

F. Y. B.ARCH. SEM – II (2010 COURSE) : WINTER - 2017

SUBJECT: THEORY OF STRUCTURES AND BUILDING MATERIALS-II

Day: Tuesday  
Date: 07/11/2017

W-2017-3247

Time: 02.00 PM TO 05.00 PM  
Max Marks: 100

N.B:

- 1) Answer ANY THREE questions from Section- I.
- 2) Answer ANY FOUR questions from Section -II.
- 3) Answer to the TWO Sections should be written in SEPARATE answer books.
- 4) Neat diagrams must be drawn WHEREVER necessary.
- 5) Figures to the right indicate FULL marks.
- 6) Use of Non- programmable calculator and steel tables is ALLOWED.
- 7) Assume suitable data if NECESSARY.

SECTION-I

- Q.1 Explain the following:- With illustrative sketches, wherever necessary (20)  
(ANY FOUR)
- a) Hooke's law and modulus of elasticity.
  - b) Composite section.
  - c) Section modulus and moment of Resistance.
  - d) Equation of shear stress at a beam layer with meaning of all terms.
  - e) Slope and deflection of a simply supported beam.
  - f) Propped cantilever.
- Q.2 a) A RCC column is 300 mm in diameter. The column is provided with 6 bars of 25mm diameter. The column carries a load of 200 KN. Find the forces and stresses carried by steel and concrete.  $E_s = 2.1 \times 10^6 \text{ kg/cm}^2$  and  $E_c = 0.14 \times 10^6 \text{ kg/cm}^2$  (10)
- b) A steel rod of size 2cm x 3cm in cross section is 40 cm long. It is subjected to a pull of 40 KN. Find the change in length, breadth, depth and volume of the bar. Take  $E = 2 \times 10^6 \text{ kg/cm}^2$ . Poissons ratio= 0.33 (10)
- Q.3 a) A timber beam 100mm x 250mm (width x depth) is used as a simply supported beam of span 4m. Find out moment of resistance of the beam. Permissible bending stress=  $10 \text{ N/mm}^2$ . Also find out maximum central point load the beam can take. (10)
- b) A simply supported beam of 'L' section, having web 3cm x 12cm and flange 9cm x 3cm, is subjected to UDL over entire span of 10 N/mm. If span of beam is 3m, find out maximum shear stress acting on the beam. (10)
- Q.4 a) A hollow 4m x 4m chimney constructed in brick masonry has a wall thickness of 50cm. If the horizontal wind pressure acting normal to one of its faces is  $1130 \text{ N/m}^2$ , find its maximum height so as to avoid tensile stress at any point of its base. Density of brick masonry is  $900 \text{ N/m}^3$  (10)
- b) Find out maximum slope and deflection for a cantilever beam 3m in span, subjected to UDL of 3kg/cm over the entire span, in addition to a point load of 3KN at the free end. The beam is 200 mm x 400mm in cross section and  $E = 0.14 \times 10^6 \text{ kg/cm}^2$  (10)

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## SECTION-II

- Q.5** What are the main ingredients of Cement Concrete? Enlist the important properties of Cement Concrete. **(10)**
- Q.6** What are the various Floor coverings that could be employed in building construction? Explain in detail any 3 that could be used in framed structures. **(10)**
- Q.7** Explain the various defects in Timber. **(10)**
- Q.8** Explain briefly with a sketch, the various technical terms associated with a typical wooden pitched Roof construction. **(10)**
- Q.9** What are the advantages & disadvantages of Flat Roofs? **(10)**
- Q.10** Write short notes on: **(10)**
- a) Use of Bamboo in construction
  - b) Slaking of Lime

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