

國立臺北科技大學 101 學年度碩士班招生考試

系所組別：1120、1131 機電整合研究所乙、丙組

第二節 工程力學 試題 (丙組選考)

第一頁 共一頁

注意事項：

1. 本試題共 4 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. A bracket shown in Figure 1 is loaded by a vertical downward force of 1.6 kN. Calculate the magnitude of the force supported by each of the pins at A and B for the loaded bracket. (25%)

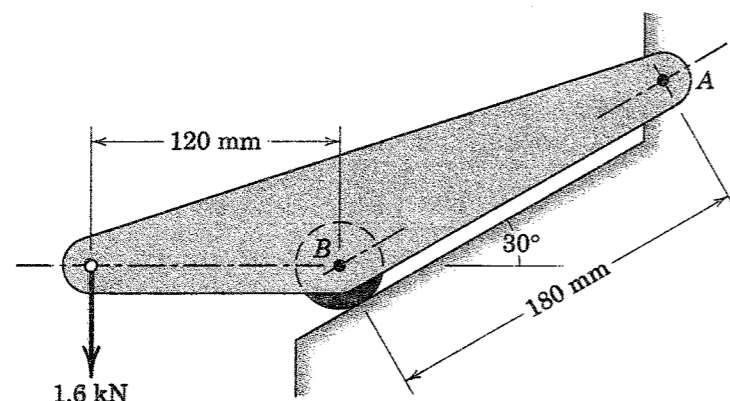


Figure 1

2. An airplane starts from rest at $s = 0$ and travels on a straight runway. The velocity-position (v - s) graph of the airplane is shown in Figure 2.
 - (a) Determine the acceleration of the airplane at $s = 50$ m and $s = 150$ m. (15%)
 - (b) Draw the acceleration-position (a - s) graph for the airplane. (10%)

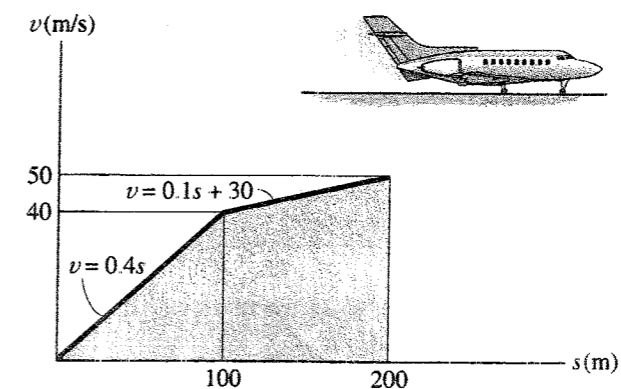


Figure 2

3. The 10-kg wheel shown in Figure 3 has a radius of gyration $k_A = 200$ mm about its center of gravity at the fixed pin A . If the wheel is subjected to a moment $M = (4\theta)$ N · m, where θ is in radians, determine its angular velocity when it undergoes one revolution starting from rest. Also, compute the reactions which the fixed pin A exerts on the wheel during the motion. (25%)

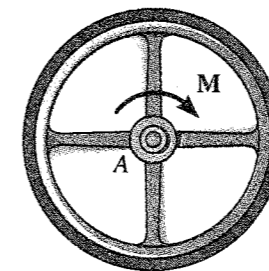


Figure 3

4. The tub of the mixer shown in Figure 4 has a weight of 350 N and a radius of gyration $k_G = 0.4$ m about its center of gravity at the point G . Originally the tub is at rest when $\theta = 0^\circ$ (vertical line). If a constant torque $M = 90$ N · m is applied to the dumping wheel, determine the angular velocity of the tub when it has rotated $\theta = 90^\circ$. (25%)

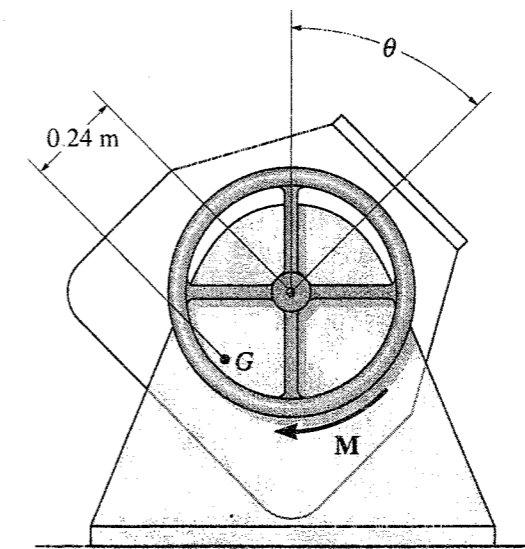


Figure 4