
UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama
Sidang Akademik 2006/2007
*First Semester Examination
2006/2007 Academic Session*

Oktober/November 2006
October/November 2006

ESA 342/3 – Sistem Dorongan
Propulsion Systems

Masa : [3 jam]
Hour : [3 hours]

ARAHAN KEPADA CALON :
INSTRUCTION TO CANDIDATES:

Sila pastikan bahawa kertas soalan ini mengandungi **ENAMBELAS (16)** mukasurat bercetak termasuk lampiran dan **ENAM (6)** soalan sebelum anda memulakan peperiksaan.

*Please ensure that this paper contains **SIXTEEN (16)** printed pages included attachment and **SIX (6)** questions before you begin examination.*

Bahagian A: Jawab **TIGA (3)** soalan. Bahagian B: Jawab **SEMUA** soalan.

*Part A: Answer **THREE (3)** questions. Part B: Answer **ALL** questions.*

Soalan boleh dijawab dalam Bahasa Malaysia kecuali satu soalan mestilah dijawab dalam Bahasa Inggeris.

The question can be answered in Bahasa Malaysia but one question must be answered in English.

Setiap soalan mestilah dimulakan pada mukasurat yang baru.

Each questions must begin from a new page.

BAHAGIAN A/PART A

1. (a) Terangkan bagaimana caranya daya tujahan dihasilkan pada enjin pesawat terbang jenis:

- (i) turbojet
- (ii) turbofan
- (iii) turboprop

Explain how the mechanism of thrust is generated by the following type of aircraft engine:

- (i) turbojet
- (ii) turbofan
- (iii) turboprop

(10 markah/marks)

- (b) Terangkan apa yang dimaksudkan dengan istilah berikut:

Explain what does it mean for the following term:

- (i) Penggunaan bahan api tujah tentu dan penggunaan bahan api tentu.

Specific thrust Fuel consumption" STFC and "Specific thrust consumption" SFC.

- (ii) Enjin "turbofan" dengan campuran aliran ekzos.

Turbo fan engine with mixed exhaust stream.

- (iii) Terangkan mengapa enjin ramjet hanya dapat digunakan pada pesawat terbang halaju supersonik?

Explain why the ram jet engine is used for the supersonic airplane?

(10 markah/marks)

2. (a) Dengan anggapan bahawa situasi ideal berlaku ketika aliran melalui komponen-komponen enjin pesawat turbo jet, tunjukkan bahawa nisbah bahan api udara f adalah:

$$f = \frac{c_p T_0}{h_{pr}} [\tau_\lambda - \tau_r \tau_c]$$

With assumption that an ideal condition is valid for the flow past through engine components of Ramjet, show that the fuel air ratio f is expressed by:

$$f = \frac{c_p T_0}{h_{pr}} [\tau_\lambda - \tau_r \tau_c]$$

(10 markah/marks)

dan halaju aliran keluar dari muncung turbo jet adalah:

$$\left(\frac{V_9}{a_0} \right)^2 = \frac{2}{\gamma - 1} \frac{\tau_\lambda}{\tau_r \tau_c} (\tau_r \tau_c \tau_t - 1)$$

and the exit velocity from the Nozzle of turbo jet as :

$$\left(\frac{V_9}{a_0} \right)^2 = \frac{2}{\gamma - 1} \frac{\tau_\lambda}{\tau_r \tau_c} (\tau_r \tau_c \tau_t - 1)$$