1. Compare the advantages and disadvantages of two-stroke and four-stroke engines. (20 marks)

2. Determine the reactions at \( A \) and \( B \), and the internal normal force, shear force and moment at midpoint of member \( AC \) for the frame shown in Fig. 2. Set \( F = 200 \, N \). (20 marks)

3. A particle is released at rest at \( A \) and slides on the smooth parabolic surface to \( B \), where it flies off as shown. Determine
   (a) the speed at which it strikes the ground at \( C \), (10%)
   (b) the total horizontal distance \( D \) that it travels from \( A \) to \( C \). (10%)
4. (a) 請問何謂飛輪（Flywheel）？其作用為何？在設計上必須考慮的參數有那些？
(b) 請比較正齒輪（Spur Gear）與螺旋齒輪（Helical Gear）在製造上和應用上各有何不同？
(20 分)

5. 請比較直接擠脹（Direct extrusion；又稱前後擠脹）與間接擠脹（Indirect extrusion；又稱後
方擠脹）兩者在製程、設備以及加工特性上的差異。 (20 分)