nswer All Questions

me allowed: One hour

1. a. Define the terms 'Shear force' and 'Bending moment'.

   b. Draw the typical free body diagram for the followings:

   i.   Pointed load acting on a cantilever beam;

   ii. Uniformly varying load acting on a rigidly fixed beam.

   c. Differentiate between 'Redundant frame' and 'Deficient frame'.

   d. A roof truss has a span of 10m and carrying 2000kg at its apex (as shown in the figure).
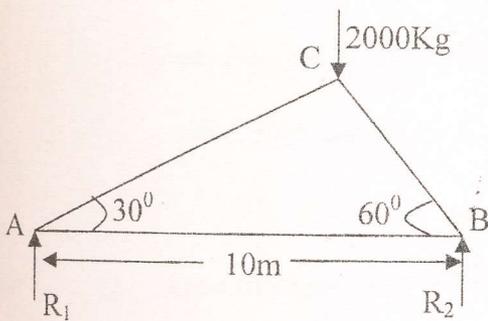
Find the following:

i. R_1 (Reaction at A);

ii. R_2 (Reaction at B);

iii. F_{AB} (Force acting on member AB);

iv. F_{AC} (Force acting on member AC);

v. F_{BC} (Force acting on member BC).

2. a. Briefly define the following:

   i.   Elastic Limit;

   ii. Hook's Law.

   b. A mild steel rod of 3mm diameter and 5m long carrying an axial pull of 8 kN. If the young's modulus of the mild steel is $2.5 \times 10^6 N/cm^2$.

   i.   Calculate the deformation due to the axial pull.

   ii. Calculate the strain energy stored in the mild steel due to the axial pull.

   c. Briefly discuss the factors affecting the friction between surfaces.