Code: 9A21402 **R09**

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2015/2016

AEROSPACE VEHICLE STRUCTURES - I

(Aeronautical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

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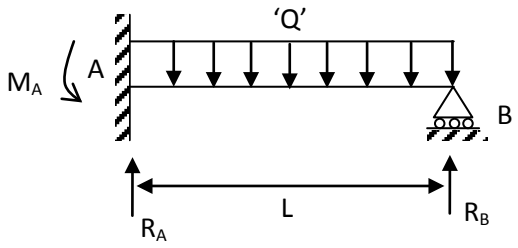
1 A propped cantilever beam of length "L" supports a UDL of intensity "Q". Analyze this beam by second order differential equation of deflection curve. Determine shear force, bending moment, slope and deflection of the beam.



2 (a) What do you mean by beams on elastic foundation?
(b) Derive differential equation for the elastic line of a beam resisting on an elastic foundation.

3 A simply supported beam of length 4 meters is subjected to a uniformly distributed load of 30 kN/m over the span and deflects 15 mm at the center. Determine the crippling loads when this beam is used as a column with following conditions:
(i) One end fixed and other end hinged.
(ii) Both ends pin jointed.
(iii) One end fixed and other end free.
(iv) Both ends fixed.

4 Define following:
(a) Compatibility.
(b) Plane stress.
(c) Plane strain.
(d) Body force.

5 A body is subjected to direct stress in two mutually perpendicular directions when the stress is unequal and alike; determine stress on oblique section with help of graphical method.

6 (a) Explain strain energy.
(b) State and derive the Castigliano's theorem I & II.

7 Explain Rayleigh – Ritz method and compare this method with any other two methods determining displacement.

8 Derive Bredt – Batho formula for a single cell thin walled closed section beams subjected to torsion.

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