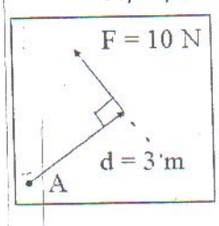
1. What is the moment of the 10 N force about point A (MA)?



A) 10 B) -10 C) 30 D) – 30

2. If $\mathbf{r} = \{5\,\mathbf{j}\}$ m and $\mathbf{F} = \{10\,\mathbf{k}\}$ N, the moment $\mathbf{r} \times \mathbf{F}$ equals $\{+50\,\mathbf{i}\}$ N·m.

A) 50 i B) 50 j C) –50 i D) – 50 j E) 0

3. When determining the moment of a force about a specified axis, the axis must be along _____.

A) the x axis B) the y axis C) the z axis

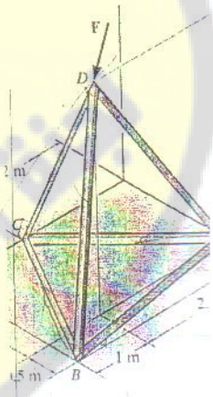
D) any line in 3-D space E) any line in the x-y plane

4. The triple scalar product $\mathbf{u} \cdot (\mathbf{r} \times \mathbf{F})$ results in

A) a scalar quantity (+ or -). B) a vector quantity.

C) zero. D) a unit vector. E) an imaginary number.

5. The force **F** is acting along DC. Using the triple product to determine the moment of **F** about the bar BA, you could use any of the following position vectors except _____.



A) $\mathbf{r}_{BC}$ B) $\mathbf{r}_{AD}$ C) $\mathbf{r}_{AC}$ D) $\mathbf{r}_{DB}$ E) $\mathbf{r}_{BD}$

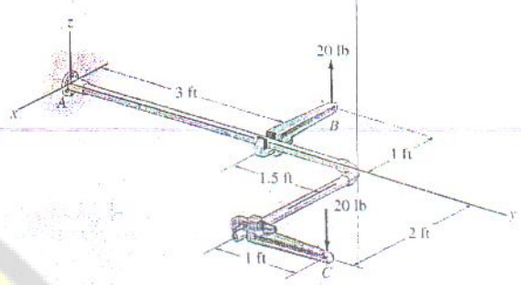
6. If $\mathbf{r} = \{1\,\mathbf{i} + 2\,\mathbf{j}\}$ m and $\mathbf{F} = \{10\,\mathbf{i} + 20\,\mathbf{j} + 30\,\mathbf{k}\}$ N, then the moment of F about the y-axis is ____ N·m.

A) 10 B) -30 C) -40 D) None of the above.

7. The moment of a couple is called a _____ vector.

A) free B) spin C) romantic D) sliding

8. If F = { -20 k} lb, then r is

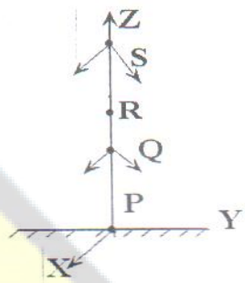


A) $\mathbf{r}_{BC}$ B) $\mathbf{r}_{AB}$

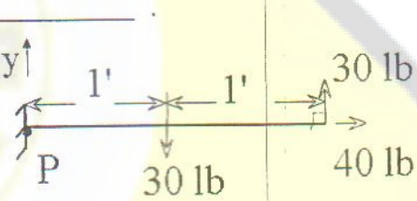
C) $\mathbf{r}_{CB}$ D) $\mathbf{r}_{AC}$

9. The forces on the pole can be reduced to a single force and a single moment at point ____.

A) *P* B) *Q* C) *R* D) *S* E) *Any of these points.*



10. For this force system, the equivalent system at P is _____ .



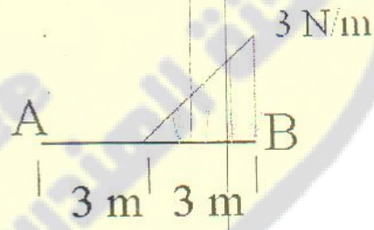
A) F_{RP} = 40 lb (along +x-dir.) and M_{RP} = +60 ft ·lb

