13 CHAPTER

Shear Centre

Q.1 The shear centre may be defined as
(a) the point through which the resultant of the shear stresses pass
(b) the point through which the moment of the shear flow is zero
(c) the point through which the resultant of the shear flow passes
(d) the centre of gravity of the section

Q.2 Consider the following statements:
A beam of channel cross-section with vertical web loaded with a concentrated load at mid-span in a plane perpendicular to the plane of symmetry passing through the centroid is subjected to
1. bending moment
2. twisting moment
3. shear force
4. axial thrust
Which of the above statements are correct?
(a) 2, 3 and 4 (b) 1, 2 and 3
(c) 1 and 2 (d) 1 and 3

Q.3 Which of the following statements are correct?
1. Only bending will occur when a concentrated load passes through the shear centre.
2. The resultant shear force passes through the shear centre.
3. It lies on the axis of symmetry of a section of such an axis exits.
(a) 1 and 2 (b) 2 and3
(c) 1 and 3 (d) 1, 2 and 3

Q.4 Assertion (A): It is important to locate shear centre for beams with thin walled open cross-section like channals, angles etc.
Reason (R): Thin walled beams with open cross-section are torsionally very weak.
(a) both A and R are true and R is the correct explanation of A
(b) both A and R are true but R is not a correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

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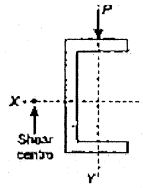
Answers Shear Centre

1. (c) 2. (b) 3. (a) 4. (a)

Explanations Shear Centre

1. (c)
If the load passes through shear centre then only bending takes place and no torsion occurs.
Open sections are torsionally weak, hence shear centre is an important consideration in open sections.

2. (b)
Since the load does not pass through shear centre of the channel section, so the cross-section is subjected to torsion in addition to bending and shear.



3. (a)
The shear centre for cross-sectional areas having one axis of symmetry is always located on axis of symmetry. The exact location of shear centre to unsymmetrical sections are complicated and can be located by inspection.

4. (a)
For avoiding twisting effect, it is important to locate SC for thin walled open cross-sections.

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