

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1.	Differentiate between the Working Stress Method (WSM) and the Limit State Method (LSM) in terms of safety, economy, and design philosophy.	1	3
Q2.	A reinforced concrete beam of 250 mm × 500 mm (effective depth) is subjected to a moment of 200 kNm. The beam is reinforced with two layers of tensile reinforcement (total $A_{st} = 1600 \text{ mm}^2$) and compressive reinforcement (total $A_{sc} = 400 \text{ mm}^2$) with $f_{ck} = 25 \text{ MPa}$ and $f_y = 415 \text{ MPa}$ ($\sigma_{st} = 140 \text{ MPa}$, $j = 0.87$). Determine whether the beam is safe for the given moment using the working state method.	1	5
Q3.	Define yield line theory and explain its significance in the design of reinforced concrete slabs.	2	3
Q4.	A simply supported square slab of size 4 m × 4 m is subjected to a uniformly distributed load (UDL) of 10 kN/m ² . The slab is reinforced in both directions with steel having yield strength of 415 MPa and a moment capacity of 50 kNm/m. Using Yield Line Theory, determine whether the slab can safely carry the applied load.	2	4