國立交通大學 104 學年度碩士班考試入學試題

科目：機械概論(8061)　　考試日期:104 年 2 月 7 日 第 1 節

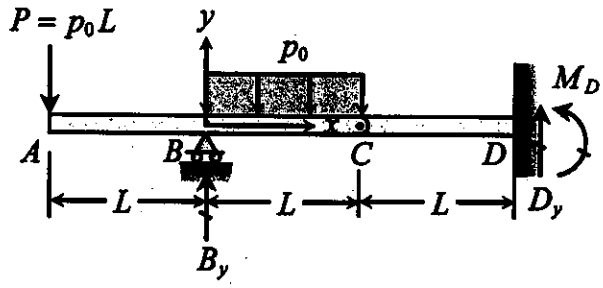
系所班別：工學院碩士在職專班　　組別：精密與自動化工程組　　第 1 頁,共 1 頁

【可使用計算機】＊作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符！！

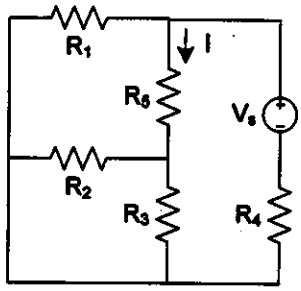
1.(20%) Two beam segments *ABC* and *CD* are connected together at *C* by a frictionless pin as shown. Segment *CD* is cantilevered from a rigid support at *D*, and segment *ABC* is overhanging beyond a roller support at *B*. The compound beam is subjected to a uniformly distributed load, p_0 (unit: force per length), over the region between *B* and *C*, and a concentrated force, $P = p_0 L$, at the end *A*.

(a) Determine the reactions B_y, D_y, M_D at *B*, *D* and internal force C_y (not shown) at pin C.

(b) Determine and draw the transverse shear force and bending moment diagram for the segment *BC*, $0 \le x \le L$.



2. (20%) Find the current I in the following circuit, where $V_s = 10V$, $R_1 = R_2 = R_3 = R_4 = R_5 = 1k\Omega$.



3. (20%) 鑄造(casting)時，由於金屬材料的冷卻所造成的體積變化，容易導致鑄件產生哪些缺陷？在模具設計上或冷卻方法上，我們應採取哪些應對措施以防止這些缺陷的發生？

4. (20%) 非傳統切削加工特點為何?此加工製程在切除材料所使用的的能量形式略分四種，請說明此四類能量形式為何?

5. (20%) 請說明滾動接觸軸承(rolling-contact bearings)的常見形式、其相對精度、摩擦來源，以及在應用上考量與分析的因素？