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43 (5) B.Arch 5-5

2017

STRUCTURE-V

Paper : ENG- **5-5**

Full Marks : 100

Time : Three hours

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

Answer **any five** questions.

1. (a) Write down the philosophy behind limit state method and working stress method. 10
- (b) Write down about the loads considered for design of any general RCC structure. Also write about different load combinations for limit state of serviceability and limit state of collapse. 10

Contd.

2. A simply supported concrete beam of clear span $5m$ resting over walls of thickness $300mm$. A uniformly distributed load of $20kN/m$ is acting over the beam. Consider $M20$ and $Fe 500$ grade of steel. Design the beam. 20

3. (a) What is short column and long column? 5
- (b) Design a short column having an axial load of $1000kN$. Consider $M20$ and $Fe 500$ grade steel. 15

4. $5 \times 4 = 20$

- (a) What is water cement ratio? How it can influence the strength of concrete explain with proper diagram?
- (b) Write about curing methods of concrete. Also write about the water quality used in concrete mix.
- (c) Describe about balanced, under-reinforced and over-reinforced sections.
- (d) Write down the I.S. recommendations regarding longitudinal reinforcements in a column.

5. (a) Write down the I.S. recommendations regarding longitudinal reinforcements in a beam. 5

- (b) Design a simply supported slab having a size of $3.0m \times 7.0m$ and total load coming over the slab is $2.5kN/m^2$. Use $M20$ grade of concrete and $Fe 415$ grade of steel. Also draw the reinforcement arrangement in plane and elevation. 15

6. A RCC beam of rectangular section $300mm \times 650mm$, overall depth is reinforced with $4-32mm$ at an effective depth of $600mm$. Using $M20$ and $Fe 500$ grade steel, estimate the moment resistance of the section. 20

7. Design a rectangular column footing for an axial load of $600kN$ for a column having base size of $400mm \times 600mm$. The safe bearing capacity of the soil is to be taken as $120kN/m^2$. Use $M20$ grade of concrete and $Fe 415$ grade of steel. Draw longitudinal section showing all dimension and reinforcement details. 20