

Duration: 3hrs

[Max Marks:80]

N.B. : (1) Question No 1 is Compulsory.

(2) Attempt any 3 questions out of the remaining 5.

(3) All questions carry equal marks.

(4) Assume suitable data, and support all theory with neat sketch, wherever required.

1. Attempt any FOUR [20]
 - a. Differentiate between surface and subsurface drainage.
 - b. Explain Q-K-V curve.
 - c. Write a note on the use of geosynthetics in highways.
 - d. What is a grade-separated intersection? What are its advantages?
 - e. What is sight distance? How is intersection sight distance calculated?
 - f. Calculate the actual ruling gradient on a curve of 3° in a BG track, if the ruling gradient of that section of railway is 1 in 200
2. a. What is the function of a taxiway? Calculate the turning radius of a taxiway for operating Boeing airplanes having a wheelbase of 17.70m, tread of main landing gear as 6.62 m, and turning speed of 37 kmph. Consider coefficient of friction as 0.13? [10]
b. Why is extra widening required at curves? Estimate the extra widening required for a pavement of width 7m on a horizontal curve of radius 255 m, if the longest wheelbase of vehicle expected is 6.8 m and design speed is 75 kmph. [10]
3. a. What is the purpose of joints in concrete pavements? Briefly explain the different types of joints in concrete pavements. [10]
b. What is meant by Cant deficiency? Calculate the cant deficiency and permissible speed for a 4° curve on a BG track [10]
4. a. Enlist the tests on aggregates used in highway construction. Explain any one test in detail. [10]
b. What is a breakwater? Give a note on different types of breakwaters. [10]
5. a. With the help of a neat diagram explain in detail, the different layers of a flexible pavement. [10]
b. What are the corrections to be applied to basic runway length? Given that the basic runway length for a proposed airport is 1150 m. What will be the corrected length of the runway, if the airport is at an elevation of 400 m? The airport reference temperature is 26°C and the effective runway gradient is 0.38 percent. [10]
6. Write short notes on any four of the following [20]
 - (a) Critical stress combination on rigid pavements
 - (b) O&D studies
 - (c) Equivalent single wheel load
 - (d) Methods for Strengthening of existing pavement
 - (e) Steps for the design of a rigid pavement
 - (f) Spot speed and its types
