

Note: Attempt all questions all questions carry equal marks. Assume any missing data if required.

Q1: Explain in detail types of stirrups with figures and also explain ACI codes for shear design.

Q2: A simply supported rectangular beam 14 inch wide having an effective depth 22 inch to carry a lateral load of 6.5 k/ft on a 18 feet simple span. It is reinforced with 7 inch<sup>2</sup> of tensile steel area, if  $f_c'$  is 4 ksi and  $f_y$  is 60 ksi then design the beam for shear.

Q3: Define both the T-Beam and L-Beam with the help of diagram. Also explain flexural strength analysis for T-Beam.

Q4: What is difference between CASE-1 & CASE-2 in the design of T-Beam.

Q5: A floor system consist of 3.5 inch concrete slab support by 16 feet simple span beam spaced at 9 feet center to center, the beam have a web width of 10 inch and effective depth if 18 inch and total height is 23 inch calculate the necessary flexural reinforcement if the factored applied moment is 5800 k-inch use  $f_c'$  is 3ksi and  $f_y$  is 60 ksi.

Q6: A beam is revised to developed and ultimate moment of 6000 k-inch is limited to 14\*26 inch size, use  $f_c'$  is 4 ksi and  $f_y$  is 60 ksi. Determine flexural reinforcement assume two rows of tensile reinforcement and effective depth of beam is 22 inch.