



22403

12223

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Figures to the right indicate full marks.
 - (3) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (4) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks**1. Attempt any FIVE of the following :****5 × 2 = 10**

- (a) Enlist the functions of ballast.
- (b) Define rail gauge.
- (c) Enlist any two factors affecting alignment of railway.
- (d) Enlist any four tools required for track maintenance.
- (e) State the classification of Tunnel according to purpose & conveyance.
- (f) Define tunnel.
- (g) State the duties of permanent way inspector.



[1 of 4]

P.T.O.



2. Attempt any THREE of the following :

- (a) Differentiate temporary bridge with permanent bridge w.r.t. followings :
 - (i) Cost (ii) Maintenance (iii) Construction (iv) Material used
- (b) Suggest the suitable fixtures & fastening for following situations :
 - (i) For maintaining continuity of rails
 - (ii) For fixing of rail to wooden sleeper
 - (iii) For fixing of rails to chairs
 - (iv) For fixing of wooden sleeper to bridge girder
- (c) Describe in brief factors affecting selection of site for bridge.
- (d) Describe any two causes of creep of rails.

3. Attempt any THREE of the following : $3 \times 4 = 12$

- (a) Define Afflux, Free Board, HFL and Effective Span.
- (b) Draw neat sketch of bridge showing its component.
- (c) Suggest the suitable foundation for bridge for following conditions :
 - (i) if good & hard soil available within 2 metres below the bed of river.
 - (ii) when river bed consist of different types of soil having bearing capacity.
 - (iii) if the soil at the site of bridge is very soft & good soil is at greater depth.
 - (iv) when good soil is available at nearly 3 metres below the bed level & bed consist of sand.
- (d) State the classification of bridge according to
 - (i) Alignment
 - (ii) Function
 - (iii) Span length
 - (iv) Position of HFL

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

$3 \times 4 = 12$

- (a) Discuss the factors affecting selection of gauge.
- (b) Suggest the suitable type of bridge for following conditions :
 - (i) when road crossing over a small stream having low depth of water (seasonable flow).
 - (ii) when bridge have to construct over navigable river.
 - (iii) when there is religious event (Kumbh mela) near river side for short duration.
 - (iv) when there is hilly terrain surrounding by Jungle.
- (c) State types of Abutment in detail.
- (d) State the functions of (i) Abutment (ii) Pier.
- (e) Describe in brief steps involved in bridge construction.

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

$2 \times 6 = 12$

- (a) Describe in brief with neat sketch diamond crossing and crossover.
- (b) State the steps involved in construction of railway track.
- (c) Draw line sketch of (1) Locomotive yard (2) Marshalling yard

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

$2 \times 6 = 12$

- (a) Describe in brief with neat sketch needle beam method of tunnel construction.
- (b) Describe in brief with neat sketch procedure of transferring center line to inside the tunnel.
- (c) State the necessity of tunnel ventilation and describe in brief methods used for tunnel ventilation.