

B. TECH.
(SEM-V) THEORY EXAMINATION, 2019-20
DESIGN OF CONCRETE STRUCTURE-I

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.
 IS456-2000 allowed.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**
- a. What is the posts and struts.
 - b. What is Characteristic Loads?
 - c. What is the necessity of providing shear reinforcement?
 - d. Draw the neat sketch of simplified curtailment rules for Simply Supported Beam.
 - e. What is the Doubly Reinforced T-Beam?
 - f. Define Slenderness Ratio for Column and distinguish column base slenderness ratio.
 - g. How you will Check shear in Two ways Slab?
 - h. What is the minimum reinforcement in slab?
 - i. Define Deflection due to Shrinkage.
 - j. Draw figure for one-way slab and Two-way slabs for Bending.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**
- a. Find The MOR of an RCC beam 300mmx500mm effective depth is required with 3bars of 16mm .Use M20 concrete and Fe415 steel By WSM.
 - b. A reinforced concrete beam 200mmx400mm effective is reinforced with 3-16mm dia. bar of Fe415 steel. Find the Ultimate UDL which the beam can carry safely over a span of 5 mtr. Use M20 concrete And Fe415 steel. by LSM
 - c. Explain the Short Term Deflection and Long Term Deflection.
 - d. Determine the Ultimate MOR of a 150mm thick slab reinforced with 10mm dia. bars at 200mm c/c .The effective cover is 25mm.Use M20 concrete and Fe415steel By LSM.
 - e. What is the function of Providing distribution steel in a Slab? Define restrained and unrestrained slabs?

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**
- (a) Analyze a rectangular beam300mm x 500mm effective depth .Determine the ultimate MOR for the tension reinforcement of 4-16 mm dia. bars .Use M20 and Fe415 steel.
 - (b) Write down the designing steps of Doubly Reinforced section for LSM.
4. Attempt any *one* part of the following: **10 x 1 = 10**
- (a) A simply supported slab of a corridor of a Hospital building has a clear span 2.5 mtr. And is supported on beams 230mm thick. Design the slab and check for Shear and Deflection. Use M20 concrete and Fe415 steel if beam is carrying a live load of 5Kn/m². Draw Sketch for Detailing.
 - (b) What do you understand continuous slab? And Draw figure for typical Detailing of reinforcement in Continuous Slab.

5. Attempt any *one* part of the following: 10 x 1 = 10

- (a) What do you understand by the term of Anchorage Bond? Prove the expression to find the development length of Bars in Tension.
- (b) A T-beam flange width 1500mm, flange thickness 100mm , width of rib is 300mm has an effective depth of 600mm.The beam is reinforced with 5bars of 22mm diameter .determine the ultimate MOR .Use M20 Concrete and Fe415 steel.

6. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Give steps for designing a beam subjected to BM and Torsional Moment.
- (b) A simply supported beam 6 mtr span is 500mmx700mm in size. reinforced with 5-25mm diameter bar on tension side ,Calculate the design surface crack width at the following locations if M20 grade concrete and Fe415steel used:
 - (i) At the bottom corner on the tension face
 - (ii) Under the middle bar on tension face
 - (iii) At a point mid way between two bars on the tension face.

7. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Design a circular column of dia. 400mm subjected to a load of 1200Kn is 3 mtr long and is effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe415 steel. Draw the figure for structural Detailing.
- (b) Design a Short Column of size 500x600mm subjected an axial load $P_u=2000\text{KN}$ and Biaxial Bending Moment as follows: $M_{ux}=150\text{KN-m}$, $M_{uy}=120\text{KN-m}$, use M20 concrete and Fe415 steel. Draw Detail.