

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2082 Chaitra

Exam.	Regular (New Course)		
Level	BE	Full Marks	60
Programme	BCE	Pass Marks	24
Year / Part	III / I	Time	3 hrs.

Subject: - Transportation Engineering I (ENCE 304)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. Define runway and taxiway. Describe the factors to be considered in selection of airport site. [2+4]
2. Check whether it is safe to overtake in a two-lane two-way highway for the following conditions: available sight distance is 480 m, reaction time is 2 sec, the overtaking operation time is 5 sec, the design speed is 80 km/h. What will be the effect on above result if the traffic is one way? [6]
3. What are the requirements of an ideal highway alignment? Describe the procedure of the conventional method of preliminary survey. [3+3]
4. A parabolic vertical curve joining an ascending gradient of 2% to another ascending gradient of 6% has been designed based on comfort criteria, with a total curve length of 30 m. Calculate the comfortable speed on the curve using a rate of change of centrifugal acceleration of 0.6 m/s^3 , and design the curve length required to satisfy the headlight sight distance conditions. Assume the height of the headlight beam to be 0.75 m and the vertical dispersion angle of the headlight beam to be 1° . Determine the elevation of the lowest point on the curve and the elevation at a point 10 m to the left of the PVI, given that the elevation of the PVI is 120 m. [6]
5. Calculate the length of transition curve and shift, if the design speed is 80 kmph. The radius of circular curve is 250 m. An allowable rate of change of centrifugal acceleration is 70 cm/s^3 . Allowable rate of change of superelevation is 1 in 120. The width of the pavement is 7.00 m. Assume rotation of pavement about the inner edge. [6]
6. Explain in detail how design speed, design vehicle and topography affect geometric design of road. [2+2+2]
7. Explain longitudinal drainage system with sketches. What are the causes of moisture variation in subgrade soil? [4+2]
8. Explain laboratory procedure for conducting the ductility test of bitumen. [6]
9. What is the difference between bulk and apparent specific gravity of aggregate? How bulk specific gravity is determined in the laboratory? [2+4]
10. Write short notes on: [3×2]
 - a) Momentum grade
 - b) Control of seepage flow
 - c) Desirable properties of bituminous mix