BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: B.Tech & B.Arch **SEMESTER :5th/ADD**
BRANCH: Civil & Environmental Engineering & Architecture **SESSION : MO/2025**

SUBJECT: CE301 STRUCTURAL DESIGN I

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**
5. IS456 is allowed in the examination hall

			CO	BL
Q.1(a)	Discuss **0.2% Proof** stress of HYSD bars.	[2]	CO1	2
Q.1(b)	Why P**artial safety factor** of materials are introduced ?.	[3]	CO1	3
Q.2(a)	Discuss "**Limit State of Serviceability**" " as per " Limit State Design Methodology" as per IS456	[2]	CO1	2
Q.2(b)	Calculate the U**ltimate moment of resistance** for a RCC beam of rectangular cross section 250mm x 500mm , reinforced with 2no.-16 mm HYSD bars of grade Fe500 and concrete grade M30.Effective cover = 50mm.Apply " Limit State Method of Design " as per IS456	[3]	CO2	2
Q.3(a)	Discuss " **Stress block parameters**" for "Limit state of Collapse".	[2]	CO1	3
Q.3(b)	Design a simply supported beam of span 6m , carrying a superimposed load of 20 Kn/m (DL+LL) against **bending moment** as an **under reinforced section**. Use HYSD bars of grade Fe415 and concrete grade M25. Apply " Limit State Method of Design " as per IS456	[3]	CO2	2
Q.4(a)	Discuss "**Balanced section**" as per " Limit State Design Methodology" as per IS456	[2]	CO1	2
Q.4(b)	A RCC beam of 5m, carrying a superimposed load of 20 Kn/m (DL+LL). rectangular cross section 250mm x 500mm , reinforced with 3no.-20 mm HYSD bars of grade Fe415 and concrete grade M25. Effective cover = 50mm. **Design for shear reinforcement** . Apply " Limit State Method of Design " as per IS456	[3]	CO2	2
Q.5(a)	Discuss " One way slab" and "Two way slab" .	[2]	CO3	2
Q.5(b)	Design a rectangular slab of dimension 4m X 5m , having **two adjacent edges discontinuous and other two edges continuous** , against a live load of 3 Kn/sq.m, against **bending moment**. Use HYSD bars of grade Fe415 and concrete grade M25. Apply " Limit State Method of Design " as per IS456	[3]	CO3	3

:::::18/09/2025:::::M