

Teknik Mesin UMY

Ujian Kompetensi #1

Statika Struktur (MEU 2303 P)

Senin, 27 Februari 2017

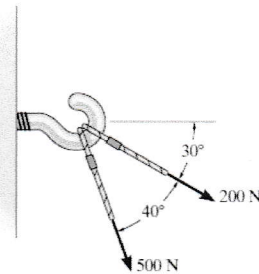
Dosen penguji: Berli Kamiel, S.T., M.Eng.Sc., Ph.D.

Sifat ujian: buku tertutup

Waktu mengerjakan soal: 90 menit

Peralatan yang diperbolehkan: kalkulator (bukan kalkulator dari *handphone*)

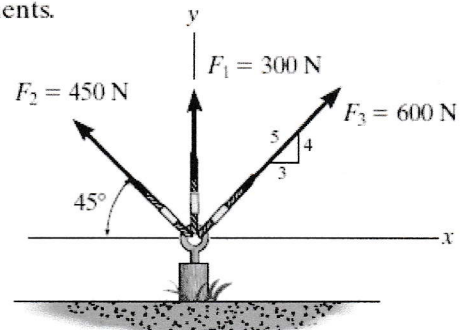
1. Tentukan besar dan arah resultan pada Gambar 1 disamping. Gunakan metode jajaaran genjang. (bobot soal: 30%)



Gambar 1

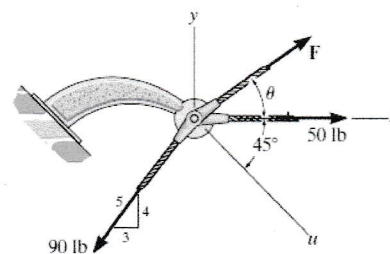
2. Pada Gambar 2., tentukan besar dan arah resultan gaya. (petunjuk: gunakan metode komponen *rectangular* notasi vektor) (bobot soal: 30%)

onents.



Gambar 2

3. Jika besar gaya resultan yang bekerja pada *bracket* pada Gambar 3 adalah 80 lb dan bekerja sepanjang sumbu *u*, tentukan besar gaya *F* dan arahnya. (bobot soal: 40%)



Gambar 3

NAMA : Statika StrukturNO. KURSI : UCP #1NO. MAHASISWA : Senin, 27 Feb 2017FAKULTAS : TEKNIK, JURUSAN

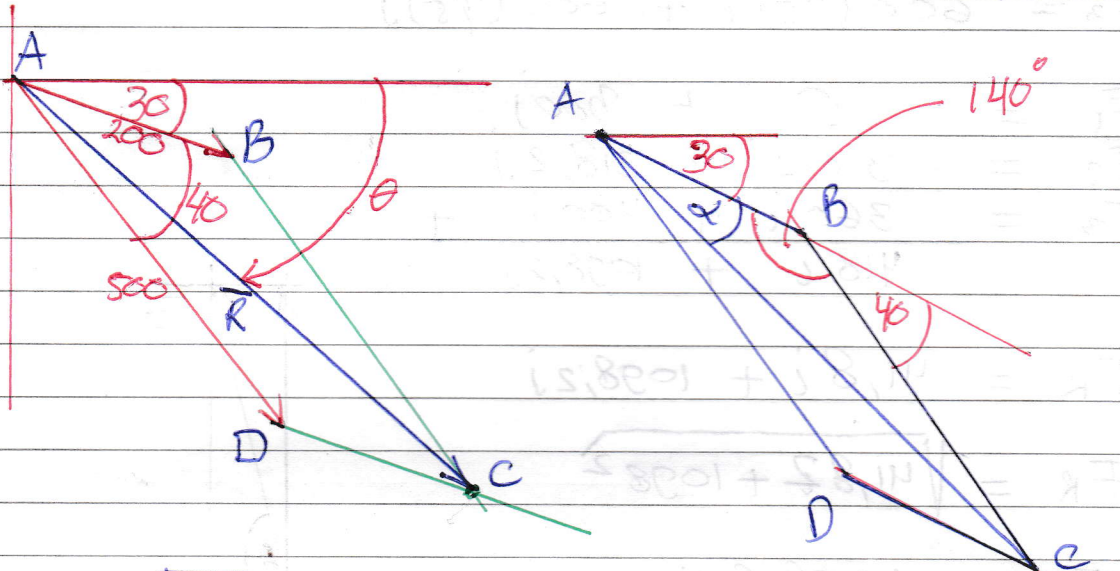
MATA UJIAN : _____

DOSEN : _____

HARI/TGL : _____

TANDA TANGAN : _____

#1



$$R = \sqrt{200^2 + 500^2 - 2 \times 200 \times 500 \times \cos 140}$$

$$R = 665,7 \text{ N}$$

$$\frac{\sin \alpha}{500} = \frac{\sin 140}{665,7}$$

$$\alpha = 28,9^\circ$$

$$\theta = 30 + 28,9$$

$$\theta = 58,9^\circ$$

$$R = 665,7 \text{ N} \quad \theta = 58,9^\circ$$

#2.

$$\vec{F}_1 = 0 + 300j$$

$$\vec{F}_2 = -450 \cos 45^\circ i + 450 \sin 45^\circ j$$

$$\vec{F}_3 = 600 \left(\frac{3}{5}\right) i + 600 \left(\frac{4}{5}\right) j$$

$$\vec{F}_1 = 0 + 300j$$

$$\vec{F}_2 = -318,2i + 318,2j$$

$$\vec{F}_3 = 360i + 480j +$$
$$418i + 1098,2j$$

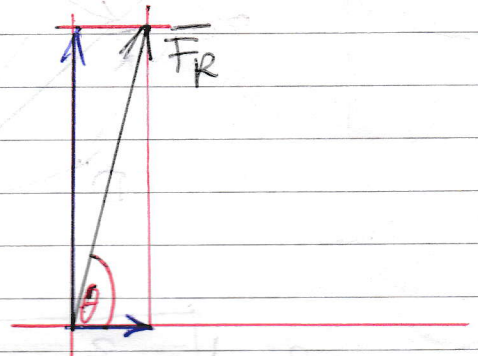
$$\vec{F}_R = 41,8i + 1098,2j$$

$$F_R = \sqrt{41,8^2 + 1098^2}$$

$$F_R = 1098,8 \text{ N}$$

$$\theta = \tan^{-1} \frac{1098}{41,8}$$

$$\theta = 87,8^\circ$$



#3.

$$\pm \rightarrow R_{Fx} = F \cos \theta + 50 - 90 \left(\frac{3}{5}\right) = 80 \cos 45^\circ \quad \text{--- (1)}$$

$$+\uparrow R_{Fy} = F \sin \theta - 90 \left(\frac{4}{5}\right) = -80 \sin 45^\circ \quad \text{--- (2)}$$

$$F \cos \theta = 80 \cos 45^\circ + 90 \left(\frac{3}{5}\right) - 50 = 60,57$$

$$F = \frac{60,57}{\cos \theta} \rightarrow \text{Substitusi ke (2)}$$

$$\frac{60,57}{\cos \theta} \times \sin \theta = 80 \sin 45^\circ + 90 \left(\frac{4}{5}\right)$$

$$\tan \theta = 0,2547$$

$$\theta = 14,29^\circ$$



$$F = \frac{60,57}{\cos 14,29} = \underline{\underline{62,5 \text{ lb}}}$$