KUMARAGURU
college of technology
character is life

Register Number: ……..

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

CIVIL ENGINEERING

CEE119: Design of Steel Structures

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Rolled steel beams are designated by Indian Standard series and its
   a) Weight per metre and depth of its section
   b) Width of flange and weight per metre
   c) Depth of section and weight per metre
   d) Weight per meter and flange width
2. Pick up the correct statement from the following:
   a) Dead load includes self-weight of the structure and super-imposed loads permanently attached to the structure
   b) Dead loads are known in the beginning of the design
   c) Dead loads change their positions and vary in magnitude
   d) None of these
3. According to IS : 800 - 2007, the minimum thickness of a vertically stiffened web plate, shall not be less than
   a) $\frac{d}{85}$
   b) $\frac{d}{200}$
   c) $\frac{d}{225}$
   d) $\frac{d}{250}$
4. Web crippling generally occurs at the point where
   a) Bending moment is maximum
   b) Shearing force is minimum
   c) Concentrated load acts
   d) Deflection is maximum
5. The rolled steel I-sections are most commonly used as beams because these provide
   a) large moment of inertia with less cross-sectional area
   b) large moment of resistance as compared to other section
   c) greater
   d) All the above

6. If d is the distance between the flange angles, the vertical stiffeners in plate girders are spaced not greater than

a) 1.25d b) d

c) 1.5d d) 1.75d

7. Roof trusses are interconnected with adjacent trusses by

a) Sag rod b) Tie member

c) purlin d) cables

8. A tension member, if subjected to possible reversal of stress due to wind, the slenderness ratio of the member should not exceed

a) 180 b) 200

c) 250 d) 350

9. For steel members not exposed to weather, the thickness of steel should not be less than

a) 6 mm b) 4 mm

c) 8 mm d) 10 mm

10. Self supporting chimney acts like a

a) Simply supported beam b) Cantilever beam

c) Continuous beam d) Fixed beam

PART B (10 x 2 = 20 Marks)

11. List out any 4-IS codes for design of a Steel Structure.
12. Distinguish between light weight sections and rolled steel sections
13. What are the different modes of failure in beams
14. What are the applications of plate girders
15. What is the difference between flexible and rigid connections
16. What are the Types of bolts used in connections
17. What are the factors affecting the intensity of wind pressure on a roof truss
18. Draw the typical sketch showing the crane and gantry girder system
19. What is the purpose of breach opening in a chimney?
20. How the heat transfer and corrosion in steel plates of a chimney are prevented?

PART C (5 x 14 = 70 Marks)

21. a) (i) What are the types of loads and applicable codes for load estimation? (7)

(ii) Explain the design requirements of steel structure (7)

(OR)

b) (i) Explain the structural behavior and properties of steel sections (7)

(ii) Write short notes on various types of steel structures (7)

22. a) Design a beam of 8 m effective span carrying an uniform load of 40kN/m and a point load 50 kN at its midspan, if the compression flange is laterally unsupported.

(OR)

b) Design a channel section purlin for the following data:

Spacing of trusses = 5 m ; Spacing of purlins = 1.5m

Weight of sheets = 110 kN/m^2; Live load = 0.75 kN/m^2

Wind load = 1.5 kN/m^2 ; Inclination of main rafter is 20^o

23. a) Suggest a type of roof truss for an industrial building located at Guwahati with a span of 22m and a length of 60m. The roofing is galvanized iron sheet, basic wind speed is 49m/s and the terrain is an open industrial area. Building is class B building with a clear height of 8m at the eaves. Also determine the Loads acting on each joint of the truss.

(OR)

b) The following data refers to a gantry girder on which an electrically operated crane of capacity 250 kN moves.

Span of gantry girder = 6.0m ; Span of crane girder = 18m

Crane capacity = 250 kN ; Self weight of trolley = 100 kN

Minimum hook approach = 1.2 m; Distance between wheels = 3.5m

Self weight of rails = 0.4 kN/m

Determine the maximum moment and shear forces due to vertical and horizontal loads.

24. a) Design an unstiffened seated connection for a beam end reaction of 150kN. The beam is ISMB 300 connected to the flange of the column section ISHB 350.

(OR)

b) ISMB350 transmits an end reaction of 1200 kN to the web of an ISMB400. Design a framed connection. Show the details with a neat sketch.

25. a) A self supporting steel stack is 70metres high and its diameter at the top is 3.5 metres. Design the plates for the stack. The location of the place is such that the intensity of wind pressure upto 30m height is 1.4 kN/m^2

(OR)

b) Design an overhead riveted steel rectangular flat bottom tank of capacity 80000 litres. The available width and the length of plates are 1.2m.

****