



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**PEPERIKSAAN AKHIR
SEMESTER I
SESI 2016/2017**

NAMA KURSUS : STATIK
KOD KURSUS : DAM 10103
KOD PROGRAM : DAM
TARIKH PEPERIKSAAN : DISEMBER 2016 / JANUARI 2017
JANGKA MASA : 3 JAM
ARAHAN : JAWAB LIMA (5) SOALAN SAHAJA

TERBUKA

KERTAS SOALAN INI MENGANDUNGI **SEBELAS (11)** MUKA SURAT

SOALAN DI DALAM BAHASA MELAYU

- S1** (a) Jelaskan ciri-ciri keseimbangan zarah. (4 markah)
- (b) **Rajah S1(b)** menunjukkan sebiji bebola berjisim 80 kg disokong oleh beberapa sambungan tali yang di ikat pada permukaan dinding. Kirakan ketegangan yang terdapat di dalam setiap tali tersebut supaya bebola berada dalam keadaan keseimbangan. (Pecutan graviti adalah 9.81 m/s^2). (16 markah)
- S2** (a) Nyatakan maksud Momen. (2 markah)
- (b) **Rajah S2(b)** menunjukkan daya-daya 2D iaitu 1kN, 2kN and beban teragih seragam 2.5 kN/m dengan sistem gandingan bertindak ke atas sebatang rasuk keluli. Dengan abaikan ketebalan rasuk:
- (i) kirakan daya paduan tunggal yang diukur dari titik A.
 - (ii) kirakan kedudukan daya paduan tunggal tersebut yang diukur dari titik A.
 - (iii) tentukan magnitude daya tindakbalas daripada penyokong A dan B. (18 markah)
- S3** (a) Terangkan secara ringkas kekuda mudah. (4 markah)
- (b) Jambatan kekuda adalah tertakluk kepada bebanan yang ditunjukkan dalam **Rajah S3(b)**:
- (i) lakarkan Gambarajah Badan Bebas (GBB).
 - (ii) tentukan daya dalam anggota GF, CF dan CD kekuda jambatan. Tunjukkan samaada ahli- ahli adalah dalam tegangan atau mampatan. (16 markah)
- S4** (a) Nyatakan secara ringkas Pusat Graviti. **TERBUKA** (2 markah)
- (b) Terangkan secara ringkas dalam keadaan bagaimana Sentroid menyamai Pusat Graviti. (3 markah)
- (c) Tentukan luas dan sentroid pada kawasan berlorek dalam **Rajah S4(c)**. (15 markah)

- S5** (a) Huraikan secara ringkas tentang geseran. (2 Markah)
- (b) **Rajah S5(b)** menunjukkan graf geseran melawan daya. Terangkan lakaran graf tersebut berdasarkan konsep geseran statik dan geseran kinetik. (6 Markah)
- (c) Baji A digunakan untuk mengangkat Sebuah bongkah B seperti dalam **Rajah S5(c)**. Hitung daya yang diperlukan untuk menolak baji A bagi mengangkat bongkah B seberat 0.2kN. (12 Markah)
- S6** (a) Trak tunda dalam **Rajah S6 (a)** mengenakan daya $P = 4 \text{ kN}$ disepanjang kabel AB. Jika $x = 25 \text{ m}$, tentukan kedudukan θ kren di mana daya tersebut menghasilkan daya momen yang maksima pada titik O. Kira momen tersebut? (7 markah)
- (b) Gantikan tiga daya yang bertindak pada aci dalam **Rajah S6 (b)** dengan daya paduan tunggal. Nyatakan kedudukan daya tunggal tersebut, diukur dari titik A. (13 markah)

