

UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 2002/2003

*Second Semester Examination
2002/2003 Academic Session*

Februari/Mac 2003

February/March 2003

ESA 342/3 – Sistem Dorongan
(Propulsion Systems)

Masa : [3 Jam]

Time : [3 hours]

ARAHAN KEPADA CALON :

INSTRUCTION TO CANDIDATES:

1. Sila pastikan bahawa kertas peperiksaan ini mengandungi **(15) LIMA BELAS** mukasurat bercetak dan **(7) TUJUH** soalan.
Please ensure that this paper contains (15) FIFTEEN printed pages and (7) SEVEN questions.
2. Anda dikehendaki menjawab **(5) LIMA** soalan
Bahagian A jawab **(4) EMPAT** soalan dan Bahagian B jawab **(1) SATU** soalan
Please answer (5) FIVE questions.
Section A : Answer (4) FOUR questions .
Section B : Answer (1) ONE question.
3. Agihan markah bagi setiap soalan diberikan di sut sebelah kanan.
The marks allocated for each questions is shown on the right hand side.
4. Soalan boleh dijawab Bahasa Inggeris kecuali satu soalan wajib dijawab dalam Bahasa Melayu.
The questions can be answered in English but one question must be answered in Bahasa Melayu
5. Mesin kira bukan yang boleh diprogram boleh digunakan.
Non programmable calculator can be used.

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**BAHAGIAN A/PART A: (JAWAB (4) EMPAT SOALAN SAHAJA)
(ANSWER (4) FOUR QUESTION ONLY)**

1. (a) Terbitkan persamaan $\frac{C_D}{C_L} = K_1 C_L + K_2 + \frac{C_{D0}}{C_L}$, supaya C_L/C_D adalah maksimum berlaku pada pekali daya angkat $(C_L)^* = \sqrt{\frac{C_{D0}}{K_1}}$ dan $\left(\frac{C_D}{C_L}\right)_{\max} = \frac{1}{2\sqrt{K_1 C_{D0}} + K_2}$ juga maksimum.

Derive from Eqs. $\frac{C_D}{C_L} = K_1 C_L + K_2 + \frac{C_{D0}}{C_L}$ so that the maximum C_L/C_D occurred at the lift coefficient $(C_L)^* = \sqrt{\frac{C_{D0}}{K_1}}$ and the maximum $\left(\frac{C_D}{C_L}\right)_{\max} = \frac{1}{2\sqrt{K_1 C_{D0}} + K_2}$.

(6 markah/marks)

- (b) Tunjukkan bahawa dari pekali nisbah angkat seret $\frac{C_D}{C_L} = K_1 C_L + K_2 + \frac{C_{D0}}{C_L}$, nilai C_L/C_D adalah maximum pada pekali seretan C_D yang diberi oleh

$$C_D = 2C_{D0} + K_2 \sqrt{\frac{C_{D0}}{K_1}}$$

Show that from the drag lift ratio coefficient $\frac{C_D}{C_L} = K_1 C_L + K_2 + \frac{C_{D0}}{C_L}$ the maximum C_L/C_D will corresponding to the drag coefficient C_D given by

$$C_D = 2C_{D0} + K_2 \sqrt{\frac{C_{D0}}{K_1}}$$

(6 markah/marks)

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