

(REVISED COURSE)

(4 Hours)

Total Marks-100

N.B.

- 1) Question No.1 is compulsory. Attempt any three out of remaining four questions.
- 2) Use of codes IS-456 and IS-3370 is permitted.
- 3) Assume additional data if necessary but justify the same

Q.1 Design a rectangular surface water tank of size 6 m x 4 m x 3 m. The tank is open at the top. Use approximate method of design. Adopt concrete M20, steel Fe415. (40)

Sketch the reinforcement details for following-

- (a) Sectional plan at 1 m height from bottom.
- (b) Sectional elevation through walls showing reinforcement details at support and mid span. 0

OR

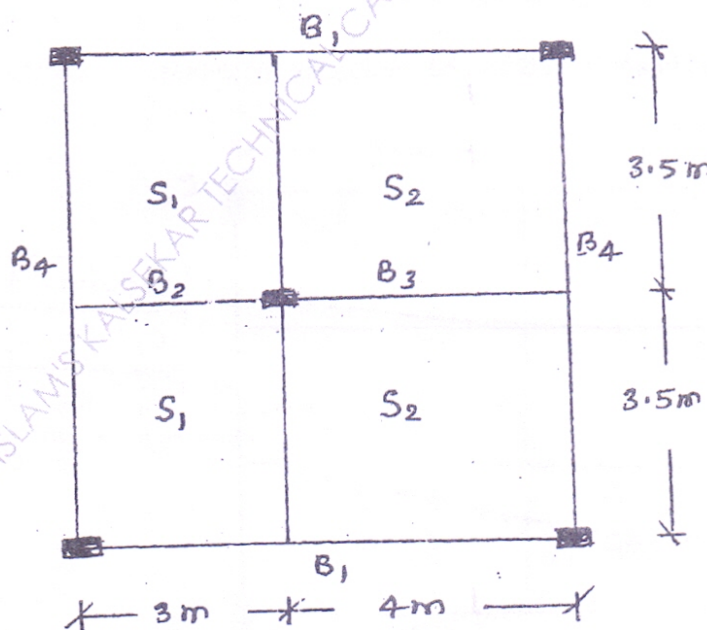
Q.1 The floor system shown below is subjected to live load of  $3 \text{ KN/m}^2$  and floor finish load of  $1 \text{ KN/m}^2$  in addition to self weight. All the external beams support 230 mm thick brick wall of height 3.3 m & internal beams carry 115 mm thick brick wall of same height of 3.3 m.

Use LSM & adopt concrete M20, steel Fe415 to design-

- (a) Slab  $S_1$  and  $S_2$
- (b) Beam  $B_2 - B_3$  and beam  $B_4$

Also sketch the reinforcement details.

(40)



TURN OVER

Q.2 Design a suitable dog-legged staircase for a public building to be located in a stair room of size 6 m x 3 m. Take floor to floor height 3.6 m. Live load = 4 KN/m<sup>2</sup>. Finish load = 1.25 KN/m<sup>2</sup>. Use LSM with Concrete & steel grade M20 and Fe415.

Also draw-

- Plan showing flight dimensions, mid landing and position of support.
- Loading diagram, SFD & BMD of typical flight.
- Reinforcement details in flight through sectional elevation.

(20)

Q.3 A cantilever type retaining wall is required to support leveled earth back fill. The height of wall above the general ground level is 4.2 m. Design all the components using following additional data-

SBC of soil = 150 KN/m<sup>2</sup>

Angle of repose = 28°

Unit weight of earth fill = 18 KN/m<sup>3</sup>.

Friction coefficient between soil and concrete = 0.55

Use concrete M20 & steel Fe415. Adopt LSM. Also draw complete reinforcement details. (20)

Q.4 (a) Design a RC circular water tank for 350 m<sup>3</sup> capacity. The tank is resting on the ground having fixed base and it is free at the top. The height of tank is restricted to 4 m including free board. Use concrete M25 & steel of grade Fe 415.

Also draw reinforcement details. Use IS code method. (14)

(b) Explain with neat sketches the difference in structural behavior between cantilever & counterfort type retaining walls. (6)

Q.5 Figure shows the layout of building columns and load on column at foundation level. Design suitable raft foundation. All the column are of size 400 mm x 400 mm. Consider SBC of soil as 110 KN/m<sup>2</sup>. Adopt concrete M20 & steel Fe415.

Design only slab and main beam 'A' & draw the reinforcement details. (20)

