

16-12

F → Flexi  
M → man  
S →

T → theory

N → not mention

	<u>15-16</u>	<u>14-15</u>	<u>13-14</u>	<u>12-13</u>	<u>11-12</u>
1 (a) → theory	1 (a) → M	1 (a) F	1 (a) M	1 (a) M	1 (a) F
(b) → Flexi	(b) M	(b) F	(b) M	(b) M	(b) S
2 (a) → T	2 (a) S	2 (a) F	2 → F	2 (a) M	2 (a) F
(b) → F/N	(b) S	(b) F	3 → M	2 (a) M	(b) S
3 (a) → F/N	3 (a) S	3 (a) S	4 → F	(b) S	(b) S
(b) → F	(b) M	(b) S	5 → M	2 (a) S	3 (a) N
4 (a) → S	4 (a) M	4 (a) S	6 → F	(b) S	(b) S
(b) → M	(b) S	(b) → T	7 → M	4 (a) S	4 → S
5 (a) → M	5 (a) F	5 (a) T	8 → S	5 (a) F	5 (a) M
(b) → M	(b) F	(b) M	9 → S	(b) F/T	(b) F
6 (a) → M	6 (a) F	6 (a) M	10 → S	6 (a) F	6 (a) Scope
(b) → M	(b) F	(b) M	11 → S	(b) F	(b) M
7 (a) → M	7 (a) F	7 (a) S	12 → S	2 (a) F	7 (a) M
(b) → S	(b) S	(b) F	13 → S	(b) F	8 (a) Scope
8 (a) → S	8 (a) N	8 (a) S	14 → F	8 (a) F	(b) —
(b) → S	(b) S	(b) S			

S → 4  
F → 4  
M → 5

S → 5  
F → 5  
M → 4

S → 6  
F → 5  
M → 3

S → 6  
F → 4  
M → 4

S → 4  
F → 6  
M → 2

S → 4  
F → 3  
M → 3

13-14

11 12  
10 11  
8 9

Nothing is certain

2016-17

1 (6)

Linear Structural system: Linear structural system

is a system where a linear relation holds between applied forces and displacement.

In practice this is applicable where stress remain in linear elastic range.

It is important because it can evaluate whether a specific structural design will be able to withstand external and internal stresses and forces expected for the design.

non-linearity: The main cause of non-linearity is stiffness. which is the response of a system to any particular loading.

Stiffness depends on → material, geometry, Support condition, temperature etc.

A deformation in structure results in a change in its stiffness.

16-17

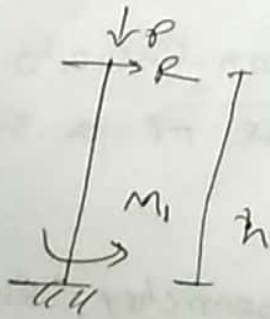
2(a)

P-Δ effect:

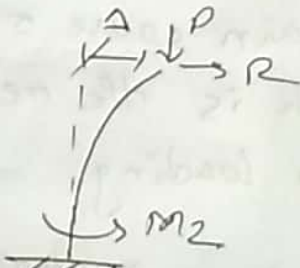
about change in second shear/moment/axial force distribution at the base of tall structure when it is subjected to a critical lateral displacement.

It is second order effect, since the magnitude depends on the amount of initial displacement.

The P-Δ effect is a ~~destabilization~~ destabilizing moment equal to the force of gravity ~~or~~ multiplied by the horizontal displacement a structure undergoes when loaded laterally



$$M_1 = Rh$$



$$M_2 = Rh + P \cdot \Delta$$

14-15

4(b)

Muller - Breslau principle:

→ Influence line of Determinate structure is straight line due to rigid body motion

→ Influence line of indeterminate structure is curved due to lack of rigid body motion

Determinate



Indeterminate



14-15

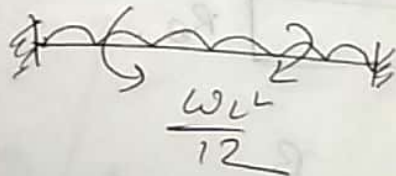
5(a)

Stiffness:  $\rightarrow$  rigidity of an object.  $\rightarrow$   
the extent to which it resists deformation  
in response to applied force.

$$k = \frac{F}{\delta}$$

more flexible  $\leftrightarrow$  less stiff.

FEM: rotational force being applied  
at the fixed end support to  
resist rotation.



+ Rakib Sir वद  
Dimension idealization  
प्रश्न 220