



- 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. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.

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) On a B. G. 3 degree curve, "The equilibrium cant" is provided for a speed of 70 kmph. 7

a) Calculate the value of the equilibrium cant.

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

b) Write short notes on **any two**. 6

i) LWR

ii) Rail failures

iii) Sleeper density

iv) Fishplate & Fishbolt

5. a) Draw the neat sketches of various types of crossings in use on Indian railways. Explain in brief. 7

b) Discuss the marshalling yard & its types. 7

OR

6. Write notes on **any three**. 14
- i) Heel divergence
 - ii) Throw of switch
 - iii) Tongue rail
 - iv) Semaphore signal
 - v) Repeater signal
 - vi) Warner signal

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) Explain in brief with neat sketch the "I. L. S. system". 7
- b) What is ATC? What En-route aids are provided through A.T.C. 6
11. a) Write notes on **any three**. 14
- i) Tunnel lining
 - ii) Drainage in Tunnels
 - iii) Lighting in tunnels
 - iv) Economics of Tunneling

OR

12. a) What are the ways in which the ventilation can be provided in the tunnel? Explain. 7
- b) Write in detail tunnel surveying. 7