TERBUKA

QUESTION IN ENGLISH

- Q1** (a) Describe the condition of Equilibrium of a particle. (4 marks)
- (b) **Figure Q1(b)** shows a ball with a mass of 80 kg is supported by some extension of ropes that tied to the wall. Calculate the tension in each rope which the ball in equilibrium. (Acceleration of gravity is 9.81 m/s^2) (16 marks)
- Q2** (a) State the meaning of Moment. (2 marks)
- (b) **Figure Q2(b)** shows the 2D forces 1kN, 2kN and distributed loading 2.5 kN/m with couple system is acting on a steel beam. By neglect the thickness of the beam:
- (i) calculate the single equivalent resultant force measured from point A.
- (ii) calculate the position of single equivalent resultant force that measured from point A.
- (iii) determine the magnitude of the reactions on the support A and B. (18 marks)
- Q3** (a) Briefly describe simple truss. (4 marks)
- (b) The bridge truss is subjected to the loading shown in **Figure Q3(b)**:
- (i) Sketch the Free Body Diagram (FBD).
- (ii) Determine the force in members GF, CF and CD of the bridge truss. Indicate whether the members are in tension or compression. (16 marks)
- Q4** (a) Briefly state "Center of Gravity". (2 marks)
- (b) Briefly explain in which condition Centroid coincides with Center of Gravity. (3 marks)
- (c) Determine the area and centroid of the shaded area in **Figure Q4(c)**. (15 marks)

TERBUKA

- Q5** (a) Describe briefly about friction. (2 Marks)
- (b) **Figure Q5(b)** shows a graph of friction against force. Explain the graph based on the concept of static friction and kinetic friction. (6 Marks)
- (c) Wedge *A* is used to lift a block *B* as shown in **Figure Q5 (c)**. Calculate the force needed to push the wedge *A* to lift up Block *B* weighs 0.2kN. (12 Marks)
- Q6** (a) The tow truck in **Figure Q6(a)** exerts a force of $P = 4 \text{ kN}$ on cable along *AB*. If $x=25 \text{ m}$, determine the position θ of the boom so that this force creates a maximum moment about point *O*. What is this moment ? (7 marks)
- (b) Replace the three forces acting on the shaft in **Figure Q6(b)** by a single resultant force. Specify where the force acts, measured for end *A*. (13 marks)

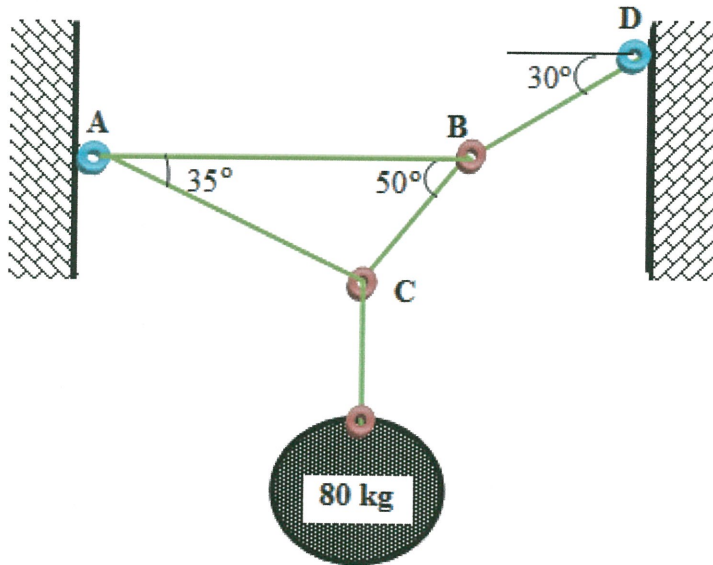
TERBUKA

-END OF QUESTION-

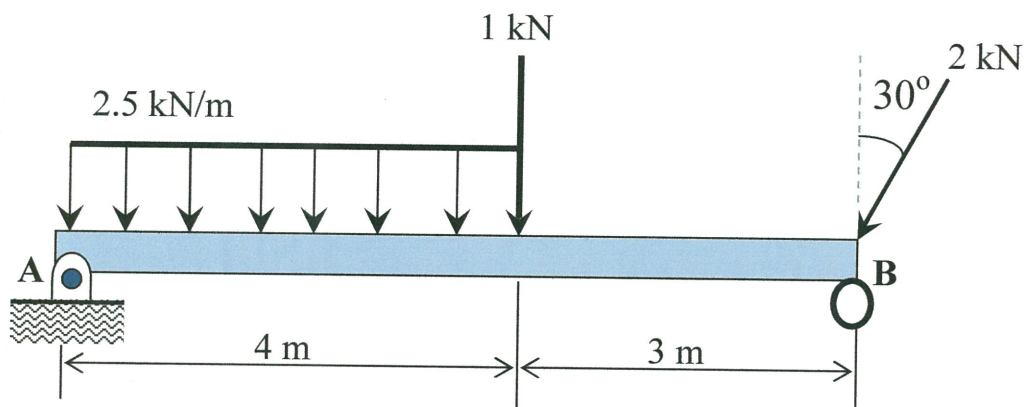
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
 NAMA KURSUS : STATIK

