



- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Assume suitable data whenever necessary.
 9. Illustrate your answers whenever necessary with the help of neat sketches.
 10. Use of non-programmable calculators and drawing instruments is permitted.

1. a) What do you understand by "Permanent Way"? Discuss the requirements of ideal permanent way. 7

b) What is Coning of wheel? Discuss its importance. 6

OR

2. a) Enumerate and explain the various resistances that have to be overcome by a moving train. 7

b) What are the possible causes of creep? Discuss in brief. 6

3. a) What are the objectives of providing ballast in the permanent way? Describe in brief, various types of ballast. 7

b) Derive the relationship of super elevation with gauge, speed and radius of a curve. 6

OR

4. a) Discuss the various types of rail failures with sketches. 7

b) On a B.G. 3 degree curve, "the equilibrium cant" is provided for a speed of 70 kmph. 6

a) Calculate the value of the equilibrium cant.

b) Allowing a maximum cant deficiency, what would be the maximum permissible speed on the track.

5. Write Notes on **any three**. 14

i) Heel divergence.

ii) Throw of switch.

iii) Tongue rail.

iv) Objects of signaling.

v) Interlocking.

OR

6. Write notes on **any three**. 14
- i) Check rails.
 - ii) Home signal.
 - iii) Starter signal.
 - iv) Marshaling Yards.
 - v) Left hand Turn-out.

7. a) Name the different characteristics of aircraft. How do they affect the planning and design of airport? 7
- b) Define the terms : 6
- i) Cross wind component.
 - ii) Wind coverage.

OR

8. a) Explain the procedure of orienting the runway. 7
- b) Enumerate the various factors which are to be considered while selecting a suitable site for an airport. 6
9. a) What do you understand by terminal area? What facilities are provided in this area? 7
- b) What are the different parking systems for an aircraft? Discuss any one in detail. 6

OR

10. a) What are the characteristics of an ideal airport layout? 7
- b) The length of runway under standard conditions is 1620m. The airport site has an elevation of 270m. Its reference temperature is 32.90°C. If the runway is to be constructed with an effective gradient of 0.20 percent, determine the corrected runway length. 6
11. Write notes on **any three**. 14
- i) Tunnel lining.
 - ii) Drainage in Tunnels.
 - iii) Lighting in Tunnel.
 - iv) Economics of Tunneling.

OR

12. a) Write in detail Tunnel Surveying. 7
- b) Why ventilation is needed during & after the tunnel construction? How it is provided? Explain. 7
