



**KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION**

COURSE NAME : STATIK DAN DINAMIK
COURSE CODE : DKM 1063
EXAMINATION : JUNE 2022
DURATION : 3 HOURS

**ARAHAN KEPADA CALON
INSTRUCTION TO CANDIDATES**

1. This examination paper consists of **ONE (1)** part: PART A (100 Marks)
*Kertas soalan ini mengandungi **SATU (1)** bahagian: BAHAGIAN A (100 Markah)*
2. Answer ALL questions in the answer sheet which is A4 size paper (or other paper with the consent of the relevant lecturer).
Jawab SEMUA soalan di dalam kertas jawapan iaitu kertas bersaiz A4 (atau lain-lain kertas dengan persetujuan pensyarah berkaitan).
3. Write your details as follows in the upper left corner for each answer sheet:
Tulis butiran anda sepertimana berikut di penjuru atas kiri bagi setiap kertas jawapan:
 - i. Student Full Name / Nama Penuh Pelajar
 - ii. Identification Card (I/C) No. / No. Kad Pengenalan
 - iii. Class Section / Seksyen Kelas
 - iv. Course Code / Kod Kursus
 - v. Course Name / Nama Kursus
 - vi. Lecturer Name / Nama Pensyarah
4. Each answer sheet must have a page number written at the bottom right corner.
Setiap helai kertas jawapan mesti ditulis nombor muka surat di penjuru bawah kanan.
5. Answers should be **neat and clear in handwritten form**.
*Jawapan hendaklah **ditulis tangan, kemas dan jelas**.*

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

This examination paper consists of **6** printed pages including front page
*Kertas soalan ini mengandungi **6** muka surat termasuk kulit hadapan*

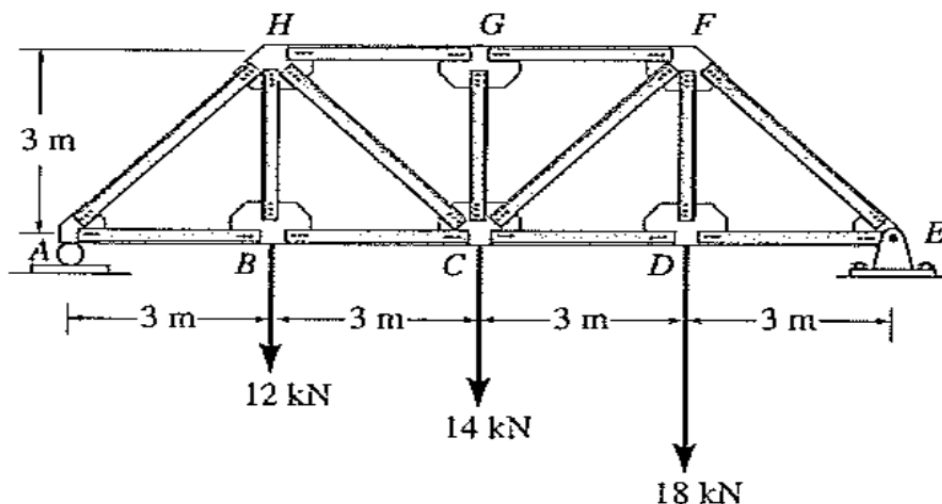
This part consists of **FOUR (4)** questions. Answer all questions in Answering Booklet.
Bahagian ini mempunyai EMPAT (4) soalan. Jawab semua soalan di dalam Buku Jawapan.

QUESTION 1 / SOALAN 1

- a. Give the definition of First, Second and Third Newton's Law
Berikan maksud Hukum Newton Pertama, Kedua dan Ketiga.

(6 Marks / 6 Markah)

- b. Based on truss structure in **Figure 1** below, calculate:
Berdasarkan struktur kekuda pada Rajah 1 dibawah, kirakan:



Rajah 1 / Figure 1

- i. The external forces at support A and E.
Daya luaran pada sokongan A dan E.

(7 Marks / 7 Markah)

- ii. The internal forces in members GF, CF and CD. State if the members are in tension or compression.

Daya dalaman pada kekuda GF, CF dan CD. Nyatakan sama ada ahli kekuda tersebut dalam keadaan tegangan atau mampatan.

(12 Marks / 12 Markah)

QUESTION 2 / SOALAN 2

- a. What is Centroid?

Apakah Titik Tengah?

