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Question Paper Code : 72164

26/04/2018

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M.E./M.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Elective

Structural Engineering

ST 7013 – DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Mention the advantages and disadvantages of steel structures.
2. Mention the benefits of steel-concrete composite construction.
3. Name the types of beam connections.
4. What are the two stage processes of Fatigue assessment ?
5. What is meant by castellated beam ?
6. How the trusses are classified according to the pitch ?
7. List the advantages of a multi-girder configuration.
8. Write the features of longitudinal girders.
9. Sketch the square and staggered splices in welding.
10. Why are steel structures good at resisting earthquakes ?

PART – B

(5×13=65 Marks)

11. a) i) Briefly explain the CIP concrete bridges and Precast girders. (8)
ii) What are the various classes of concrete ? Also discuss the usage of various concrete classes. (5)

(OR)

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- b) Write short notes on the following :
- i) Durability. (3)
 - ii) Cracking. (3)
 - iii) Corrosion Protection. (3)
 - iv) Lightweight Aggregate Concrete. (4)
12. a) What are the factors should designer keep in mind while design of connections. ?
Elaborate it. (13)
- (OR)
- b) Elaborate in detail about the Behaviour of elements in connections. (13)
13. a) Explain the typical cross sections of composite column with neat figures. (13)
- (OR)
- b) Elaborate the deflections, vibrations and crack control of composite slabs. (13)
14. a) Briefly explain the pitched roof trusses with neat figures. (13)
- (OR)
- b) i) Elaborate the factors which are considered in the design of a bridge. (8)
ii) Write short notes on deflection limits for girders. (5)
15. a) Determine the maximum bending moment M_{ed} of the simply supported reinforced concrete slab of the span $L = 3$ to 5 m exposed to permanent load due to own weight of the slab having the thickness h is $L/20$ m and imposed load 5 kN/m^2 . Consider 1 m width of the slab (volume weight is 25 kN/m^3), partial factor for the dead load is 1.35 , for imposed load is 1.5 . (13)
- (OR)
- b) i) How is an Elastic Response Spectrum established ? Explain. (7)
ii) Briefly discuss the aspects of seismic analysis and design checks common to all structural types. (6)

PART – C**(1×15=15 Marks)**

16. a) With a case study explain steel concrete composite construction in buildings.
Draw sketches.
- (OR)
- b) With a case study explain the failure of any one structure due to earth quake.