) Cost
  - (ii) Maintenance
  - (iii) Construction
  - (iv) Material used

- (b) Suggest the suitable type of bridge for following conditions :
  - (i) Hilly terrain surrounded by Jungle
  - (ii) Religious event near river side for short duration
  - (iii) Bridge have to construct over navigable river
  - (iv) Road crossing over a small stream having low seasonal flow
- (c) State the necessity of providing tunnel shaft.
- (d) Suggest suitable situation for Raft foundation and pile foundation.
- (e) Give the points to be observed during pre-monsoon and post-monsoon inspection of bridge.

**5. Attempt any TWO of the following :**

**12**

- (a) Explain coning of wheels & tilting of rail with neat sketch.
- (b) State the necessity of gradient. List various types of gradient. Explain any one in detail.
- (c) Describe with neat sketches :
  - (i) Diamond crossing
  - (ii) Cross over

**6. Attempt any TWO of the following :**

**12**

- (a) State the necessity of tunnel ventilation and describe tunnel ventilation by mechanical method.
  - (b) Suggest suitability and draw cross section of various shapes of tunnel.
  - (c) Define Tunnel surveying and describe the process of transferring centre line inside the tunnel.
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