UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER II
SESI 2009/2010

NAMA MATA PELAJARAN	:	STATIK
KOD MATA PELAJARAN	:	BDA 1023
KURSUS	:	1 BDD
TARIKH PEPERIKSAAN	:	APRIL/MEI 2010
JANGKA MASA	:	3 JAM
ARAHAN	:	JAWAB **LIMA** (5) SOALAN SAHAJA DARIPADA **ENAM** (6) SOALAN.

KERTAS SOALAN INI MENGANDUNGI SEPULUH (10) MUKA SURAT

S1 Paip seperti ditunjukkan dalam **Rajah S1** dikenakan daya $F = 80N$.

(a) Tentukan vektor kedudukan dari titik B ke C dan dari titik B ke A.
(b) Tentukan sudut θ diantara segmen paip BC dan BA.
(c) Tentukan vektor kedudukan dari titik A ke D dan tentukan nilai magnitudnya.
(d) Formulakan daya tersebut dalam bentuk vektor.
(e) Tentukan vektor kedudukan dari titik A ke B dan tentukan nilai magnitudnya.
(f) Tentukan nilai magnitud bagi komponen daya yang selari dengan paksi AB paip tersebut.

(20 Markah)

S2 Tiang layer AB seperti ditunjukkan dalam **Rajah S2** dikenakan daya $F = 1\,kN$.

(a) Lukiskan gambarajah badan bebas (GBB) bagi tiang layar AB tersebut.
(b) Tentukan ketegangan kabel BC dan BD dan tindakan daya penyokong di bebola soket A bagi tiang layar seperti yang ditunjukkan dalam **Rajah S2**.

(20 Markah)

S3 Tiang digunakan untuk menyokong lantai yang dikenakan daya 30000N di atas tiang tersebut. Kesan tekanan tanah sepanjang sisi tiang tersebut adalah teragih seperti yang ditunjukkan dalam **Rajah S3**.

(a) Tentukan nilai magnitud bagi daya paduan setara ke atas tiang tersebut.
(b) Tentukan kedudukan daya paduan setara di atas tiang tersebut, diukur dari tapak A.

(20 Markah)

S4 Satu kerangka disokong oleh pin A dan pin D ditunjukkan seperti dalam **Rajah S4.** Bar ABC dan DEF berada dalam keadaan mendatar. Kerangka ini dikenakan daya menegak 6 kN pada C.

(a) Lukiskan gambarajah badan bebas (GBB) bagi kerangka tersebut.
(b) Tentukan daya pada anggota BE dan CF bagi kerangka tersebut.
(c) Dapatkan magnitud bagi daya-daya tindakbalas pada penyokong A dan D.
(d) Nyatakan samada anggota-anggota tersebut berada dalam keadaan tegangan atau mampatan.
(e) Nyatakan semua anggota dua daya pada kerangka tersebut.

(20 Markah)

S5 **Rajah S5** menunjukkan sebuah plat rencam nipis homogenus. Di beri pada lampiran adalah sentroid bagi luas bentuk umum.

(a) Tentukan momen luas pertama bagi plat tersebut merujuk kepada paksi x dan y.
(b) Tentukan koordinat (x_c, y_c) bagi sentroid plat tersebut.

(20 Markah)

S6 Berat bagi kotak adalah, W_A = 65 N dan W_B = 130 N seperti yang ditunjukkan dalam **Rajah S6**. Pekali geseran statik diantara kotak A dan B, dan antara kotak B dan lantai adalah, $\mu_s = 0.12$.

(a) Terangkan secara ringkas perbezaan diantara daya geseran statik dan kinetik.
(b) Lukiskan gambarajah badan bebas bagi rajah tersebut.
(c) Apakah nilai daya terbesar F supaya kotak tersebut tidak akan gelincir.

(20 Markah)

S1 The pipe in **Figure Q1** is subjected to the force of $F = 80N$.

(a) Express the position vector from B to C and B to A.
(b) Determine the angle θ between pipe segments BC and BA.
(c) Express the position vector from A to D and determine its magnitude.
(d) Express the force as a Cartesian vector.
(e) Express the position vector from A to B and determine its magnitude.
(f) Determine the projected component of the force acting along the axis AB of the pipe.

(20 Marks)

S2 Mast AB shown in **Figure Q2** is subjected to the force of $F = 1\,kN$.

(a) Draw a free body diagram (FBD) of the mast AB.
(b) Determine the tension in cables BC and BD and the reactions at the ball-and-socket joint A for the mast shown in **Figure Q2**.

