

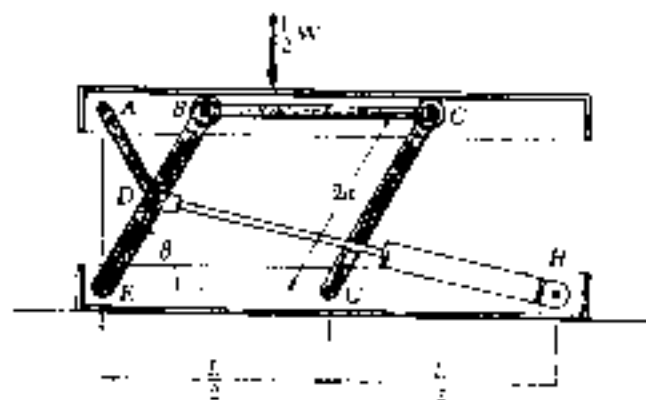
八十六學年度 動機 系(所) 丙丁 組碩士班研究生入學考試

科目 應用力學 科號 2802 共 3 頁第 1 頁 *請在試卷【答案卷】內作答

1. Explain the following terminology. (16%, 4% each)
- (a) simple truss;
 - (b) radius of gyration of an area;
 - (c) principle of impulse and momentum;
 - (d) oblique central impact.

2. A hydraulic-lift table is used to raise a 3000-kg crate. It consists of a platform and of two identical linkages on which hydraulic cylinders exert equal forces. (Only one linkage and one cylinder are shown in figure.) Members EDB and CG are each of length $2a$, and member AD is pinned to the midpoint of EDB. If the crate is placed on the table, so that half of its weight is supported by the system shown, use the principle of virtual work to determine the force exerted by each cylinder in raising the crate for $\theta = 30^\circ$, $a = 0.5$ m, and $l = 3.0$ m.

(16%)

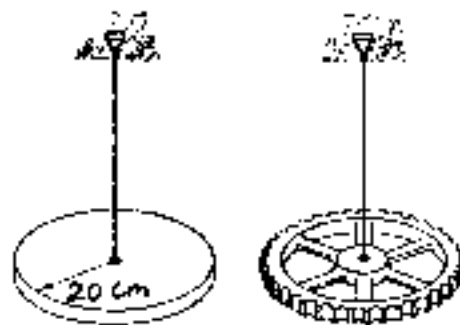


八十六學年度 動力 系(所) 丙丁 組碩士班研究生入學考試

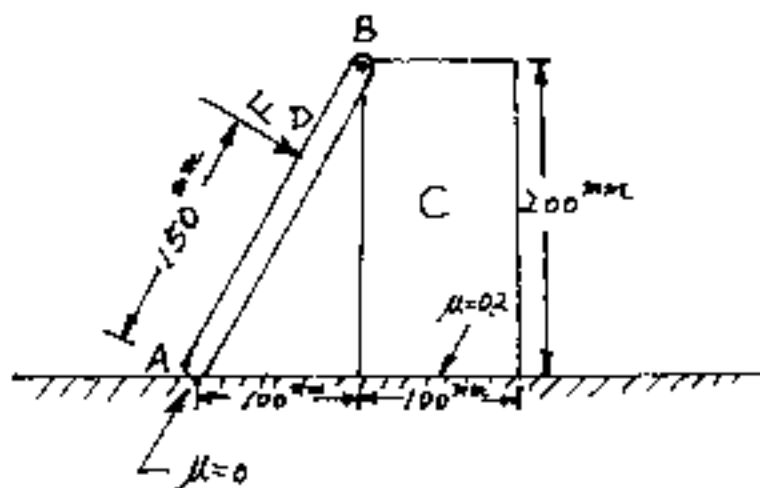
科目 應用力學 科號 2802 共 3 頁第 2 頁 *請在試卷【答案卷】內作答

3. A circular 10-kg disk of radius 20 cm, is suspended from a wire as shown. The disk is rotated (thus twisting the wire) and then released; the period of the torsional vibration is observed to be 1.2 s. A gear is then suspended from the same wire, and the period of torsional vibration for the gear is observed to be 2.0 s. Assuming that the moment of the couple exerted by the wire is proportional to the angle of twist, determine
- the torsional spring constant of the wire,
 - the centroidal moment of inertia of the gear,
 - the maximum angular velocity reached by the gear if it is rotated through 30° and released

(16%)



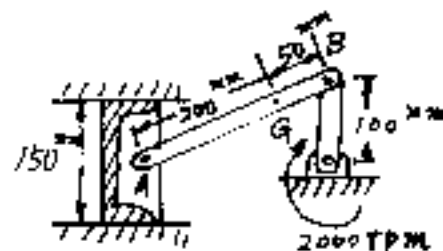
4. The homogeneous bar AB weight 6-kg and is connected to the 20-kg block C by means of a smooth pin at B. Determine the maximum applied force at D under which the block C will not move. (20%)



八十六學年度 動力機 系(所) 丙、丁 組碩士班研究生入學者試

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5. Determine the components of the force exerted by piston pin A on the connecting rod AB of the reciprocating engine for the crank position of 90° . The engine is rotate at 2000 rpm clockwise. The connecting rod weight 4 kg and has a centroidal radius of gyration of 60 mm. The pressure of the expanding gases on the 4 kg piston at this position is 5 kg/cm^2 . Neglect friction between the piston and the cylinder. It is noted that G is the centroid of connecting rod. (16%)



6. The 2-kg homogeneous bar is rest in the vertical position. After the bar rotates 90° clockwise, it is strikes the two springs and continuous to rotate until the spring 1 is compressed 5 mm. The modulus of spring 1 is equal to the spring 2, and the springs are unstressed when the bar first strikes them. Determine the modulus of springs. (16%)