(3 Marks / 3 Markah)

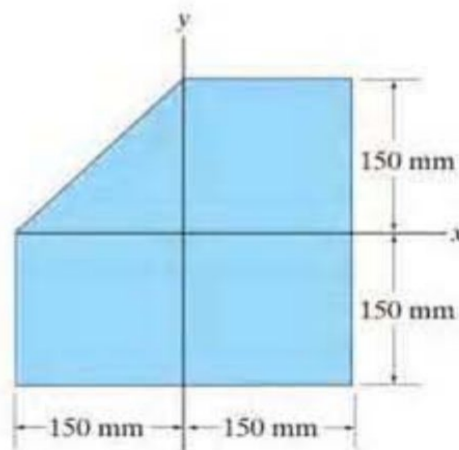
- b. State the definition of second moment area in equation form.

Nyatakan maksud luas momen kedua di dalam bentuk persamaan.

(4 Marks / 4 Markah)

- c. **Figure 2** shows a composite shape. Based on the figure, determine:

Rajah 2 menunjukkan sebuah bentuk komposit. Berdasarkan rajah tersebut, carikan:



Rajah 2 / Figure 2

- i. Determine the location (x,y) of composite shape center.

Lokasi titik tengah (x,y) bentuk komposit.

(6 Marks / 6 Markah)

- ii. Area moment of inertia of the composite shape about the X axis.

Luas momen inersia bentuk komposit berpaksi X.

(6 Marks / 6 Markah)

- iii. Area moment of inertia of the composite shape about the Y axis.

Luas momen inersia bentuk komposit berpaksi Y.

(6 Marks / 6 Markah)

SOALAN 3 / QUESTION 3

- a. Explain the definition of beam.

Terangkan maksud rasuk.

(3 Marks / 3 Markah)

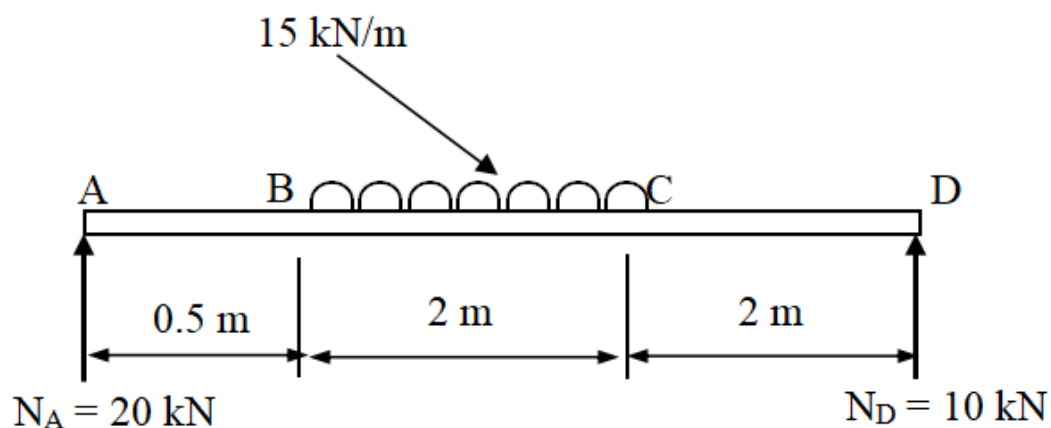
- b. Explain the importance of shear force and bending moment diagram.

Terangkan kepentingan gambar rajah daya ricih dan rajah momen lentur.

(3 Marks / 3 Markah)

- c. A beam is loaded as shown in **Figure 3**. Based on the figure:

*Sebatang rasuk dibebankan seperti ditunjukkan dalam **Rajah 3**. Berpandukan rajah tersebut:*



Rajah 3 / Figure 3

- i. Calculate the value of shear force and bending moment.

Kirakan nilai daya ricih dan momen lentur.

(10 Marks / 10 Markah)

- ii. Draw the shear force and bending moment diagram.

Lukiskan gambar rajah daya ricih dan momen lentur.

(9 Marks / 9 Markah)

SOALAN 4 / QUESTION 4

- a. Describe the Principle Conservation of Linear Momentum.

Huraikan Prinsip Keabadian Momentum Linear.

(5 Marks / 5 Markah)

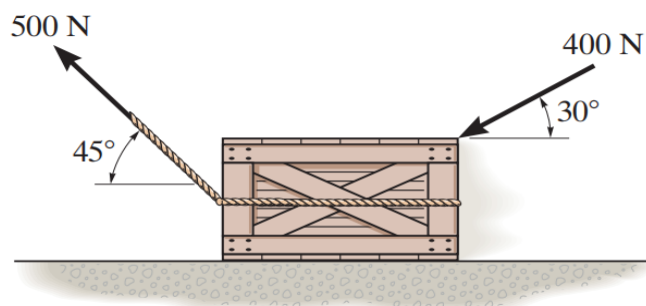
- b. Traveling with an initial speed of a car accelerates at 6000 km/h^2 along a straight road. How long will it take to reach a speed of 120 km/h and through what distance does the car travel during this time?

