DIGITAL ASSIGNMENT-2

MOSF

1. A simply supported beam is subject to a uniform load of 2 kN/m over the region shown in Fig.1. Determine the maximum shearing force and bending moment in the beam.
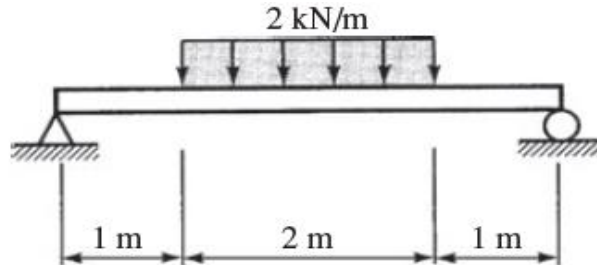

Fig.1

2. A thin-walled titanium alloy spherical shell has a 1-m inside diameter and is 7 mm thick. It is completely filled with an unpressurized, incompressible liquid. Through a small hole an additional 1000 cm³ of the same liquid is pumped into the shell, thus increasing the shell radius. Find the pressure after the additional liquid has been introduced and the hole closed. For this titanium allow E = 114 GPa and the tensile yield point of the material to be 830 MPa.

3. The velocity vector in an incompressible flow is given by

$$V = \left(6xt + yz^2\right)i + \left(3t + xy^2\right)j + \left(xy - 2xyz - 6tz\right)k$$

(i) Verify whether the continuity equation is satisfied.

(ii) Determine the acceleration vector at point A (1,1,1) at t=1.0.