

臺灣綜合大學系統 111 學年度學士班轉學生聯合招生考試試題

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| 科目名稱 | 動力學 | 類組代碼 | D37 |
| | | 科目碼 | D3794 |

※本項考試依簡章規定所有考科均「不可」使用計算機。

本科試題共計 3 頁

Problem 1 (20%) 單選 (倒扣)

Knowing that the coefficient of static friction between the tires and the road is 0.80 for the front wheel drive automobile as shown, the maximum possible acceleration on a level road is

- (A) $4.06 \text{ m/s}^2 \rightarrow$ (B) $4.06 \text{ m/s}^2 \leftarrow$ (C) $3.68 \text{ m/s}^2 \rightarrow$ (D) $3.68 \text{ m/s}^2 \leftarrow$

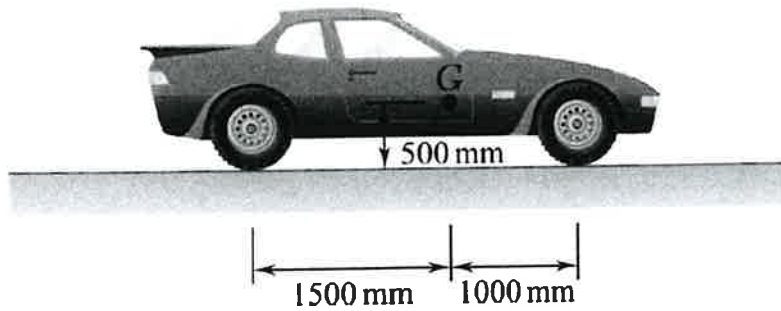


Fig. 1

Problem 2 (20%) 單選 (倒扣)

A uniform rectangular plate has a mass of 5 kg and is held in position by three ropes as shown. If $\theta = 30^\circ$, the acceleration magnitude of the plate immediately after rope CF has been cut is

- (A) 2.54 m/s^2 (B) 4.91 m/s^2 (C) 6.89 m/s^2 (D) 0.26 m/s^2

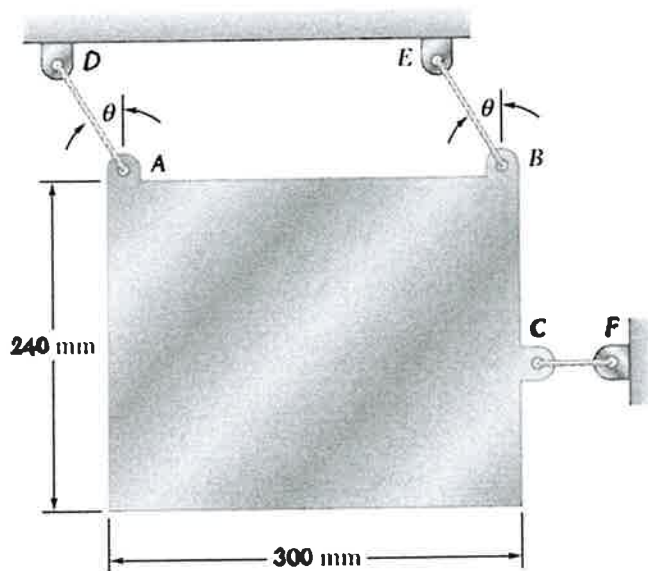


Fig. 2

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Problem 3 (15%) 單選 (倒扣)

The 2-kg block B and 15-kg cylinder A are connected to a light cord that passes through a hole in the center of the smooth table. If the block is given a speed of $v = 10 \text{ m/s}$, the radius r of the circular path along which it travels is

- (A) 6.12 m (B) 3.49 m (C) 1.36 m (D) 3.25 m

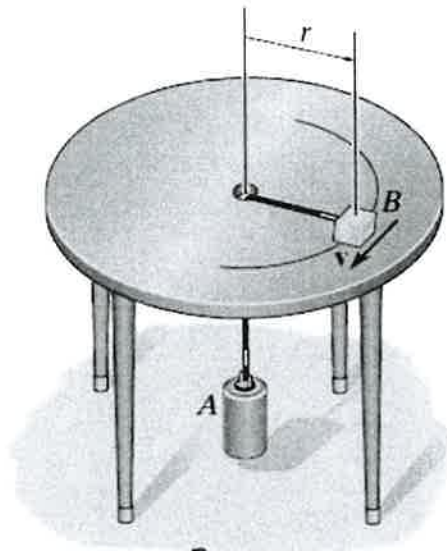


Fig. 3

Problem 4 (15%) 單選 (倒扣)

A robot arm moves so that P travels in a circle about Point B , which is not moving. If P starts from rest, and its speed increases at a constant rate of 10 mm/s^2 , the magnitude of the acceleration when $t = 4 \text{ sec}$ is

- (A) 10.20 mm/s^2 (B) 8.35 mm/s^2 (C) 11.57 mm/s^2 (D) 6.08 mm/s^2

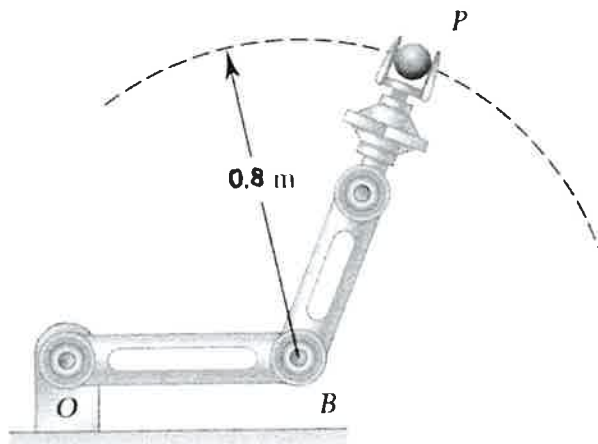


Fig. 4

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Problem 5 (15%) 單選 (倒扣)

A motor gives gear *A* an angular acceleration of $\alpha_A = 2t^3 \text{ rad/s}$, where t is in seconds. If this gear is initially turning at $\omega_A = 15 \text{ rad/s}$, the angular velocity of gear *B* when $t = 3 \text{ s}$ is

- (A) 31.7 rad/s (B) 6.8 rad/s (C) 13.65 rad/s (D) 1.97 rad/s

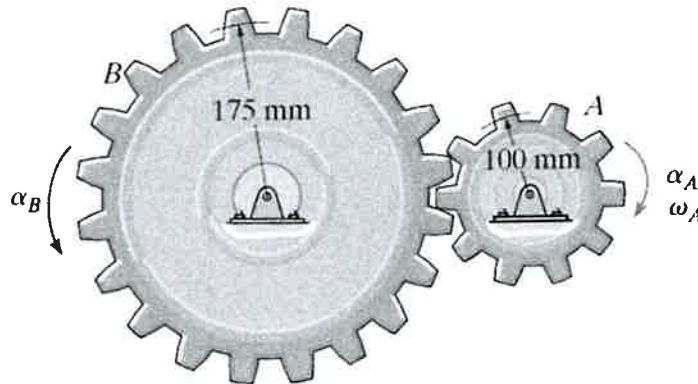


Fig. 5

Problem 6 (15%) 單選 (倒扣)

An airplane flying at a constant speed of 240 m/s makes a banked horizontal turn. What is the minimum allowable radius of the turn if the structural specifications require that the acceleration of the airplane shall never exceed $4g$?

- (A) 1467.9 m (B) 471.2 m (C) 395.8 m (D) 21.6 m



Fig. 6