



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food. Engg.) 2016 Admission
V Semester Final Examination-January-2019

Cien.3105

Design of Structures (1+1)

Marks: 50
Time:2 hours

I State True or False (10x1=10)

- 1 The most economical section for a column, is tubular section.
- 2 A beam is defined as a structural member subjected to axial loading.
- 3 Web crippling generally occurs at the point where deflection is maximum.

Fill in the Blanks

- 4 The ratio of shearing stress to shearing strain within elastic limit, is known as _____
- 5 The Indian standard code which deals with steel structures, is _____
- 6 When two plates are placed end to end and are joined by two cover plates, the joint is known as _____

Define the Following

- 7 Neutral axis.
- 8 Lever arm.
- 9 Modular ratio.
- 10 Flanged beam.

II Write Short notes on any FIVE of the following (5x2=10)

- 1 Center line method.
- 2 Effective length of weld.
- 3 Web crippling in steel beam.
- 4 Main differences between limit state and working state methods.
- 5 Fe250, Fe415 and Fe500.
- 6 Differentiate between one way and two way slab.
- 7 Book value.

III Answer any FIVE of the following. (5x4=20)

- 1 The two plates of 20mm and 18mm thickness are to be joined by a groove weld. The joint is subjected to a factored tensile force of 430kN. Due to some reasons the effective length of the weld that could be provided was 180mm only. Check the safety of the joint if single V groove weld is provided.
- 2 Show with neat diagram slab base and gusseted base plate.
- 3 Calculate the design shear strength of a 16mm diameter bolt of grade 4.6 for double cover butt joint. Each of the cover plate being 8mm thick. The main plate to be jointed are 12mm thick.
- 4 Calculate the maximum load that can be carried by 400x400mm square column reinforced with 8 bars of 22 mm diameter. The effective length of column is 4 m.
- 5 Discuss critical section for punching shear in RCC footings.
- 6 An R.C.C. beam of width 450mm and depth 750mm is reinforced with 8 bars of 20mm diameter. If the stresses in steel and concrete are not to exceed 230MPa and 7MPa respectively, determine moment of resistance considering it as over reinforced.
Assume $m = 13.33$.
- 7 Differentiate between scrap and salvage value.

P.T.O

IV Answer ANY ONE of the following

(1x10=10)

- 1 Design a slab over a room 4m x 6m as per IS Code. The edge of the slab are simply supported and corners are not held down. The live load on the slab is 3000 N/m² . The slab has bearing of 150 mm on the supporting walls. Use M20 concrete and Fe-415 steel. Use limit state method.
- 2 Calculate the design compressive load for a stanchion 350@710.2N/m, 3.5m high. The column is restrained in direction and position at both ends. It is to be used as an uncased column in a single storey building. Use steel of grade Fe-410.
