FAQs

1. **Define the term: Continuous slab.**

   The slab supported over more than two supports is called as continuous slab.

2. **Write the IS codal provisions for using moment coefficients given in IS 456:2000 for the design of continuous slab.**

   Unless more exact estimates are made, for slabs of uniform cross-section which support substantially uniformly distributed loads over three or more spans which do not differ by more than 15 percent of the longest, the bending moments and shear forces used in design may be obtained using the coefficients given Table 12 of IS 456:2000. For moments at supports where two unequal spans meet or in case where the spans are not equally loaded, the average of the two values for the negative moment at the support may be taken for design.

3. **Give the moment coefficients for bending moment calculations as per IS 456:2000**

Type of load	**Span Moments**		**Support Moments**	
	Near the middle of end span	**At middle of interior span**	**At support next to the end support**	**At other interior supports**
Dead load and imposed load (fixed)	+1/12	+1/16	- 1/10	- 1/12
Imposed load (not fixed)	+1/10	+1/12	- 1/9	- 1/9
For obtaining BM, the coefficient shall be multiplied by the total design load and effective span				

4. **Design a five span one way continuous floor slab over an effective span of 3.0m required for an institutional building. It carries a live load of 3 kN/m^2 and consider other dead loads also. Adopt M20 concrete & Fe415 steel. Draw the section of slab showing reinforcement details also.**

   <u>a. Load calculations:</u>

   i. Dead loads:

   Assuming thickness of slab from Cl. 23.2.1

	l/d	=	26		
	d	=	3000/26	=	115.40
	D	=	115.40 + 15 + 8/2	=	134.38mm
Assume	D	=	125mm		
Self weight of slab		=	0.125 x 25	=	3.125 kN/m^2
Weight of floor finish		=	0.025 x 24	=	0.60 kN/m^2
Weight of partitions (as per IS875)				=	1.96 kN/m^2

Total dead loads w_d = **5.685 kN/m²**

ii. Live load on slab w_l = **3.0 kN/m²**

b. Moment calculations:

i. Span moments

Moment near the middle of end span = $w_d l^2/12 + w_l l^2/10$ = 6.96 kNm

Moment at the middle of interior span = $w_d l^2/10 + w_l l^2/12$ = 5.45 kNm

ii. Support moments

Moment at support next to end support = $-w_d l^2/10 - w_l l^2/9$ = - 8.12 kNm

Moment at other interior supports = $-w_d l^2/12 - w_l l^2/9$ = - 7.26 kNm

c. Effective depth of slab:

here maximum BM M_d = 8.12 kNm

M_u = 1.5 x 8.12 = 10.80 kNm

by equating M_u to $M_{u,lim}$,

d = 66.43mm < 106mm

Hence safe against moment.

Hence keep D = 125mm; d = 106mm

d. Area of reinforcement – Main Steel

A_{st} for Maximum bending moment

$\mathbf{M_u = 0.87 f_y A_{st}(d-o.416x_u)}$

where $x_u = \mathbf{0.87 f_y A_{st} / 0.36 f_{ck} b}$

$= 0.05\ \mathbf{A_{st}}$

Now $\mathbf{A_{st\ reg} = 340.67\ mm^2}$

Check for Minimum steel as per IS 456:2000

A_{st} = 0.12% cross sectional area

= 127.2 mm² < 340.67mm²

Hence $A_{st\ reg}$ = 340.67mm²

Provide 8mm diameter bar

Spacing = 147.55mm

Provide 8mm diameter bar at 125mm c/c

$A_{st\ pro}$ = 402.12mm²

Distribution Steel

A_{st} = 0.15% cross sectional area

= 159 mm²

Use 6mm dia ms bar

Spacing = 177.83mm

Provide 6mm dia MS bar at 150mm c/c

e. Check for deflection

As per cl.23.2.1 of IS 456:2000

l/d = 26 x M.F

p_t = 0.40%

f_s = $0.58\ f_y\ A_{st\ reg} / A_{st\ pro}$ = 340.67 N/mm^2

As per Fig.4 of IS 456: 2000; M.F = 1.6

Hence d = 72.12mm < 106mm

Hence safe against deflection.