國立成功大學
110學年度碩士班招生考試試題

編　號：68

系　所：機械工程學系

科　目：動力學及專業英文

日　期：0202

節　次：第 2 節

備　註：可使用計算機

※ 考生請注意：本試題可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (25%) 請將以下名詞翻譯成英文，或將英文句子翻譯成中文：

　　(1) 正齒輪

　　(2) 滾珠軸承

　　(3) 疲勞

　　(4) 材料失效

　　(5) 主應力

　　(6) 傳動角

　　(7) 機械利益

　　(8) 轉動慣量

　　(9) 挫曲

　　(10) 振動

　　(11) The angular momentum of a particle about a fixed point is the moment of the linear momentum about the point.

2. (25%) An object with 0.6 kg mass slides on a smooth horizontal plate, as shown in the figure. The object is attached to one end of a fixed-length string, while the other end of the string passes through a hole in the plate and is attached to a spring (k = 100 N/m). The spring is unstretched when ℓ = 0. At the instant shown in the figure, the velocity v = 10 m/s and ℓ = 0.5 m. Determine

(a) the angular momentum at the instant shown, and

(b) the minimum and maximum values of ℓ in the resulting motion.
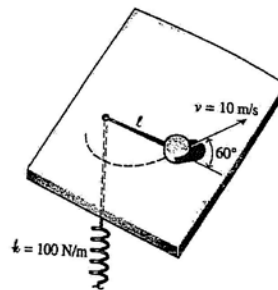

Figure of Problem 2

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3. (25%) The wheel rolls without slipping over the ground <u>as the collar slides at constant speed u</u> over the curved guide bar. Determine (a) the velocity, and (b) the acceleration of the center of the wheel <u>in terms of u</u> when the linkage is in the position shown.
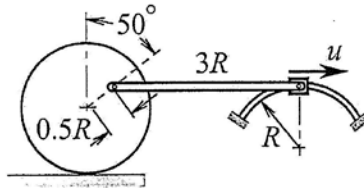

Figure of Problem 3

4. (25%) A 5-kg uniform disk is attached to the 3-kg uniform rod BC by means of a frictionless pin AB. An elastic cord is wound around the edge of the disk and is attached to a ring at E. Both ring E and rod BC can rotate freely about the vertical shaft. Knowing that the system is released from rest when the tension in the elastic cord is 15 N, determine (a) the angular acceleration of the disk, (b) the angular acceleration of the rod, and (c) the acceleration of the center of the disk.
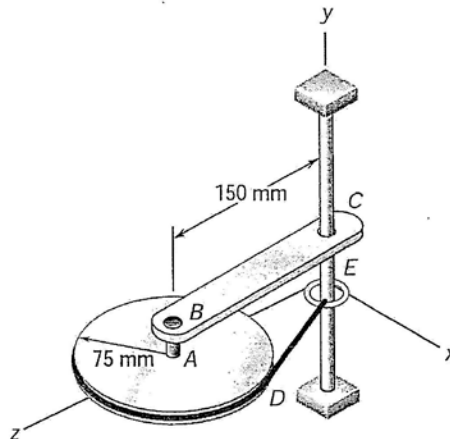

Figure of Problem 4