Perjalanan sebuah kereta dengan kelajuan awal memecut pada 6000 km/j^2 di sepanjang jalan lurus. Berapa lamakah masa untuk mencapai kelajuan 120 km/j dan sejauh manakah perjalanan kereta dalam tempoh masa ini?

(8 Marks / 8 Markah)

- c. **Figure 4** shows a 100 kg mass of a crate is subjected to the action of the two forces. If it is originally at rest, determine the distance it slides in order to attain a speed of 8 m/s . The coefficient of kinetic friction between the crate and the surface is $\mu_k = 0.2$.

Rajah 4 menunjukkan sebuah peti berjisim 100 kg yang dikenakan dua daya keatasnya. Sekiranya pada mula ianya dalam keadaan rehat, tentukan jarak yang ia meluncur untuk mencapai kelajuan 8 m/s . Pekali geseran kinetik antara peti dan permukaan adalah $\mu_k = 0.2$.



Rajah 4 / Figure 4

(12 Marks / 12 Markah)

[100 Marks / Markah]

END OF QUESTIONS

FORMULA / RUMUS

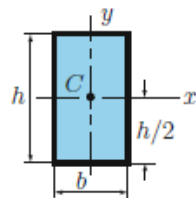
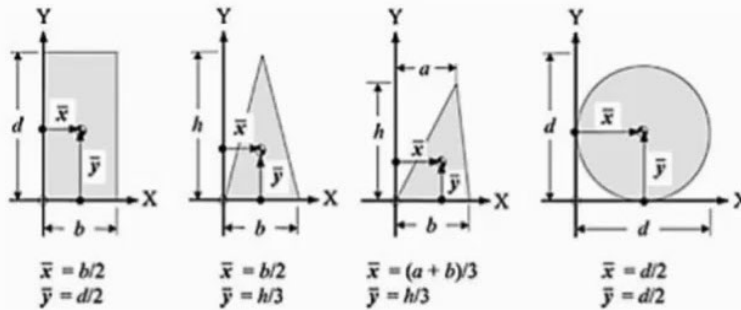
Statics

$M = F.d$ $\sigma = F/A$ $\bar{x} = \Sigma xA/\Sigma A$
 $\Sigma F = ma$ $\tau = V/A$ $\bar{y} = \Sigma yA/\Sigma A$
 $\Sigma F_x = 0$ $\epsilon = \Delta L/L$ $\tau_{max} = F/A$
 $\Sigma F_y = 0$ $E = \sigma/\epsilon$ $\tau = Tr/J$
 $\Sigma M = 0$ $\phi = x/L$ $T = F.r$

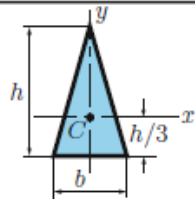
Dynamics

$u = s/t$ $\theta = \omega_0 t + 1/2 \alpha t^2$
 $a = (v-u)/t$ $v = \omega.r$
 $s = ut + 1/2 \alpha t^2$ $\omega^2 = \omega_0^2 + 2 \alpha \theta$
 $v^2 = u^2 + 2 as$ $a = r.\alpha$
 $\omega = 2 \pi n$ $T1 + \Sigma U_{1-2} = T2$

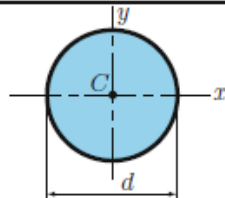
Centre of Gravity and Centroid for some typical/Standard shapes



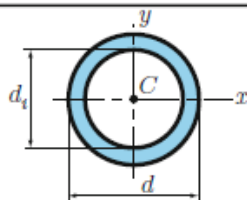
$A = bh$
 $I_{xx} = \frac{bh^3}{12}$ $I_C = \frac{bh}{12}(b^2 + h^2)$
 $I_{yy} = \frac{b^3h}{12}$



$A = \frac{bh}{2}$
 $I_{xx} = \frac{bh^3}{36}$ $I_C = \frac{bh}{36}(b^2 + h^2)$
 $I_{yy} = \frac{b^3h}{36}$



$A = \frac{\pi d^2}{4}$
 $I_{xx} = I_{yy} = \frac{\pi d^4}{64}$
 $I_C = \frac{\pi d^4}{32}$



$A = \frac{\pi}{4}(d^2 - d_i^2)$
 $I_{xx} = I_{yy} = \frac{\pi}{64}(d^4 - d_i^4)$
 $I_C = \frac{\pi}{32}(d^4 - d_i^4)$