

MEEG 2003

Name: _____
(Underline your last name.)

Test II ()

ID#: _____

1. (30%) For the rigid body carrying the loads shown in Fig. P1, determine (a) the tension T_{EF} in cable EF , (b) the reaction force \mathbf{A} and the reaction moment \mathbf{M}_A at universal joint support A .

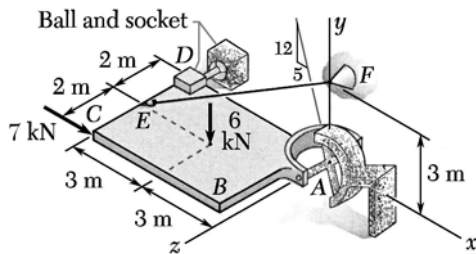


Fig. P1

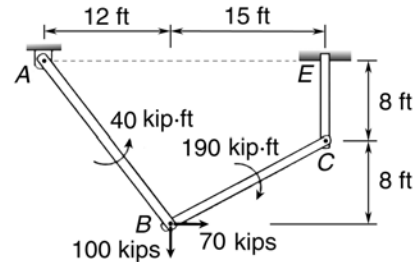


Fig. P2

2. (30%) A frame carrying loads is shown in Fig. P2. Using *virtual work method*, determine (a) the reaction moment \mathbf{M}_E at fixed support E , (b) the horizontal component \mathbf{A}_x of the reaction force at hinge support A .

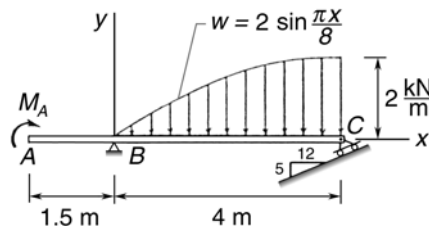


Fig. P3

3. The beam ABC carries a distributed load of intensity w kN/m and a moment $\mathbf{M}_A = 3.5$ kN·m \curvearrowright as shown in Fig. P3. Circle on this test sheet the correct or nearest item for each of the following:
- (7%) The magnitude of the reaction force at roller support C is
(a) 4.32 kN. (b) 4.46 kN. (c) 4.60 kN. (d) 4.73 kN. (e) 4.87 kN. (f) 5.00 kN.
 - (6%) The magnitude of the horizontal component \mathbf{B}_x of the reaction force at hinge support B is
(a) 1.716 kN. (b) 1.768 kN. (c) 1.820 kN. (d) 1.872 kN. (e) 1.924 kN. (f) 1.976 kN.
 - (7%) The magnitude of the vertical component \mathbf{B}_y of the reaction force at hinge support B is
(a) 0.601 kN. (b) 0.726 kN. (c) 0.851 kN. (d) 0.976 kN. (e) 1.101 kN. (f) 1.226 kN.
4. Non-numerical problem:
- (5%) Describe the **first theorem of Pappus-Guldinus**.
 - (5%) Define the **work of a force** on a body.
 - (5%) Define the **work of a moment** on a body.
 - (5%) To determine a *specific unknown* in the free-body diagram using *virtual work method*, what is the general **strategy** (or *guide*) that you should employ in drawing the **virtual displacement diagram**?