43 (ARC-7) 7·5

2018

STRUCTURE - VII

Paper : ENG-7·5

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* What are the losses in pre-stress concrete ? Describe.

   (b) Explain why detailing is necessary for any RCC structure. Sketch the detailing for a 2-way slab. 10+10=20

2. A simply supported pre-stressed concrete beam of rectangular cross-section 300×500 is loaded with a uniformly distributed load $15kN/m$ over a span of $6m$ (including the self-weight of the beam). The pre-stressing tendons are along the longitudinal centroidal axis providing an effective force of $1000kN$. Determine the extreme fibre stress in concrete at the mid-span section. 20

Contd.

3. *(a)* What are flat slabs? Discuss its advantages and disadvantages. Also, mention the different types of flat slabs.

(b) Differentiate pre-stressed concrete beams and RCC beams. 10+10=20

4. *(a)* What is post-tensioning? Describe the process of post-tensioning.

(b) Draw structural sections of the following showing detailed reinforcement :

(i) Isolated sloped footings

(ii) Columns.

10+10=20

5. Design one of the flight of stairs of a school building spanning between landing beams with the following data : 20

Tread = 300*mm*

Rise = 150*mm*

Type of stair = Dog-leg

No. of steps in each flight = 12

Width of landing beam = 400*mm*

Grade of concrete = M20

Grade of steel = Fe415 HYSD bars.

6. *(a)* State *three* differences between one-way and two-way slabs.

(b) Name *four* different types of stairs.

(c) Design the interior panel for a flat slab for a warehouse to suit the following data :

Size of warehouse = $30m \times 30m$

Size of panels = $5m \times 5m$

Grade of concrete = M 20

Grade of steel = Fe 415

Load = $5kN/m.$

6+4+10=20

7. Write short notes on : 5×4=20

(a) Tendons

(b) Anchor

(c) Open well staircase

(d) One-way slabs

(e) Pre-stressed beams.
