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UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama  
Sidang Akademik 2004/2005  
*First Semester Examination  
2004/2005 Academic Session*

Oktober 2004  
*October 2004*

**ESA 481/3 – Rekabentuk Kapal Angkasa**  
*Spacecraft Design*

Masa : 3 jam  
*Hour : 3 hour*

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**ARAHAN KEPADA CALON :**  
**INSTRUCTION TO CANDIDATES :**

Sila pastikan bahawa kertas soalan ini mengandungi **EMPAT (4)** mukasurat dan **EMPAT BELAS (14)** soalan sebelum anda memulakan peperiksaan.

*Please ensure that this paper contains **FOUR (4)** printed pages and **FOURTEEN (14)** questions before you begin examination.*

Kertas ini mengandungi tiga bahagian. **BAHAGIAN A**, **BAHAGIAN B** dan **BAHAGIAN C**.

Jawab **LIMA (5)** soalan dari **BAHAGIAN A**.

Jawab **SATU (1)** soalan dari **BAHAGIAN B**.

Dan jawab **SATU (1)** soalan dari **BAHAGIAN C**.

*This paper has three sections, **SECTION A**, **SECTION B** and **SECTION C**.*

*Answer **FIVE (5)** questions from **SECTION A**.*

*Answer **ONE (1)** questions from **SECTION B**.*

*And answer **ONE (1)** question from **SECTION C**.*

Calon boleh menjawab semua soalan dalam Bahasa Malaysia. Sekiranya calon ingin menjawab dalam Bahasa Inggeris, sekurang-kurangnya satu soalan perlu dijawab dalam Bahasa Malaysia.

*Student may answer all the questions in Bahasa Malaysia. If you want to answer in English, at least one question must be answered in Bahasa Malaysia.*

Setiap soalan mestilah dimulakan pada mukasurat yang baru.

*Each questions must begin from a new page.*

**BAHAGIAN A**  
**SECTION A**

1. Jelaskan kejuruteraan sistem dan tulis matlamatnya sebagai dasar kepada tatabara rekabentuk.

*Explain system engineering and write the objective as a base of design methodology.*

**(30 markah/marks)**

2. Jelaskan ketiga-tiga asas konsep kepada aktiviti-aktiviti kejuruteraan mengikut kos hasil dan kos perkhidmatan hasil.

*Elaborate the three underlying concepts of engineering activities in terms of product cost and product service cost.*

**(30 markah/marks)**

3. Takrifkan kitaran hayat projek. Apakah yang menetapkan pelabelan dan pembahagian fasa yang membuatkan satu piawaian berlainan dengan yang lain?

*Define project life cycle. What dictates labelling and dividing of phases that makes one standard different from another?*

**(30 markah/marks)**

4. Gariskan enam katogeri kitaran hayat projek seperti ditakrifkan oleh NASA.

*Outline the six categories of project life cycle defined by NASA.*

**(30 markah/marks)**

5. Kembangkan sekurang-kurangnya tiga aktiviti utama yang terlibat pada kajian awal.

*Elaborate at least three major activities involved at preliminary study.*

**(30 markah/marks)**

6. Senaraikan sekurang-kurangnya tiga prinsip konsep misi dalam proses rekabentuk misi angkasa.

*List at least three principles of mission concept in space mission design process.*

**(30 markah/marks)**

7. Senaraikan sekurang-kurangnya enam elemen untuk konsep misi satelit yang baik.

*List at least six important elements that make a good satellite mission concept.*

**(30 markah/marks)**



8. Dalam merencanakan sebuah kapal angkasa, tentukan had-had kepada pemandu-pemandu berikut:

*In designing a spacecraft, determine the respective limitations of the following drivers.*

**(30 markah/marks)**

<b>Pemandu Driver</b>	<b>Apa Menghad Pemandu What Limits Driver</b>	<b>Apa Pemandu Hadkan What Driver Limits</b>
Sais ( <i>Size</i> )		
Pengarah ( <i>Pointing</i> )		
Liputan ( <i>Coverage</i> )		

9. Dalam merencanakan orbit untuk sebuah misi, apakah maklumat yang biasanya diperlukan dan apakah pengaruh parameter tersebut terhadap sesuatu rekabentuk.

*In designing an orbit for a mission, what informations are generally needed and what are the influence of those parameters towards a design.*

**(30 markah/marks)**

10. Apakah keperluan-keperluan dan pengaruh bebanbayar kepada sesebuah misi?

*What are the requirements and influence of a payload to a mission?*

**(30 markah/marks)**

## **BAHAGIAN B**

### **SECTION B**

Pilih satu daripada TIGA (3) get kawalan utama tersebut :  
*Choose between the THREE (3) main control gate mentioned :*

1. Pemeriksaan Konsep Misi  
*Mission Concept Review (MCR).*
2. Pemeriksaan Takfiran Misi  
*Mission Definition Review (MDR).*
3. Pemeriksaan Takrifan Sistem  
*System Definition Review (SDR).*

Huraikan tujuan dan objektif get kawalan utama tersebut. Kemudian senaraikan kriteria kejayaan pelengkapan proses pemeriksaan masing-masing.

*Describe the purpose and objectives of the following major control gates. Then list down the criteria of a successful completion of the respective review process.*

**(100 markah/marks)**

**Bahagian C.***Part C.*

Berikut adalah sebahagian daripada kenyataan tender yang diperolehi daripada Kementerian Pertanian dan Pengairan, Republik Yemen mencari perkhidmatan konsultasi. Baca kenyataan berikut, kemudian tulis definisi masalah terperinci dalam menyediakan satu penyelesaian satelit.

*The following is a part of a tender statement obtained from the Ministry of Agriculture and Irrigation, Republic of Yemen seeking for consultation service. Read the statement carefully, and then write a detail problem definition in providing a satellite solution.*

**Republic of Yemen**  
**Groundwater and Soil Conservation Project**  
**Expression of Interest for Consultation Services**

The Republic of Yemen has received a Credit from the International Development Association (IDA) to assist in financing of the Groundwater and Soil Conservation Project (GSCP) and intends to apply parts of the proceedings for consultant services for

“Satellite Imagery/Data Analysis Study for Monitoring of Changes in Irrigated Areas and Cropping Pattern for some selected sub-basins.”

*The project is geographically spread country wide in fifteen governorates.*

The period for carrying out the study shall be in two spells during 2004 and 2009.

The Ministry of Agriculture and Irrigation (MAI) represented by the Project Coordination Unit (PCU) of the GSCP, now invites eligible consultants to indicate their expression of interests (EOIs) in providing the services for carrying out the study as indicated above. The interested consultants must provide their approach and methodology, in brief, to undertake the study and other supporting information indicating that they are qualified to perform the services in the most professional and timely manner. EOI should also include a profile of the firm, key personnel and specific information regarding their relevant qualifications, description of their experience in similar assignments etc.

A consultant will be selected in accordance with the procedures set out in the World Bank, *Guidelines: Selection and Employment of Consultants by World Bank Borrowers*, January 1997 (revised September 1997 and January 1999)

Interested consultants may obtain further information at the address below during office hours from 9:00am to 2:00pm.

Firms submitting EOIs will be considered for short-listing, and a formal Request for Proposal (RFP) will be provided to the short-listed firms.

*Engr. Hamoud Al Rubaidi, Project Director,  
 Groundwater and Soil Conservation Project,  
 Ministry of Agriculture and Irrigation,*

*P.O. Box 2805, Sana'a (Republic of Yemen)  
 Al-Hay Al-Seyasi Street, Near Djibouti Street, Sana'a (Republic of Yemen)*

**(250 markah/marks)**

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