Mid-West University

Examinations Management Office

Semester End Examinations 2081

Bachelor level/ B.E. Hydropower/ 5th Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

Subject: Road Engineering (HE456/HE306)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. a) Briefly Explain the historical development of road & road construction in Nepal. **[2+2]**

b) What are the factors that control highway alignment? Explain. **[4]**

2. a) The design speed of a highway is 80 KMPH. There is a horizontal curve of radius 100m on a certain locality. Calculate the super elevation needed to maintain this speed. If maximum super elevation of 1 in 15 is not to be exceeded, Calculate the maximum allowable speed on this horizontal curve. **[4]**

b) Compute the minimum sight distance required to avoid a head on collision of two busses approaching from the opposite directions. The speed of both busses is 68.5 kmph. Assume a total perception and brake reaction time of 3.5 seconds. Coefficient of friction is 0.4 and brake efficiency is 50%. **[4]**

3. a) Write short notes. (i) Median Strip (ii) Carriageway (iii) Shoulders (iv) Right of Way **[4]**

b) Why the highway drainage is important? Explain with suitable reasons. **[5]**

4. a) Briefly explain the consistency test on binders. **[5]**

b) Briefly explain (i) Bio engineering works (ii) Drainage structures for hill roads. **[5]**

5. a) Design the pavement for construction of a new two lane carriageway for design life 15 years using IRC method. The initial traffic in the year of completion in each direction is 150 commercial vehicles per day and growth rate is 5%. Vehicle damage factor based on axle load survey is 2.5 standard axle per commercial vehicle. Design CBR of subgrade soil is 5%. **[5]**

b) What do you mean by river training structure? Classify bridges and their components. **[1+4]**

c) Briefly explain the construction of cement concrete pavement. **[5]**

The End