

**GUJARAT TECHNOLOGICAL UNIVERSITY**

M.E Sem-II Remedial Examination December 2010

Subject code: 721502

Subject Name: Behaviour of Reinforced Concrete

Date: 20 /12 /2010

Time: 02.30 pm – 05.00 pm

Total Marks: 60

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss the various stress-strain models for concrete proposed by researchers. **06**  
 (b) Explain the concept of nominal flexural strength of a beam and codal provisions to prevent brittle failure of beam in flexure. **06**
- Q.2** (a) Discuss the response of RC elements under biaxial bending. **06**  
 (b) When can the T-beam action be justified in the design process? State the measures taken to ensure that in the usual construction practice the slabs and beams in a frame structure act as monolithic. **06**
- OR**
- (b) Clarify why shear design is considered as limit state of collapse? Explain how does a concrete beam resist shear? **06**
- Q.3** (a) Justify the statement giving example: Yield line theory is the simplest approach that the designer can use and it represents the true behaviour of reinforced concrete slabs **04**  
 (b) Derive 'm' for the isotropically reinforced circular slab , simply supported all around and uniformly loaded. **08**
- OR**
- Q.3** (a) Sketch neatly the trajectories of principal stresses in a homogenous isotropic beam **04**  
 (b) The role of web reinforcement in torsion members is similar is similar to that of stirrups in flexural members subject to shear. Justify the statement .State the provisions from the code. **08**
- Q.4** Explain the significance of any three **12**  
 (i) effect of slenderness ratio and radius of gyration  
 (ii) beam with very small amount of steel  
 (iii) confinement effect  
 (iv) moment curvature relationship
- OR**
- Q.4** A short eccentrically loaded column has uniaxial bending. Discuss the modes of failure in combined axial load and uniaxial bending in context of their strain diagram and location of neutral axis. **12**
- Q.5** (a) A rectangular cantilever beam of 3m span is 300 mm wide and 600 mm deep , and is reinforced with 3 bars of 25 mm at tension side ,placed at an effective cover of 50 mm .It is subjected to a maximum bending moment of 125 kN-m at the fixed end , out of which 50% is due to permanent loads. Check the beam for deflection. Assume M20 concrete and Fe 415 steel. **12**
- OR**
- Q.5** (a) State the precautions taken and measures practiced to reduce deflection. What are the limits of deflection of a structure or a structural member as given by the code of practice? **06**  
 (b) What is a local bond and Why is it called flexure bond? What are the factors influencing the stress transfer mechanism of bond .? **06**

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