UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER 1
SESI 2012/2013

NAMA KURSUS	:	STATIK
KOD KURSUS	:	DAM 10103/ DDA 1013
KURSUS	:	DAM/ DDT
TARIKH PEPERIKSAAN	:	OKTOBER 2012
JANGKA MASA	:	3 JAM
ARAHAN	:	JAWAB **LIMA (5)** DARIPADA **ENAM (6)** SOALAN

KERTAS SOALAN INI MENGANDUNGI SEMBILAN (9) MUKA SURAT

SOALAN DALAM BAHASA MELAYU

S1 Tiga (3) daya bertindak ke atas pendakap seperti ditunjukkan dalam **Rajah S1**

(a) Tentukan magnitud daya paduan yang bertindak ke atas pendakap dan arahnya diukur mengikut arah jam dari paksi positif x jika F1 = 180 N dan $\theta = 30^{o}$

(8 Markah)

(b) Jika magnitud daya paduan yang bertindak keatas pendakap adalah 550 N diarahkan sepanjang paksi positif *u* tentukan magnitud F1 dan arah θ

(12 Markah)

S2 Zarah A disokong oleh sistem kabel AB, AC dan AD seperti **Rajah S2.** Diberi jarak *h* hádalah 9m dan tegangan kabel AD adalah 200N.

(a) Lukiskan gambarajah badan bebas (GBB) bagi sistemtersebut.

(5 Markah)

(b) Tentukan tegangan dalam kabel AB dan AC supaya zarah adalah dalam keseimbangan.

(15 Markah)

S3 Tiga (3) daya bertindak ke atas pendakap seperti yang ditunjukkan dalam **Rajah S3.**

(a) Tentukan momen paduan bagi daya-daya tersebut di titik A. Ambil $F_1 = 250N, F_2 = 300N$ dan $F_3 = 500N$.

(8 Markah)

(b) Sekiranya momen paduan bagi titik A adalah 4800 N.m mengikut arah jam, tentukan nilai magnitud daya F_3 sekiranya $F_1 = 300N$ dan $F_2 = 400N$.

(12 Markah)

S4 Kekuda jambatan Pratt menyokong lima (5) daya (F=300kN) dan dimensi L=8m seperti yang ditunjukkan di dalam **Rajah S4.**

(a) Lukiskan gambarajah badan bebas (GBB) bagi kekuda jambatan tersebut.

(3 Markah)

(b) Dapatkan magnitud bagi daya-daya tindakbalas pada penyokong A dan H.

(7 Markah)

(c) Dengan menggunakan kaedah keratan, tentukan daya pada anggota BC, BI and BJ bagi kekuda jambatan tersebut.

(10 Markah)

S5 **Rajah S5** menunjukkan sebuah plat rencam nipis homoginus. Lampiran adalah sentroid bagi luas bentuk umum. Tentukan sentroid (x_c,y_c) bagi plat tersebut.

(20 Markah)

S6 Jisim-jisim bagi bongkah adalah, M_A = 50 kg dan M_B = 42 kg seperti yang ditunjukkan dalam **Rajah S6**. Bagi permukaan yang bersentuhan, pekali geseran statik, μ_s = 0.22 dan μ_k = 0.20.
Ambil g = 9.81 ms^{-2}.

(a) Terangkan secara ringkas perbezaan daya geseran statik dan kinetik.

(5 Markah)

(b) Lukiskan gambarajah badan bebas bagi rajah tersebut.

(5 Markah)

(c) Tentukan magnitud daya F yang diperlukan supaya bongkah B bergerak ke kiri.

(10 Markah)

SOALAN DALAM BAHASA INGGERIS

Q1 Three (3) forces act on the bracket shown in **Figure S1**

(a) Determine the magnitude of the resultant force acting on the bracket and its direction measured clockwise from the positive x axis if F1 = 180 N and $\theta = 30$.

(8 Marks)

(b) If the magnitude of the resultant force acting on the bracket is to be 550 N directed along the positive u axis determine the magnitude of **F**1 and its direction θ.

(12 Marks)

Q2 Particle A is supported by a cable system of AB, AC and AD as shown in **Figure S2.** Distance h is 9 m and tension in cable AD is 200 N are given.

(a) Draw the free body diagram (FBD) for the system.

(5 Marks)

(b) Determine the tension in cables AB and AC so that the particle is in equilibrium

(15 Marks)

Q3 Three (3) forces act on the bracket shown in **Figure S3.**

(a) Determine the resultant moment of the forces about point A. Take $F_1 = 250\text{N}, F_2 = 300\text{N}$ and $F_3 = 500\text{N}$.

(8 Marks)

(b) If the resultant moment about point A is 4800 N.m clockwise, determine the magnitude of F_3 if $F_1 = 300\text{N}$ and $F_2 = 400\text{N}$.

(12 Marks)

Q4 The Pratt bridge truss supports five (5) forces (F=300 kN) and the dimension L= 8m.shown in **Figure S4.**

(a) Draw a free body diagram (FBD) of the bridge truss.

(3 Marks)

(b) Determine the magnitude of the reaction forces at supports A and H.