KOD PROGRAM : DAM
 KOD KURSUS : DAM 10103



RAJAH S1 (b)/ FIGURE Q1 (b)



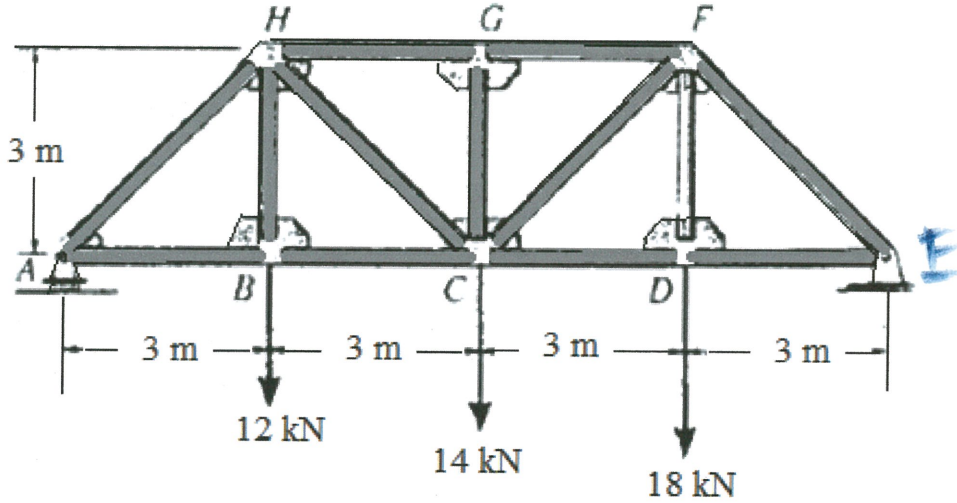
RAJAH S2 (b)/FIGURE Q2 (b)

TERBUKA

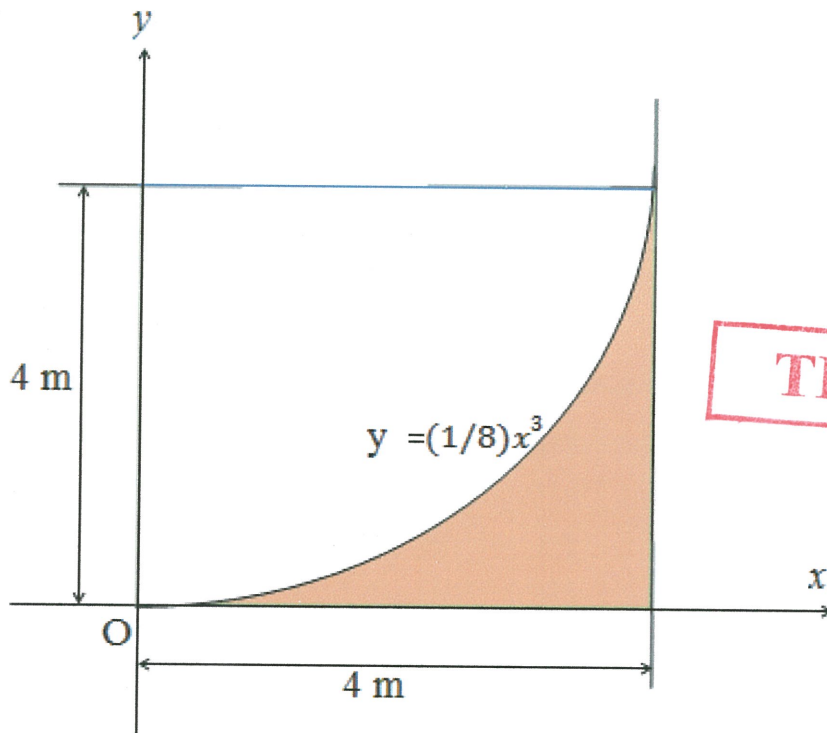
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
NAMA KURSUS : STATIK

KOD PROGRAM : DAM
KOD KURSUS : DAM 10103



RAJAH S3(b) / FIGURE Q3(b)

