SCHOOL OF PLANNING AND ARCHITECTURE, VIJAYAWADA

B. ARCH II YEAR - IV SEMESTER EXAMINATION, (SUPPLEMENTARY) JULY 2015

THEORY OF STRUCTURES (TS-4)

Maximum Marks – 100 **Time – 3.00 Hours.**

a) Answer any Five Questions
b) Question No.8 is Compulsory.
c) IS 456 and SP:16 code books are allowed into Exam Hall
d) Any missing data can be suitably assumed and stated

Q1. a) Write the properties of the concrete and discuss in brief about each property. **(15)**

b) What are the different loading standards of reinforced concrete structures? **(05)**

Q2. a) A singly reinforced simply supported beam 200mm wide by 550mm overall depth is reinforced with 4 bars of 12mm diameter at an effective depth of 500mm. The self weight of the beam together with the dead load is 3.5 KN/m. Adopting M-20 grade concrete and Fe 415 HYSD bars, estimate the maximum permissible live load on the beam. **(08)**

b) A reinforced concrete beam of rectangular section is to be designed to resist a service load of 200KN-m. Assuming the width of the beam as half the effective depth, calculate the dimensions of the beam adopting M-20 grade concrete and Fe-415 HYSD bars. **(12)**

Q3. a) Write a note on the philosophy of limit state of design. **(08)**

b) Determine the area of reinforcement required for a singly reinforced concrete section having a breadth of 300mm and an effective depth of 600mm to support a factored moment of 200KN-m. **(12)**

Q4. a) What is the design principle adopted for reinforced concrete beams with compression reinforcement. **(05)**

b) A rectangular R.C. beam of width 400mm and effective depth 600mm is to be designed to support an ultimate moment of 600 KN-m using M-20 grade concrete and Fe-415 HYSD bars design suitable reinforcements in the beam at an effective cover of 60mm. **(15)**

Q5. Design a reinforced concrete of rectangular section using the following data. **(20)**

Effective span=8m.
Working live load=30KN/m.
Overall depth restricted to 650mm.
M-20 grade concrete.
Fe-415 HySD bars.

Q6. Design a simply supported R.C.C slab for an office floor having clear dimensions of 4m x 10m with 230mm thick walls all around. Adopt M-20 grade concrete and Fe-415 grade HYSD bars. Sketch the reinforcement. **(20)**

Q7. a) Classify the columns based on its reinforcement, loading and slenderness ratio. **(10)**

b) Design the reinforcement of a column of size 400mm x 600mm subjected to axial working load of 2000KN. The column has an unsupported length of 3m and is braced against side sway in both directions. Adopt M-20 grade concrete and Fe-415 HySD bars. **(10)**

Q8. **Write short notes of *any four* of the following** **4 x 5=20**

a) Give at least two examples of pre-stressing which existed prior to its application on concrete.

b) What are the advantages of pre stressed concrete.

c) Classify the pre stressing based on source and time.

d) Write about the different stages in pre-tensioning with neat sketches.

e) Explain the limitations of pre-tensioning.

f) What is post-tensioning? Elaborate the purpose of grouting.