T.E./Civil/Sem-V/'C' Scheme/Sub:-TE/Date:-19/11/2025 15.11.2025
QP. Code:-10095366

(Time: 3 Hours) [Total Marks: 80]

Note: i. Q. No. 1 is **compulsory**
ii. Attempt **any 3** out of remaining 5

1. **Solve any four** (20 M)
   A. Draw layout of an artificial harbour and label all its elements.
   B. What is Highway Alignment? What are the basic requirements of an ideal alignment?
   C. Explain the term Passenger Car Unit.
   D. Compare Rigid & Flexible Pavement.
   E. Write a note on soil stabilization.
   F. What is overlay? Explain its types.
   G. Describe and explain the details of any one major, recently completed or ongoing transport infrastructure project in Mumbai or its surrounding areas.

2. A. Two vehicles are approaching each other on a single lane road having gradient of 2%. Downward vehicle is moving with a speed of 50 kmph and upward vehicle is moving with a speed of 35 kmph. Calculate Intermediate Sight Distance required to avoid collision. Assume reaction time as 2 seconds and f=0.30. (08 M)
   B. Determine the Design Traffic (in MSA) for a 15-year design period of a new single-lane road. The initial traffic is 400 CVPD, and the traffic is expected to grow at 7.5% per annum. Assume a Vehicle Damage Factor (VDF) of 2.5 and a construction period of 2 years. (06 M)
   C. Compare the characteristics, advantages, and disadvantages of wood, concrete, and steel sleepers. (06 M)

3. A. Find out the warping stress at interior, edge and corner of 25 cm thick CC pavement with transverse joint at 5 m & longitudinal joint at 3.6 m interval. Take k = 6.9 kg/cm^3, a = 15 cm, temperature difference between top and bottom layer of pavement is 15°C. Take E = 3 x 10^5 kg/cm^2, e = 10 x 10^{-6}/°C, Radius of relative stiffness = 87.2 cm. Take Cx=1 and Cy=1.1 (10 M)
   B. What is equilibrium Cant? Find value of equilibrium cant at a 20 curve on a B.G track if 15, 10, 5 and 2 trains are running at 50, 60, 70 and 80 kmph respectively (06 M)
   C. Explain factors affecting site selection of an airport. (04 M)

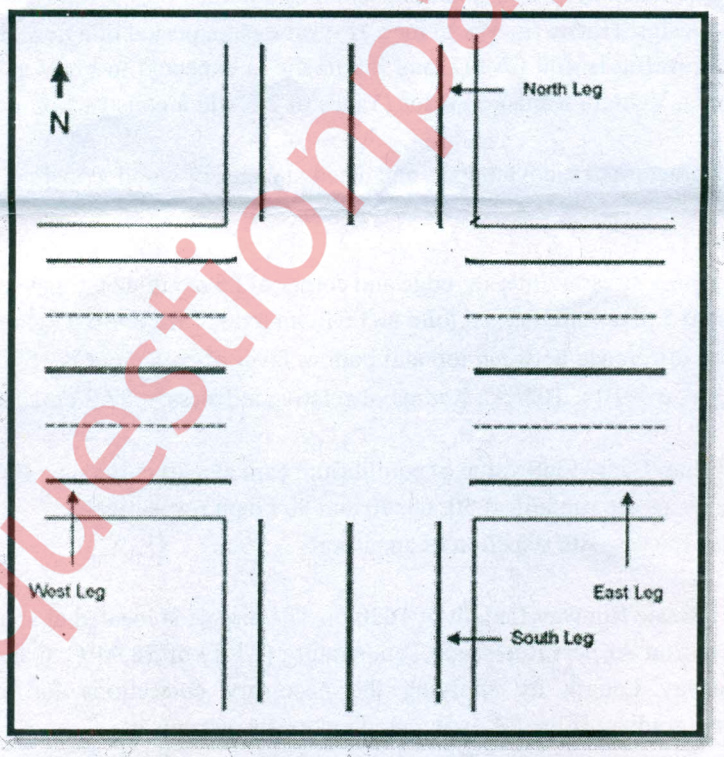
4. A. A runway has a Basic Runway Length of 1620 m. The airport is located at an elevation of 270 m and has an Airport Reference Temperature (ART) of 32.94^{0}C. Calculate the Corrected Runway Length by applying the necessary corrections for elevation, temperature, and gradient if the following gradient exists on runway. (08 M)

Chainage from	Chainage to	Gradient
0 m	1000 m	+ 0.8 %
1000 m	End of runway	- 0.5 %

   B. Explain camber and calculate the required camber percentage for a two-lane road with a bituminous surface located in an area that experiences heavy rainfall. (06 M)
   C. Write a note on QKV curve. (06 M)

5. A. Write note on: (08 M)
   a. O-D Survey
   b. Types of conflicts at an intersection.
   B. What is the maximum allowable superelevation on a highway according to standard road design codes? Also, for a highway curve with a 100 m radius and a design speed of 50 kmph, what is the required superelevation, assuming a coefficient of lateral friction (f) of 0.15? (06 M)
   C. Explain construction procedure of rigid pavement. (06 M)

6. A. Enlist various test performed in laboratory and explain anyone in detail. (08 M)
   B. Discuss on highway drainage. (06 M)
   C. Considering a four-legged intersection in Navi Mumbai where the North-South road connects Mahape and Pawne, the East-West road connects Shilphata and Koparkhairne, and the maximum safe speed towards intersection is 20 kmph, what specific traffic signs and their optimal locations would you recommend as a Traffic Engineer to install before and after the junction? (06 M)



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