3 **(a)** Define the *moment* of a force.

.....

..... [2]

(b) State the two conditions necessary for a body to be in equilibrium.

1. .....

.....

2. .....

..... [2]

(c) Two parallel strings S_1 and S_2 are attached to a disc of diameter 12 cm, as shown in Fig. 3.1.

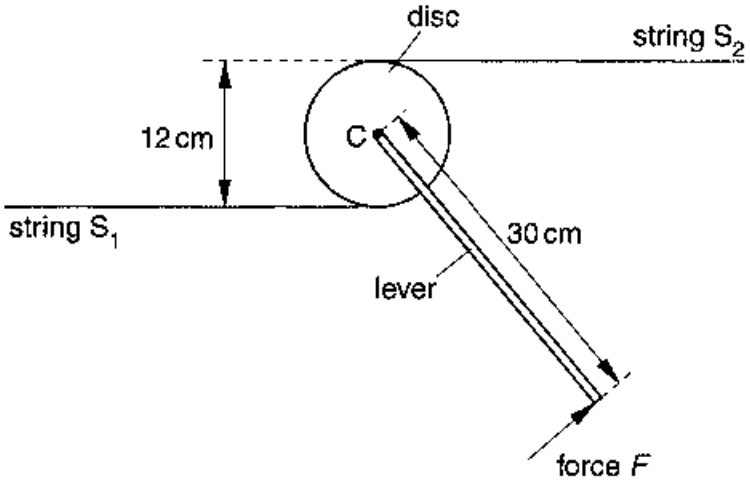

Fig. 3.1

The disc is free to rotate about an axis normal to its plane. The axis passes through the centre C of the disc.

A lever of length 30 cm is attached to the disc. When a force F is applied at right angles to the lever at its end, equal forces are produced in S_1 and S_2. The disc remains in equilibrium.

(i) On Fig. 3.1, show the direction of the force in each string that acts on the disc. [1]

(ii) For a force F of magnitude 150 N, determine

1. the moment of force F about the centre of the disc,

moment = ... N m

2. the torque of the couple produced by the forces in the strings,

torque = ... N m

3. the force in S_1.

force = ... N

[4]

[Turn over