

MEEG 2003

Name: _____

(Underline your last name.)

Test III ()

ID#: _____

1. (30%) A frame is shown. Using *method of virtual work*, determine (a) the reaction forces D_x at the hinge support D , (b) the reaction moment M_A at the fixed support A .

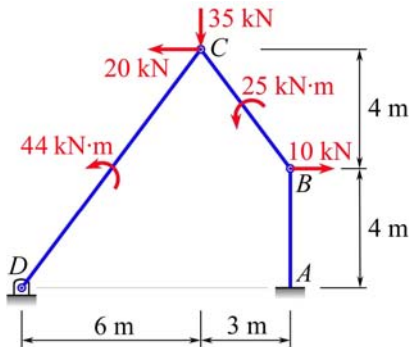


Fig. P1

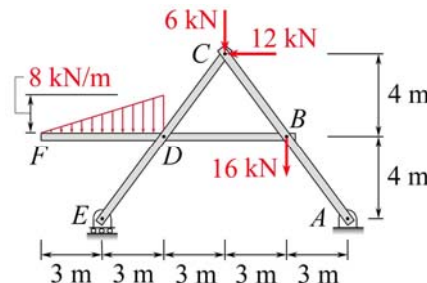


Fig. P2

2. (30%) Determine the reaction forces **A**, **B**, and **C** exerted on member ABC by the pins at A , B , and C , respectively, of the frame shown.

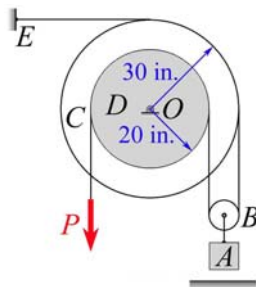


Fig. P3 A&B

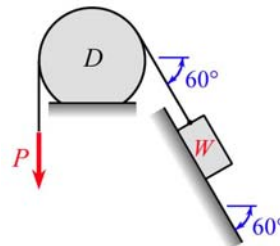


Fig. P3 C&D

3. (5% each) Drums C and D are rigidly attached to each other and can rotate freely about the bearing at O . It is known that μ_s is 0.11 between the belt and all surfaces of drums C and D . *Circle on this test sheet* the correct or nearest item for each of the following:

- The minimum magnitude P of the force to prevent the 112-lb block A from falling is
(a) 36.1 lb. (b) 36.6 lb. (c) 37.5 lb. (d) 38.0 lb. (e) 38.9 lb. (f) 39.4 lb. (g) 40.2 lb.
- The minimum magnitude P of the force to cause the 112-lb block A to move upward is
(a) 63.1 lb. (b) 65.6 lb. (c) 68.1 lb. (d) 69.3 lb. (e) 72.1 lb. (f) 74.9 lb. (g) 77.7 lb.
- If $\mu_s = 0.6$ between *all* surfaces of contact and the block has a weight of $W = 22$ lb, the minimum magnitude P of the force to pull the block up the incline is
(a) 151.4 lb. (b) 145.8 lb. (c) 140.2 lb. (d) 134.6 lb. (e) 129.0 lb. (f) 123.4 lb. (g) 117.8 lb.
- If $\mu_s = 0.6$ between *all* surfaces of contact and the block has a weight of $W = 22$ lb, the minimum magnitude P of the force to prevent the block from sliding down the incline is
(a) 2.59 lb. (b) 2.71 lb. (c) 2.82 lb. (d) 2.94 lb. (e) 3.06 lb. (f) 3.18 lb. (g) 3.29 lb.

4. (20%) Non-numerical problem.