(20 Marks)

S3 The column is used to support the floor which exerts a force of 30000N on the top of the column. The effect of soil pressure along its side is distributed as shown in **Figure Q3.**

(a) Determine the magnitude of the equivalent resultant force acting on the column.
(b) Specify the location of equivalent resultant force acts along the column, measured from its base A.

(20 Marks)

S4 A frame which is supported by a pin A and a pin D is shown in the **Figure Q4**. The bars ABC and DEF are horizontal. The frame supports a 6 kN vertical load at C.

(a) Draw a free body diagram (FBD) of the entire frame.
(b) Determine the forces in members BE and CF of the frame.
(c) Determine the magnitude of the reaction forces at supports A and D.
(d) State that whether each members is in tension or compression.
(e) Indicate two force members of the frame.

(20 Marks)

S5 **Figure Q5** shows a homogeneous thin plate. Given in the appendix are centroids of common shapes of area.

(a) Determine the first moment of area with respect to the x and y axis of the plate.
(b) Determine the coordinates (x_c, y_c) of the centroid for the plate.

(20 Marks)

S6 The weights of the boxes are W_A = 65 N and W_B = 130 N as shown in **Figure Q6**. The coefficient of static friction between boxes A and B and between box B and floor is, μ_s = 0.12.

(a) Explain briefly the differences between the force static friction and kinetic friction.
(b) Draw the free body diagram of the figure.
(c) What is the largest force F for which the boxes will not slip.

(20 Marks)

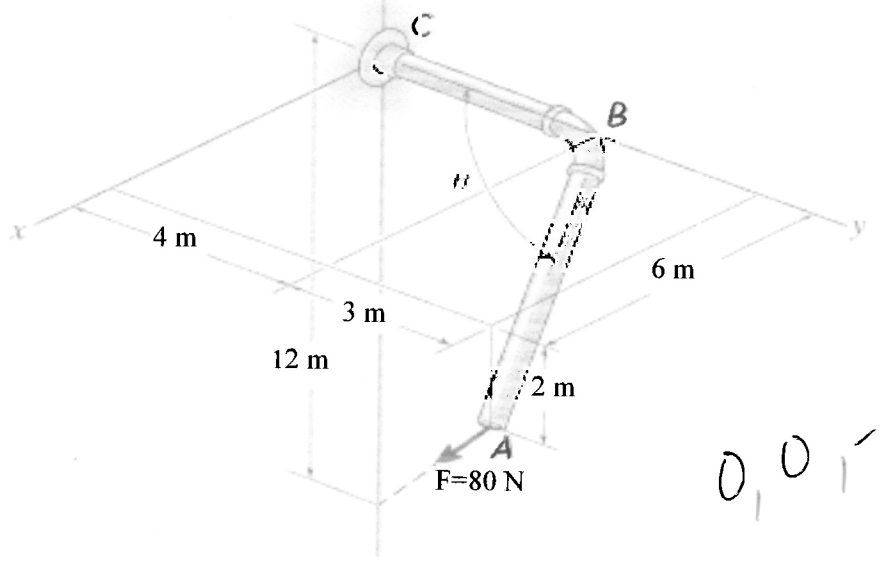
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEMESTER 2/2009/10

