

**T. Y. B.ARCH. SEM – V (2010 COURSE) : SUMMER - 2018**  
**SUBJECT : THEORY OF STRUCTURES & BUILDING MATERIALS – V**

Day : **Monday**  
Date : **07/05/2018**

**S-2018-3323**

Time : **10.00 AM TO 1.00 PM**  
Max. Marks : 100

**N.B.:**

- 1) Attempt **ANY THREE** questions from Section – I and attempt all questions from Section – II.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Use of electronic non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Figures to the right indicate **FULL** marks.
- 6) Assume suitable data if necessary.

**SECTION – I**

- Q.1** Write short notes on **ANY FOUR** of the following: [20]
- a) Steel plate girder
  - b) Counterfort retaining wall
  - c) Types of staircases
  - d) Active and passive earth pressure
  - e) Underground water tank
- Q.2** Design a simply supported dog-legged R.C.C staircase for residential building with floor to floor height of 3m. Riser is 150 mm and tread is 250 mm. Staircase is supported over 230 mm wide beam at the outer edge of landing. Width of landing is 1.2m. Use 12 mm diameter bars for main steel and 8 mm diameter for distribution. Use M20 grade concrete and Fe415 grade steel. [20]
- Q.3** Check the stability of a masonry retaining wall having dimensions as follows: [20]
- |                                  |                        |
|----------------------------------|------------------------|
| Height of wall                   | - 4 m                  |
| Width of base                    | - 2.8 m                |
| Thickness of wall at the top     | - 500 mm               |
| Unit weight of soil              | - 17 kN/m <sup>3</sup> |
| Unit weight of masonry           | - 19 kN/m <sup>3</sup> |
| Angle of repose                  | - 26°                  |
| Coefficient of internal friction | - 0.6                  |
- Earth is retained on the vertical side of wall.
- Q.4** a) A simply supported pre-stressed beam having dimensions 300 mm × 700 mm is subjected to uniformly distributed load of 40 kN/m over its entire length. If length of beam is 7m, and beam is subjected to pre-stressing force of 500 kN at an eccentricity of 200 mm. Find extreme fiber bending stresses and plot bending stress diagram. [12]
- b) Write a short note on: [08]
- i) Elements of Intze tank
  - ii) Sketch reinforcement in stem of cantilever retaining wall

**SECTION – II**

- Q.5** Define light weight concrete. Explain its use in building industry? [10]
- Q.6** Write short notes on **ANY TWO** of the following: [10]
- a) Bitumen
  - b) P.V.C. Water Bar
  - c) D.P.C.
  - d) Guniting
- Q.7** Describe different waterproofing methods. [10]
- Q.8** Explain with sketches light weight concrete panels. [10]

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