B) F_{RP} = 0 lb and M_{RP} = +30 ft · lb

C) F_{RP} = 30 lb (along +y-dir.) and M_{RP} = -30 ft ·lb

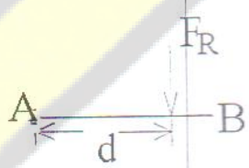
D) F_{RP} = 40 lb (along +x-dir.) and M_{RP} = +30 ft ·lb

11. What is the location of FR, i.e., the distance d?



A) 2 m B) 3 m C) 4 m

D) 5 m E) 6 m

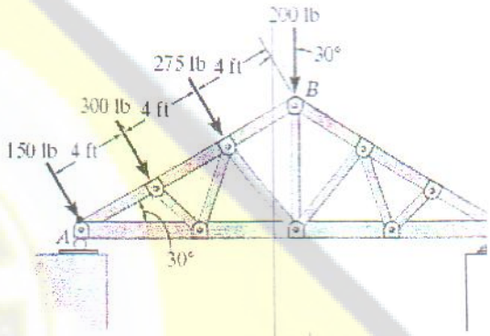


12. The force **P** is applied to the lever, determine the magnitude of the smallest force **P** (lb) which has a 19.5 lb.in ccw moment about A.

A) 1 .1 B) 3.32 C) 5.2

D) 7.9 E) 13.2

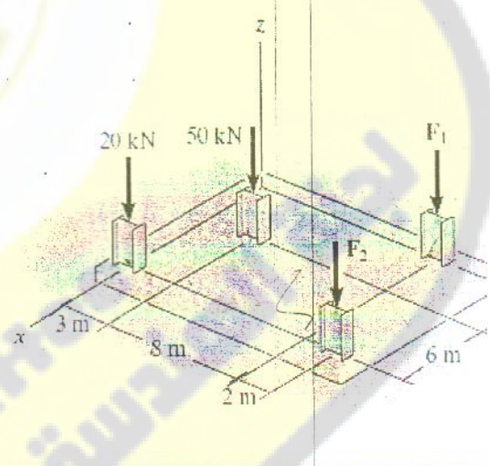
13. The system of four forces acts on the roof truss. Specify the location of the equivalent resultant force along AB measured from point A.



A) 5.21 B) 6.10 C) 8.12

D) 12.00 E) 13.22

14. The building slab is subjected to four parallel column loadings. Specify the location (x, y) of the equivalent resultant force on the slab.Take F1 = 30 kN and F2 = 40 kN.



A) (5.14 , 2.71) B) (6.14 , 3.71)

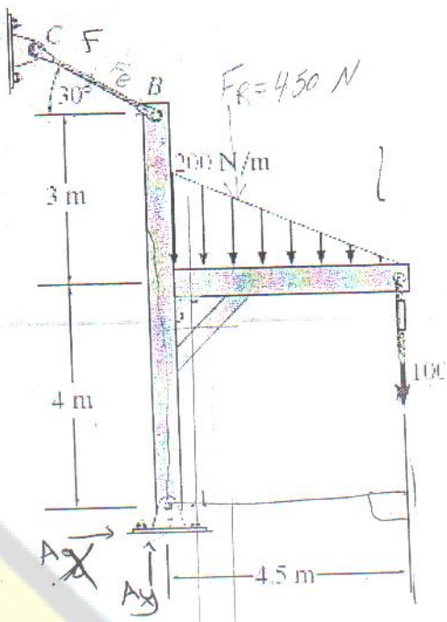
C) (6.14 , 4.71) D) (7.14 , 5.71) E) (8.14 , 5.71)

15. Determine the horizontal and vertical components of reaction at the pin A {(Ax, Ay) N}. Neglect the thickness of the members.

A) (161 , 457) B) (181 , 511) C) (211 , 667)
D) (251 , 667) E) (311 , 667)

$\Sigma M_A = 0$

$\Sigma F_x = 0$



16. Member AB is supported at B by a cable and at A by a smooth fixed square rod which fits loosely through the square hole of the collar. If $F = 20\,i - 40\,j - 75\,k$, determine the x, y, z components of reaction moments at A .

{(Mx , My , Mz) N.m} =

A) (-300 , 0 , -720) B) (-300 , 230 , -720)
C) (-213 , 417 , -621) D) (0 , 0 , -720)