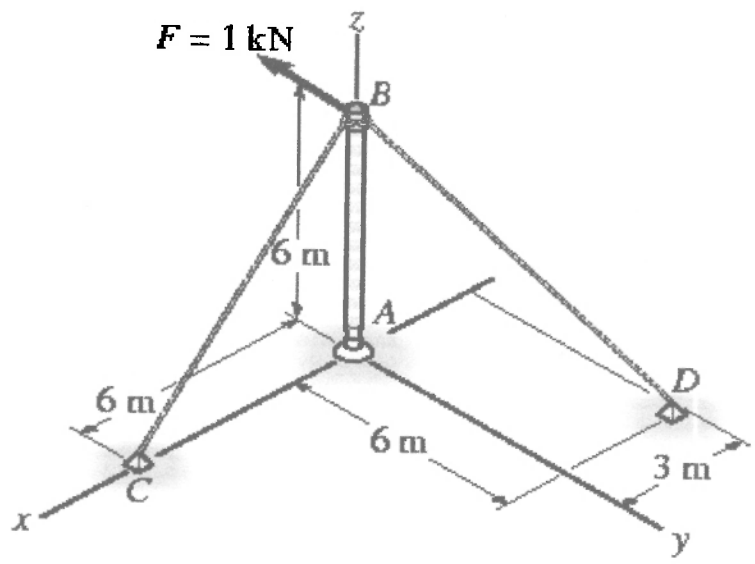
KURSUS : 1BDD

MATA PELAJARAN : STATIK

KOD MATA PELAJARAN :BDA 1023



Rajah S1/ Figure Q1

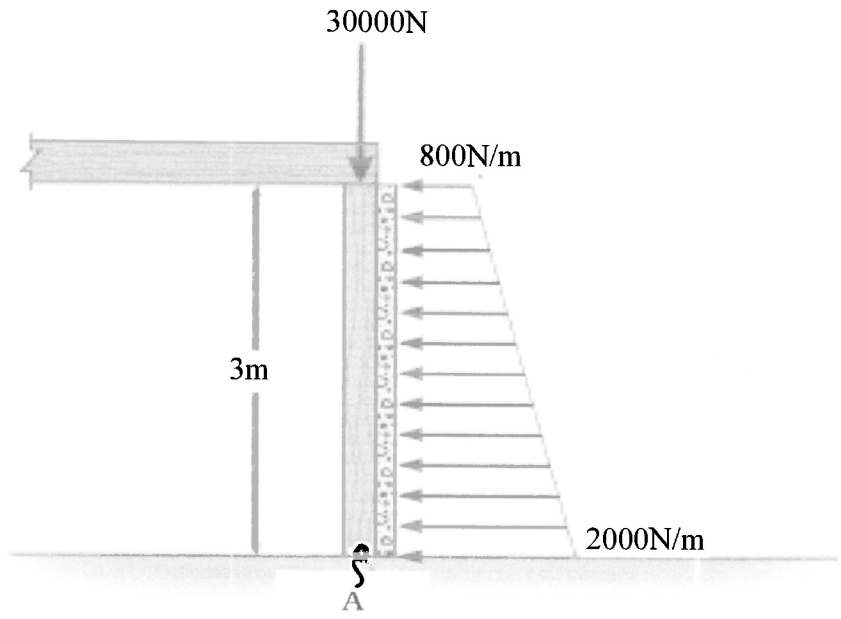


Rajah S2/ Figure Q2

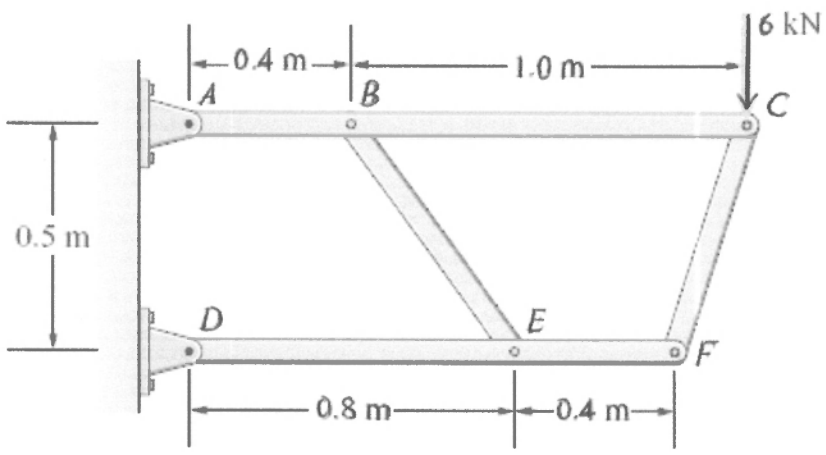
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEMESTER 2/2009/10 KURSUS : 1BDD