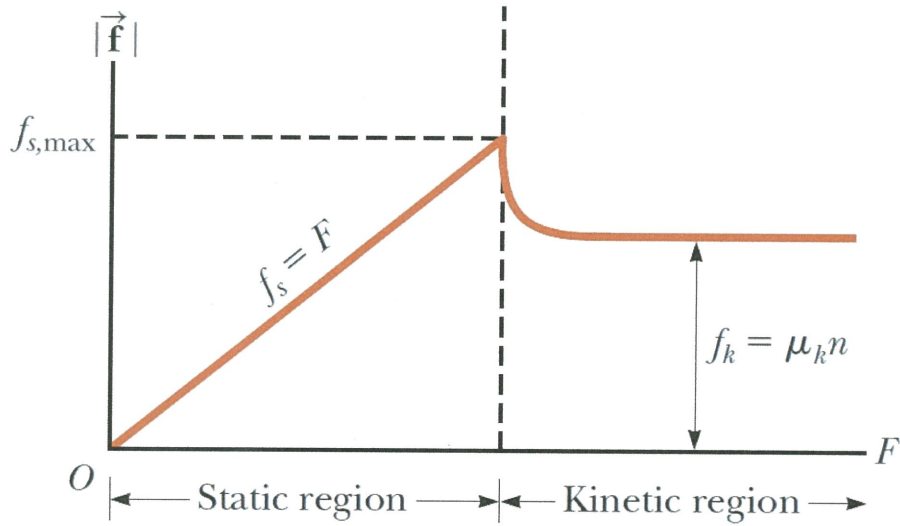


RAJAH S4(c) / FIGURE Q4(c)

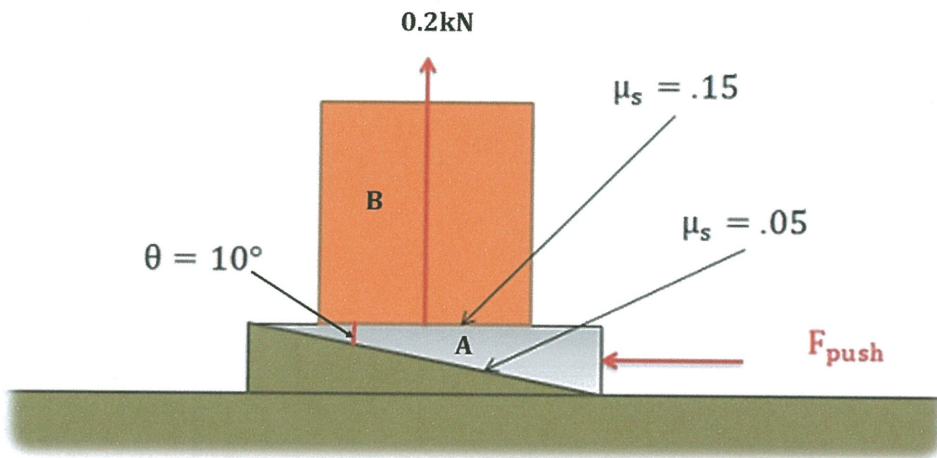
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
 NAMA KURSUS : STATIK

KOD PROGRAM : DAM
 KOD KURSUS : DAM 10103



RAJAH S5(b) / FIGURE Q5(b)



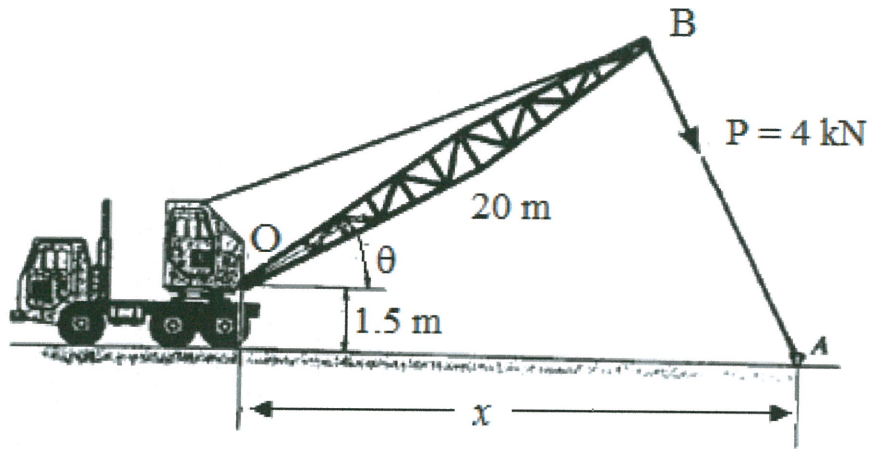
RAJAH S5(c) / FIGURE Q5(c)