(7 Marks)

(c) Using the method of section, determine the forces in members BC, BI and BJ of the bridge truss.

(10 Marks)

Q5 **Figure S5** shows a homogeneous thin plate. Given in the appendix are centroids of common shapes of areas. Determine centroid (x_c,y_c) of the plate.

(20 Marks)

Q6 The masses of the blocks are $M_A = 50$ kg and $M_B = 42$ kg as shown in **Figure S6.** Between all the contacting surfaces, $\mu_s = 0.22$ and $\mu_k = 0.20$. Take $g = 9.81$ ms^{-2}.

(a) Explain briefly the differences between the force static friction and kinetic friction.

(5 Marks)

(b) Draw the free body diagram (FBD) of the figure.

(5 Marks)

(c) Determine the magnitude of force, F needed to start B moving to the left?

(10 Marks)

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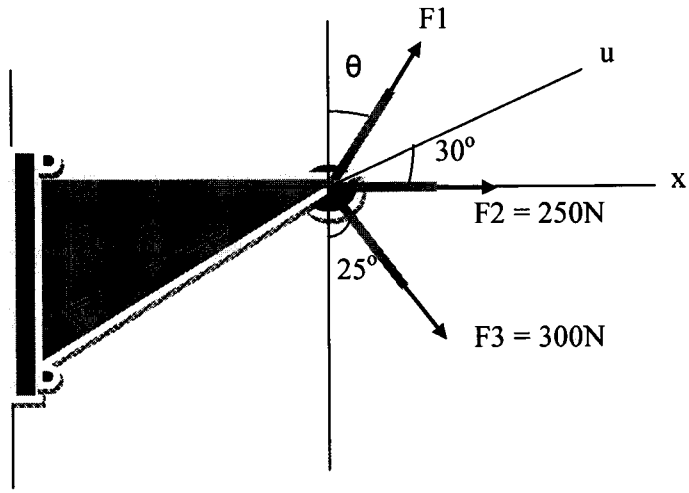
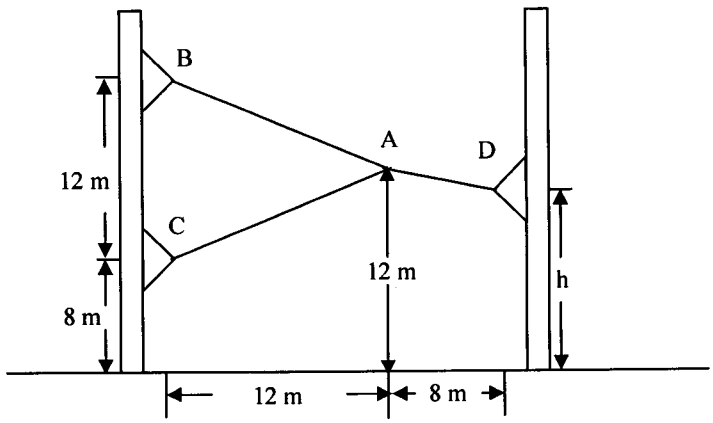


RAJAH S1/ FIGURE S1



RAJAH S2/ FIGURE S2

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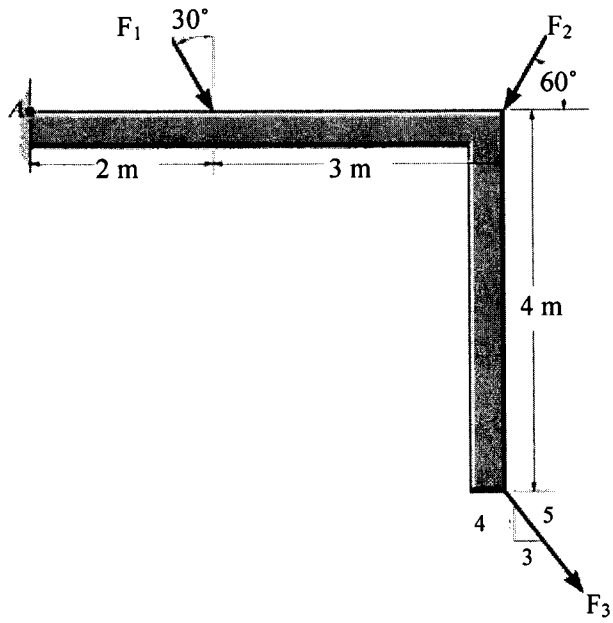
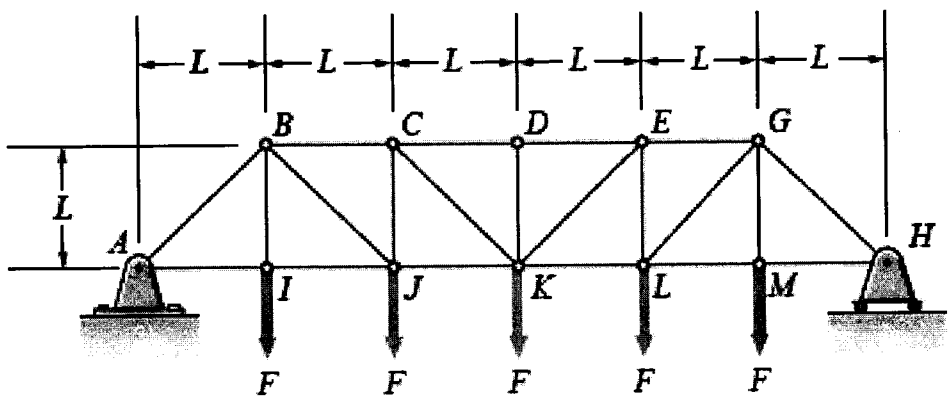