MATA PELAJARAN : STATIK KOD MATA PELAJARAN :BDA 1023



Rajah S3/ Figure O3

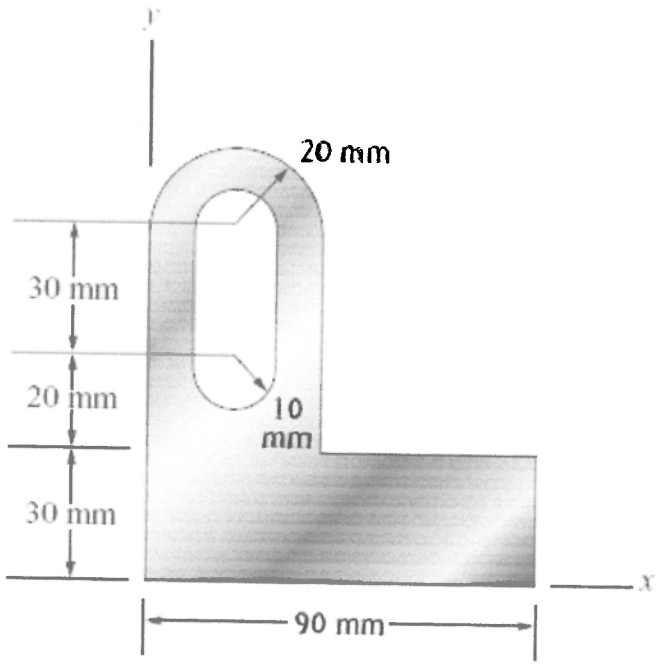


Rajah S4/ Figure O4

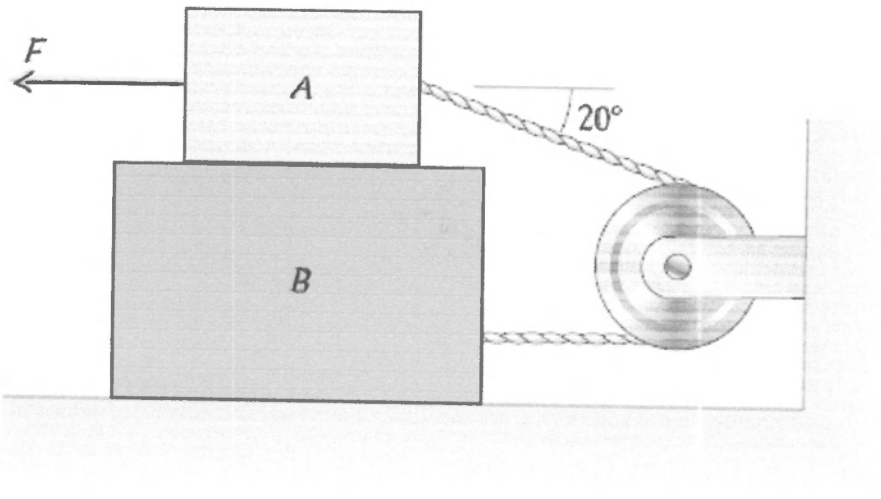
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEMESTER 2/2009/10 KURSUS : 1BDD

MATA PELAJARAN : STATIK KOD MATA PELAJARAN :BDA 1023



Rajah S5/ Figure O5



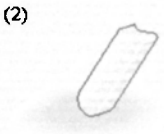
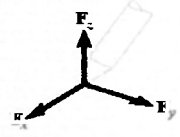
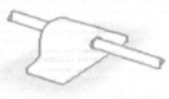
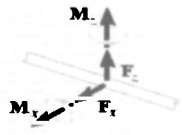
Rajah S6/ Figure O6

PEPERIKSAAN AKHIR

SEMESTER / SESI : SEMESTER 2/2009/10 KURSUS : 1BDD

MATA PELAJARAN : STATIK KOD MATA PELAJARAN : BDA 1023

SUPPORT REACTIONS :

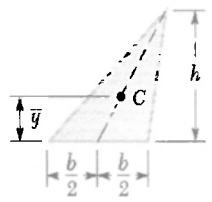
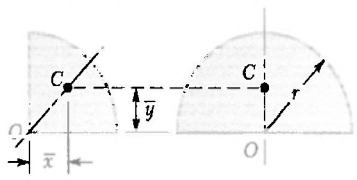
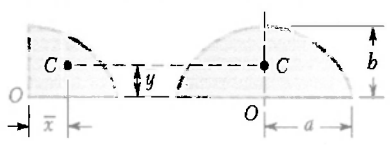
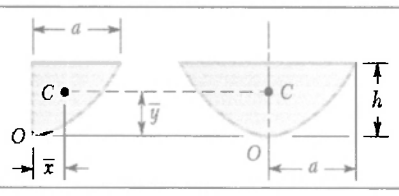
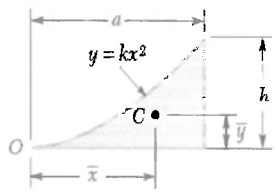
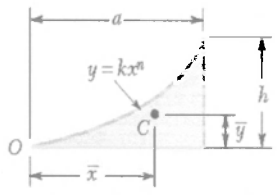
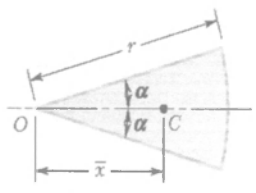
Types of Connection	Reaction	Number of Unknowns
(1)  cable		One unknown. The reaction is a force which acts away from the member in the known direction of the cable.
(2)  smooth surface support		One unknown. The reaction is a force which acts perpendicular to the surface at the point of contact.
(3)  roller		One unknown. The reaction is a force which acts perpendicular to the surface at the point of contact.
(4)  ball and socket		Three unknowns. The reactions are three rectangular force components.
(5)  single journal bearing		Four unknowns. The reactions are two force and two couple-moment components which act perpendicular to the shaft.

PEPERIKSAAN AKHIR

SEMESTER / SESI : SEMESTER 2/2009/10 KURSUS : 1BDD

MATA PELAJARAN : STATIK KOD MATA PELAJARAN :BDA 1023

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