

22403

22232

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) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
  - (8) Preferably, write answers in sequential order.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) State role of transportation in development of nation.
- (b) List two merits of roadways.
- (c) Define gradient and superelevation.
- (d) List four types of yards.
- (e) Define : (i) Abutments (ii) Wing walls.
- (f) State types of crossings.
- (g) State any two purpose of tunnel lining.

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

**12**

- (a) Explain the functions of fish plates. Give essential requirements of fish plates.
- (b) Draw typical cross-section of permanent way. Give requirements of an ideal permanent way.
- (c) Discuss suspension bridge with neat sketch.
- (d) Describe with neat sketch various types of "Rail Joints".



- 3. Attempt any THREE of the following : 12**
- (a) Explain with sketch various types of piers.
  - (b) Discuss fixed bearing and expansion bearing with their suitability.
  - (c) Illustrate with sketches the following. State under what conditions these are used.
    - (i) Caisson foundation
    - (ii) Cofferdam
  - (d) Define
    - (i) Afflux (ii) Economic Span (iii) Free board (iv) Scouring.
- 4. Attempt any THREE of the following : 12**
- (a) Differentiate temporary bridges and permanent bridges.
  - (b) Draw a neat labelled sketch of a single span arch culvert.
  - (c) Explain Needle Beam method of tunneling in soft rock with a sketch.
  - (d) Draw plan and sectional elevation of bridge showing parts of superstructure and substructure.
  - (e) Explain routine maintenance and special maintenance of bridges.
- 5. Attempt any TWO of the following : 12**
- (a) Explain the necessity of gradients. Discuss all types of gradients giving their permissible values in India.
  - (b) Discuss cant deficiency and negative cant in detail.
  - (c) Explain diamond crossing with a sketch.
- 6. Attempt any TWO of the following : 12**
- (a) Give classification of tunnels on the basis of their purpose and alignment. Describe each type briefly.
  - (b) Draw a typical cross-section of tunnel for
    - (i) A double broad gauge railway track
    - (ii) A national highway.
  - (c) Describe with sketches drainage of tunnels.
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