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BAR-044

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BACHELOR OF ARCHITECTURE

Term-End Examination

December, 2010

BAR-044 : THEORY OF STRUCTURES - V

Time : 3 hours *Maximum Marks : 70*

Note : *Question No.1 is* ***compulsory.*** *Attempt* ***any four*** *questions from the remaining questions. Use of calculator is permitted.*

1. Choose the most appropriate answer from the options given in questions (a) to (g). **2x7=14**

(a) In the grade of concrete, such as M2O, the unit of the number showing the strength is in

(i) Pascal

(ii) N/cm^2

(iii) Kg/m^2

(iv) N/mm^2

(b) Compared to medium tensile steel, mild steel is / has

(i) less ductile

(ii) more ductile

(iii) equally ductile

(iv) more strength

(c) Failure of concrete and steel in a beam occurs simultaneously in the case of

(i) a balanced section

(ii) an under reinforced section

(iii) an over reinforced section

(iv) a balanced and under reinforced section.

(d) In the case of a one way slab the aspect ratio is

(i) less than 1

(ii) more than 2

(iii) less than 2

(iv) more than 12

(e) Due to compression steel in a beam

(i) deflections are reduced

(ii) deflections are increased

(iii) the beam becomes over reinforced

(iv) the beam becomes weak as compression steel cancels the tensile steel.

(f) Choose the correct statement.

(i) Cover - concrete also provides strength in a concrete beam.

(ii) IS 465 is used for design of RC structures

(iii) Bond between concrete and steel does not depend on grade of concrete

(iv) Concrete in tension zone in a beam is neglected.

(g) Select the correct statement.

(i) Shear reinforcement is usually not provided in beams.

(ii) Ties in columns increase the shear resistance of columns.

(iii) Quality of water does not affect quality of concrete.

(iv) Concrete is equally strong in tension and compression.

2. (a) Write assumptions made in the design of RC beams. 7

(b) Determine the neutral axis depth from the top of a beam at ultimate limit state for the following data. 7

Width = 300 mm, effective depth = 550 mm
$A_{st} = 1963 mm^2$, $f_y = 415$ MPa, $F_{ck} = 20$ MPa.

3. (a) Briefly discuss properties of mild steel. 7

(b) What do you understand by detailing of reinforcement ? Discuss it with reference to shear reinforcement in a beam. 7

4. (a) What are doubly reinforced sections ? Discuss briefly giving an example. 7

(b) Explain the procedure of a "pull out test" to measure bond strength of concrete. 7

5. (a) Discuss effect of slenderness on load carrying capacity of columns. 7

(b) What do you understand by 'Punching Shear' ? Explain with a neat sketch. 7

6. (a) What do you understand by 'Earthquake resistant structures' ? Why earthquake proof structures are not aimed to be designed ? 7

(b) Discuss the procedure of design of shear reinforcement in a beam. 7

7. Write short notes on any **two** of following . **2x7=14**

(a) Design of two way slabs

(b) Composite sections

(c) Types of foundations.