R09

Code No: C0410

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations March/April-2011
STRESS ANALYSIS AND VIBRATION
(CAD/CAM)

Time: 3hours   Max.Marks:60

Answer any five questions
All questions carry equal marks
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1.   (a)   State the assumptions in two dimensional elasticity theory.   (6)
       (b)   Explain stress analysis in rotating discs.   (6)

2.   (a)   Derive expressions for bending of circular plate with constant thickness
       (b)   Explain shell theory with assumptions if any   (6+6)

3.   (a)   Define vibration isolation and transmissibility.   (4)
       (b)   In a single-degree damped vibrating system, a suspended mass of 8 kg
               makes 30 oscillations in 18 seconds. The amplitude decreases to 0.25 of
               the initial value after 5 oscillations. Determine (i) the stiffness of he spring
               (ii) the logarithmic decrement (iii) the damping factor, and (iv) the
               damping coefficient.   (8)

4.   A steel bar 22 mm wide and 45 mm deep is freely supported at two points 800
       mm apart and carries a load of 180 kg midway between them. Determine the
       natural frequency of the transverse vibrations, neglecting the weight of the bar.
       Take E = 250 GN/ m^2.   (12)

5..   A simply supported bridge of span 20m , *EI* = 8 GN m^2 and weight is 20000 kg/m
       is subjected to a load of *P sin 2πft,* which moves with a velocity 20 m/s. If natural
       frequency is 5 Hz, what is the largest amplitude of vibration in the bridge*?* (12)

6.   (a)   Explain principle of orthogonality.
       (b)   What is significance of modal analysis?   (6+6)

7.   Derive Lame's equations for thick cylinders and state the assumptions.   (12)

8.   Write short notes on the following   (12)
       (a)   Contact Stresses
       (b)   Stress Concentration
       (c)   Logarithmic decrement

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