TERBUKA

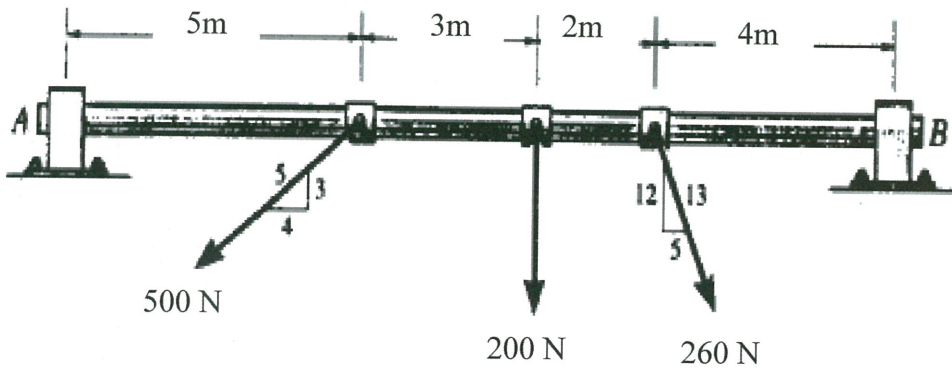
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
NAMA KURSUS : STATIK

KOD PROGRAM : DAM
KOD KURSUS : DAM 10103



RAJAH S6(a) / FIGURE Q6(a)



RAJAH S6(b) / FIGURE Q6(b)

TERBUKA

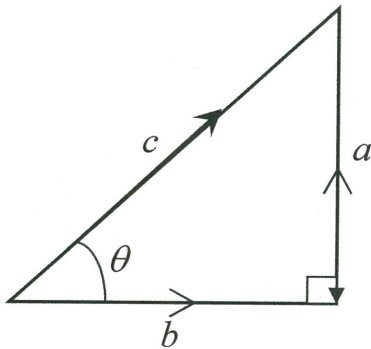
PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
 NAMA KURSUS : STATIK

KOD PROGRAM : DAM
 KOD KURSUS : DAM 10103

FORMULA:

1. Trigonometry



$$\sin \theta = \frac{a}{c}$$

$$\cos \theta = \frac{b}{c}$$

$$\tan \theta = \frac{a}{b} = \frac{\sin \theta}{\cos \theta}$$

$$\sec \theta = \frac{c}{b} = \frac{1}{\cos \theta}$$

$$\operatorname{cosec} \theta = \frac{c}{a} = \frac{1}{\sin \theta}$$

$$\cot \theta = \frac{b}{a} = \frac{\cos \theta}{\sin \theta}$$

2. Integration $\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$

3. Differentiate $\frac{d}{dx} x^n = n x^{n-1}$

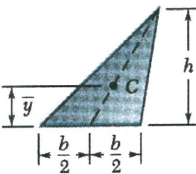
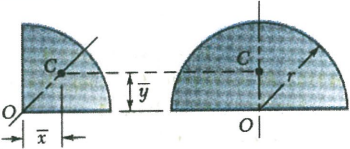
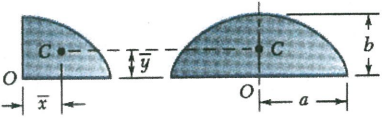
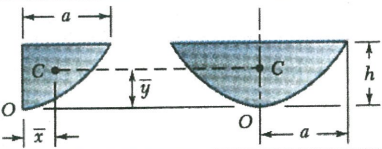
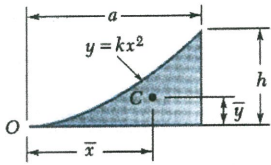
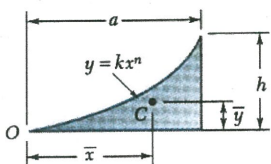
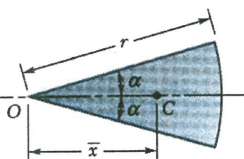
TERBUKA

PEPERIKSAAN AKHIR

SEMESTER / SESI : SEM I / 2016/2017
 NAMA KURSUS : STATIK

KOD PROGRAM : DAM
 KOD KURSUS : DAM 10103

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

TERBUKA