RAJAH S3/ FIGURE S3



RAJAH S4 / FIGURE S4

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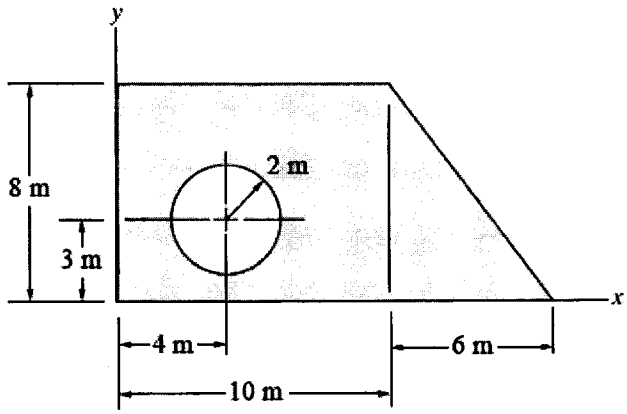
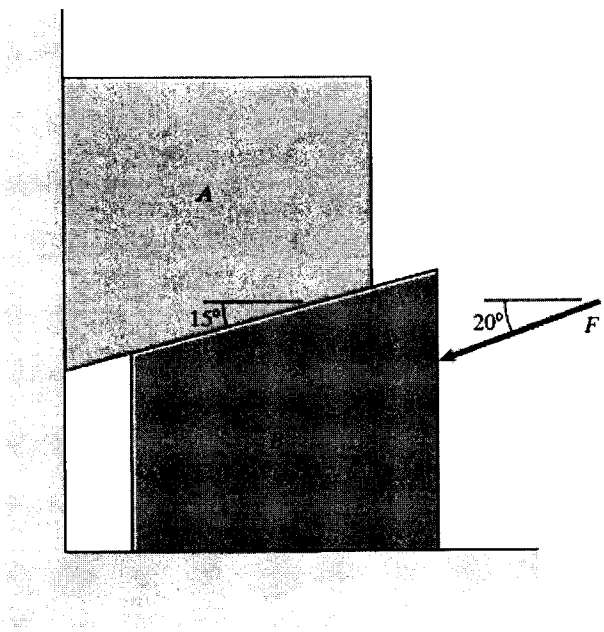


RAJAH S5 / FIGURE S5



RAJAH S6 / FIGURE S6

PEPERIKSAAN AKHIR

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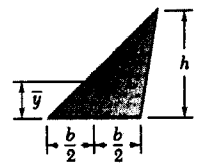
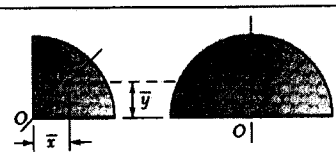
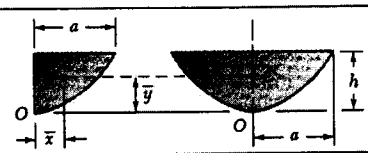
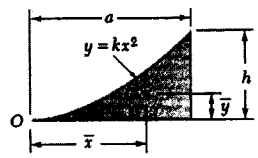
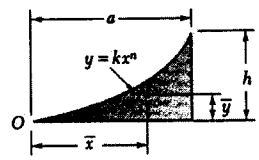
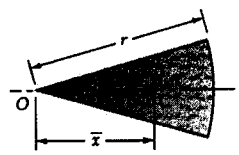
CENTROIDS OF COMMON SHAPES OF AREAS:

Shape		$\bar{x}$	$\bar{y}$	Area
Triangular area			$\frac{h}{3}$	$\frac{bh}{2}$
Quarter-circular area		$\frac{4r}{3\pi}$	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{4}$
Semicircular area		0	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{2}$
Quarter-elliptical area		$\frac{4a}{3\pi}$	$\frac{4b}{3\pi}$	$\frac{\pi ab}{4}$
Semielliptical area		0	$\frac{4b}{3\pi}$	$\frac{\pi ab}{2}$
Semiparabolic area		$\frac{3a}{8}$	$\frac{3h}{5}$	$\frac{2ah}{3}$
Parabolic area		0	$\frac{3h}{5}$	$\frac{4ah}{3}$
Parabolic spandrel		$\frac{3a}{4}$	$\frac{3h}{10}$	$\frac{ah}{3}$
General spandrel		$\frac{n+1}{n+2}a$	$\frac{n+1}{4n+2}h$	$\frac{ah}{n+1}$
Circular sector		$\frac{2r\sin\alpha}{3\alpha}$	0	αr^2