Mid-West University

# Examinations Management Office

End Semester Examinations 2081

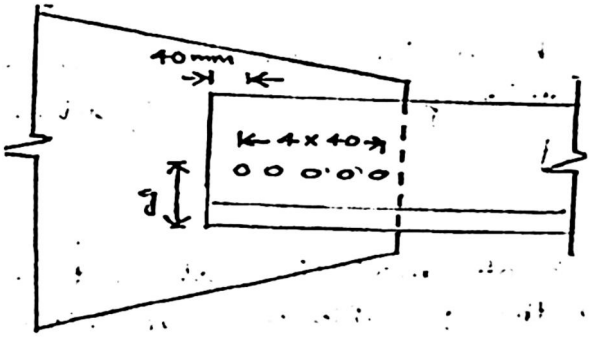
Bachelor level/ B.E. Hydropower/ 6th Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

**Subject: Design of Steel Structures (HE461/HE309)**

- *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.*
- *IS800-2007, IS875-1987/2015 (all parts) IS883-1994 & SP6/SP38, Standard Steel Table and all codes are allowed to use.*

1. Explain why Limit state design method has become more popular than the working stress design method. Design a double cover plate butt joint of two plates of 120mm width if the thickness of one plate is 16mm and other one is 12mm. Joint has transfer a load of 180 KN. Given M20 bolts of grade 4.6 and E250 plates are used. Take thickness of cover plate is 10mm individually. **(2+4)**
2. Define the term of Web buckling, Crippling and Local buckling with sketch. A Simply supported steel joist of 6 m effective span is laterally unsupported throughout. It carries a total uniformly distributed load of 60 KN/m (inclusive of self-weight). Design an appropriate section using steel of grade Fe410. **(2+7)**
3. Find the design wind pressure on a sloping roof of span 10m and pitch 1/4. The height of the eves is 6 m above ground. The expected life of building is 100 years. The building is situated in Kathmandu and its permeability is normal. **(6)**
4. Design of welded plate girder 19m long laterally supported throughout is has supported a uniformly distributed load of 150KN /m without self-weight, grade of steel Fe410 and design of end bearing stiffener. Assume all other suitable data if necessary. **(9)**
5. Explain the components of Transmission Tower with sketch and also classify the Transmission Tower as per Cable orientation and Angle of Sag. **(6)**
6. A Rolled steel beam ISHB350@67.4 Kg/m is used as a column . The column is fixed in position but not in direction at both ends. Determine the design compressive strength of the section if the length of column is 7.5m. **(6)**
7. A single angle ISA 90x60x6 mm is connected to a 10mm gusset plate at the end with 5 numbers of 16mm diameter bolts to transfer tension. Determine the tensile strength of angle. **(8)**
   a) Let g=50mm for 90mm length
   b) Let g=30mm for 60mm length




**The End**