

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – II • EXAMINATION – WINTER 2012

Subject code: 1721502**Date: 31-12-2012****Subject Name: Behavior of Reinforced Concrete****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of relevant IS 456 and SP 16 are permitted.

- Q.1 (a)** Why it is important to consider the serviceability criteria of the structure? What are various conditions and types of structures where this criteria governs the design? How it is accounted in design? **06**
- (b)** Describe different idealized stress-strain characteristic curve of unconfined concrete. **08**

- Q.2 (a)** How does spacing of longitudinal bars and transverse steel affect the confining compressive strength of concrete? Explain various spacing criteria in beams and columns. **07**
- (b)** What do you understand by active and passive confinement of concrete? Describe effect of multiaxial stresses on concrete. **07**

OR

- (b)** Differentiate between failure criteria of (i) working stress method (ii) Ultimate strength method and (iii) Limit state method. Explain difference between assumptions made in limit state and working stress method as per IS 456. **07**
- Q.3 (a)** Explain various failure mechanism of reinforced concrete beam under pure flexural loads. **08**
- (b)** Derive various parameters of stress-strain curve prescribed by IS 456 under flexure **06**

OR

- Q.3** Explain the analysis of column having steel on two faces under axial load and uniaxial moment. **14**

- Q.4 (a)** Explain principal mechanism of shear resistance in a reinforced concrete beam. **07**
- (b)** How torsion is resisted by a reinforced concrete member? Explain in brief. **07**

OR

- Q.4 (a)** Why it is important to calculate deflections of beams? **02**
- (b)** Explain various methods to analyze slabs under flexural load. **06**
- (c)** Describe IS code provisions related to anchorage? Explain significance of parameters associated with them. **08**

- Q.5 (a)** IS 456 prescribes increase in bond strength when HYSD bars are used and when steel is embedded in compression zone. Why? **04**
- (b)** Describe in brief: **10**
- (i)** Why do we provide bars on compression face even designing a beam as singly reinforced beam? Is there any contribution of this

- steel in resisting mechanism? If so, how?
- (ii) Justify “ A beam always fails by crushing of concrete irrespective of whether it is designed as singly, doubly or balanced”

OR

Q.5 Write a short note on following (Attempt any four):

14

- (a) Minimum eccentricity in column
- (b) Plastic behavior of RC beam
- (c) Effect of shear span in RC beams
- (d) Equivalent effect of torsion and shear
- (e) Stress strain behavior of concrete under dynamic load
- (f) Effect of spirals and ties on confinement of concrete in column
