M.TECH. DEGREE EXAMINATION
Model Question Paper - I
Branch: Civil Engineering
Specialization: Geomechanics and Structures
First Semester
MCEGS 105 – 4 DESIGN OF STEEL-CONCRETE COMPOSITE STRUCTURES

(Regular – 2013Admissions)

Time: Three hours   Maximum: 100 Marks

*Answer **all** questions*
(Use of IS: 800-2007 and Eurocode 4 are permitted)

1. a) What is a steel concrete composite structure ?   (5 Marks)

    b) A composite beam of 8 m span is spaced at 3m c/c.Thickness of RC slab is 125 mm. The floor has to carry an imposed load of 3 KN/m^2, partition load of 1.5 KN/m^2 and a floor finish load of 0.5 KN/m^2. The floor will not be propped during construction. Check the adequacy of the section at preconstruction stage and also design the shear connection.
                                                                           (20 Marks)

OR

2. a) Write the advantages of steel concrete composite connection   (5 Marks)

    b) The composite column of size 400X400X400 mm under the design axial load of 1500 KN and bending moment about XX axis is of 200 KNm with steel section ISMB 250 is at the centre. Steel reinforcement is 4 Nos of 12 mm dia bars. Check the adequacy of the section for uniaxial bending. Adopt M30 and Fe 415 steel.   (20 Marks)

3. Explain the design concepts for the checking the adequacy of concrete encased composite section for biaxial bending   (25 Marks)
OR

4. Design a composite truss of span 10 m with following data:
    Truss spacing = 10 m
    Slab thickness = 150 mm
    Profile depth = 75 mm
    Self weight of deck slab = 2.8 KN/m^2
    Maximum laterally unrestrained length on top chord = 1.5 m
    Adopt M 30 grade concrete.   (25 Marks)

5. a) Define shear connectors and expain its types with neat sketches   (10 Marks)
    b) Explain the characteristic strength of shear connectors   (15 Marks)

OR

6. Explain general principles for design of composite frames.   (25 Marks)

7. Explain the behaviour of box girder bridge under bending, torsion, torsional warping and distortion   (25 Marks)

OR

8. Explain the factors to be considered while the designing the composite structure uder seismic loads. Also explain the seismic behaviour of composite beams.   (25 Marks)