M R
Ahmed Mahdy

استاتيكا	فيزياء
الكــــترونيات	دوائر كهربية
هيدروليكا	ميكانيكا الانشائات

مدرس خصوصي

اونلاين **حضوري**

يحصل الطالب علي

· مقاطع فيديوهات لشرح المقرر بشكل وافي

· ملخص للمادة Pdf للمذكرة والمراجعة

· محاضرات مباشرة علي برنامج زووم
لمناقشة الأجزاء الغير مفهومة

· تواصل مستمر مع معلم المادة

للتواصل

0567630097   0565657741

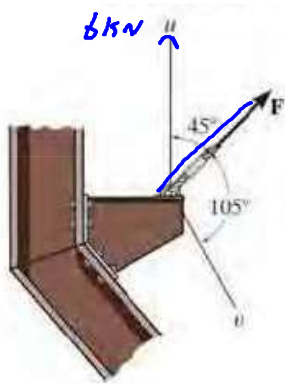**1-** Convert a torque value of 5.31 N.m in to US units.

| 1 lb = 4.4482 N |
| 1 slug = 14.5938 kg |
| 1 ft = 0.3048 m |
| 1 in = 0.0254 m |

$$5.31 \times \frac{1}{4.4482} \times \left(\frac{1}{0.3048}\right) \, lb \cdot ft$$

$$= 3.916 \; lb \cdot ft$$

$$lb \rightarrow 4.4482 \; N$$

$$N = \frac{1}{4.4482} \rightarrow$$

2- If force F is to have a component along the u axis of F_u = 6kn, determine the magnitude the of F and the magnitude of its component F_v along the v axis.
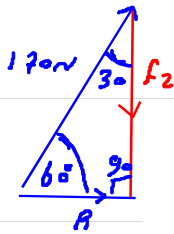
6kn

45°

105°

$$\frac{6}{\sin 105} = \frac{F_v}{\sin 45} = \frac{F}{\sin 30}$$

$$F_v = \frac{6 \sin 45}{\sin 105}$$

$$F_v = 4.39 \, kN$$

$$F = \frac{6 \sin 30}{\sin 105} = 3.105 \, kN$$
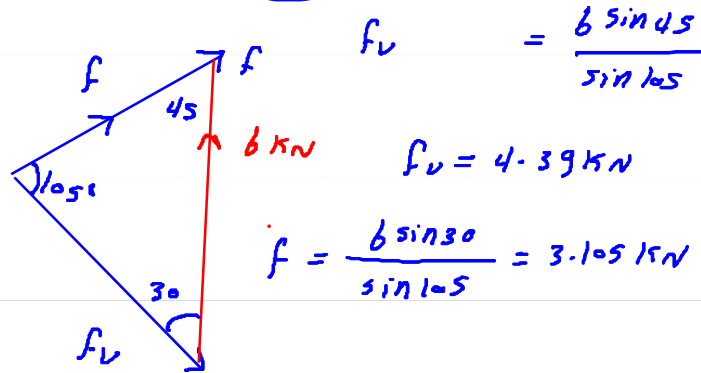
3- It is required that the resultant force acting on the eyebolt in figure below be directed
along the positive x axis and that F_2 have a minimum magnitude. Determine this
magnitude, the angle θ and the corresponding resultant force. **(1 marks)**

$\theta = 90°$

$$\frac{170}{\sin 90} = \frac{R}{\sin 30} = \frac{f_2}{\sin 60}$$

$$R = 170 \sin 30 = 85 N$$

$$f_2 = 170 \sin 60 = 147.2 N$$

4- The magnitude of two forces is such that when acting at right angle produce a
resultant force of $R^2 = 30kN$, and when acting at $60°$ produce a resultant equal to $R^2 = 38kN$. Find out the magnitude of the two forces. **(1 marks)**

$$R^2 = f_1^2 + f_2^2 + 2f_1 f_2 \cos\theta$$

$$30 = f_1^2 + f_2^2 \rightarrow ①$$

$$38 = f_1^2 + f_2^2 + f_1 f_2$$

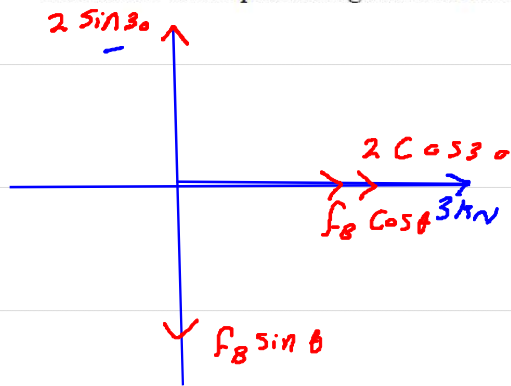$$38 = f_1^2 + f_2^2 + f_1 f_2 \rightarrow ②$$

$$38 = 30 + f_1 f_2$$

$$8 = f_1 f_2$$

$$\frac{8}{f_2} = \frac{f_1 f_2}{f_2} \Rightarrow f_1 = \frac{8}{f_2} = \frac{8}{1.52} = 5.26 kN$$

$$30 = \left(\frac{8}{f_2}\right)^2 + f_2^2 \Rightarrow f_2 = 1.52 kN$$

5- If the resultant force of the two tugboats is 3kN, directed along the positive x axis, determine the required magnitude of force FB and its direction u. **(1 marks)**

$2 \sin 30$

$2 \cos 30$

$f_B \cos \theta$ $3kN$

$f_B \sin \theta$

$3 = 2 \cos 30 + f_B \cos \theta$

$0 = 2 \sin 30 - f_B \sin \theta$

$3 - 2 \cos 30 = f_B \cos \theta \rightarrow ①$

$+ \quad 2 \sin 30 = + f_B \sin \theta \rightarrow ②$

divide ② / ①

$\dfrac{2 \sin 30}{3 - 2 \cos 30} = \dfrac{f_B \sin \theta}{f_B \cos \theta}$

$\dfrac{2 \sin 30}{3 - 2 \cos 30} = \tan \theta$

$\theta = \tan^{-1}(\ldots\ldots)$

$\theta = 38.2°$

$\dfrac{2 \sin 30}{\sin 38.2} = f_B \dfrac{\sin 38.2}{\sin 38.2}$

$f_B = 1.6 \, MN$