

UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2006/2007

April 2007

ZCE 275/4 - Introduction to Astronomy
[Pengantar Astronomi]

Duration: 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **FIVE** printed pages before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi LIMA muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instruction: Answer all **EIGHT** questions. Students are allowed to answer all questions in Bahasa Malaysia or in English.

Arahan: Jawab kesemua **LAPAN** soalan. Pelajar dibenarkan menjawab semua soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

1. (a) What does the unit parsec measure. Define one parsec.
[Apakah yang diukur dengan unit parsek. Takrifkan parsek.] (20/100)
- (b) What is the H-R diagram? Explain its features and importance.
[Apakah rajah H-R? Terangkan ciri-ciri dan kepentingannya.] (30/100)
- (c) Variable Cepheids have be used to determine astronomical distances. By highlighting its characteristic feature, explain how this is done.
[Cepheid berubah telah digunakan untuk menentukan jarak astronomi. Dengan menonjolkan ciri utamanya, terangkan bagaimana ini dilakukan.] (50/100)
2. (a) Explain the magnitude system? What is apparent magnitude? What is absolute magnitude.
[Terangkan sistem magnitud. Apakah magnitud ketara? Apakah magnitud absolut?] (30/100)
- (b) A star measures an apparent magnitude of 2.5 at 25 pc. Determine its absolute magnitude.
[Satu bintang mempunyai magnitud ketara 2.5 pada 25 pc. Tentukan magnitud absolutnya.] (20/100)
- (c) Explain how information from far away astronomical objects be derived from light. What are the physical properties of light that allow for this.
[Terangkan bagaimana maklumat daripada objek astronomi yang jauh diperolehi dari cahaya. Apakah sifat-sifat fizikal cahaya yang membolehkan ini dilakukan.] (50/100)
3. (a) What is the first point of Aries? Show its position on a celestial sphere diagram.
[Apakah titik awal Hamal? Tunjukkan posisinya di atas rajah sfera samawi.] (20/100)
- (b) What are the characteristics of the ecliptic coordinate system. On the same diagram in 3(a), show the system coordinates.
[Apakah ciri-ciri sistem koordinat ekliptik. Di dalam rajah yang sama di dalam soalan 3(a), tunjukkan koordinat-koordinat sistem ini.] (20/100)

- (c) Compare the ecliptic and the equatorial coordinate systems.
[Bandingkan sistem-sistem koordinat ekliptik dan khatulistiwa.] (20/100)

- (d) Explain the following times:
[Terangkan waktu-waktu berikut:]

- (i) Terrestrial time (TT)
[Waktu terrestrial]
 (ii) Universal time (UT)
[Waktu universal]
 (iii) Sidereal time (ST)
[Waktu siderius]

Why is there a non-uniform difference between TT and UT over time?
[Dengan masa, kenapakah terdapat perbezaan yang tidak sekata di antara TT dan UT?]

(40/100)

4. (a) What is resolving power for a telescope? Explain the Rayleigh criterion.
[Apakah kuasa lerai sebuah teleskop? Terangkan kriteria Rayleigh.] (20/100)

- (b) Compare and/or contrast 5 features of a reflector and a refractor telescope.
[Banding dan/atau bezakan 5 ciri sebuah teleskop pembalik dan pembias.] (50/100)

- (c) Determine the best limiting magnitude for a refractor that has a collecting aperture of 10 cm and a transmission efficiency of 0.7. Take the opening diameter of a human eye as 8 mm.
[Tentukan magnitud penghad bagi sebuah teleskop pembias yang memiliki bukaan pengumpul 10 cm dan kecekapan transmisi 0.7. Ambil diameter bukaan mata manusia sebagai 8 mm.] (30/100)

5. Explain each one of the following calendar systems:
[Terangkan setiapnya dari sistem-sistem kalendar berikut:]

- (i) solar calendar
[kalendar suria]
 (ii) lunar calendar
[kalendar bulan]
 (iii) luni-solar calendar
[kalendar bulan-suria]

(100/100)

6. You are asked to plan and build a new observatory. List and explain 5 of the most important factors and/or items you must take into account in you plan.

[Anda diminta merancang membina sebuah balaicerap baru. Senaraikan dan terangkan 5 perkara terpenting yang anda perlu mengambilkira di dalam perancangan tersebut.]

(100/100)

7. Explain the following terminologies used in astronomy:

[Terangkan maksud istilah-istilah berikut di dalam penggunaan astronomi:]

- | | | |
|-----|---|----------|
| (a) | Red giant [<i>Gergasi merah</i>] | (10/100) |
| (b) | Supernova [<i>Supernova</i>] | (10/100) |
| (c) | Neutron star [<i>Bintang neutron</i>] | (10/100) |
| (d) | Black hole [<i>Lohong hitam</i>] | (10/100) |
| (e) | White dwarf [<i>Kerdil putih</i>] | (10/100) |
| (f) | Spectroscopic binary [<i>Binari spektroskopi</i>] | (10/100) |
| (g) | Spectroscopic parallax [<i>Paralaks spektroskopi</i>] | (10/100) |
| (h) | Oort cloud [<i>Awan Oort</i>] | (10/100) |
| (i) | Kuiper belt [<i>Jaluran Kuiper</i>] | (10/100) |
| (j) | Van Allen belt [<i>Jaluran Van Allen</i>] | (10/100) |

8. Figure 1 shows a snapshot view ($190^\circ \times 140^\circ$) of a night-sky seen from Penang on 19th Mac 2007 at 10.50 pm. A few constellations are shown using stick diagrams. On the figure:

[Rajah 1 menunjukkan pandangan seketika ($190^\circ \times 140^\circ$) langit malam yang dilihat dari Pulau Pinang pada 19 Mac 2007 pada jam 10.50 malam. Beberapa buruj telah dilabelkan menggunakan rajah ranting. Di atas Rajah 1:]

- (i) Draw the ecliptic
[Lakarkan ekliptik]
- (ii) Show the approximate direction of North
[Tunjukkan anggaran arah Utara]
- (iii) Name the stars indicated by the thick arrows
[Nama bintang-bintang yang ditunjukkan oleh panah tebal]

(100/100)

Index number : _____ (Submit this page together with your answer scripts)

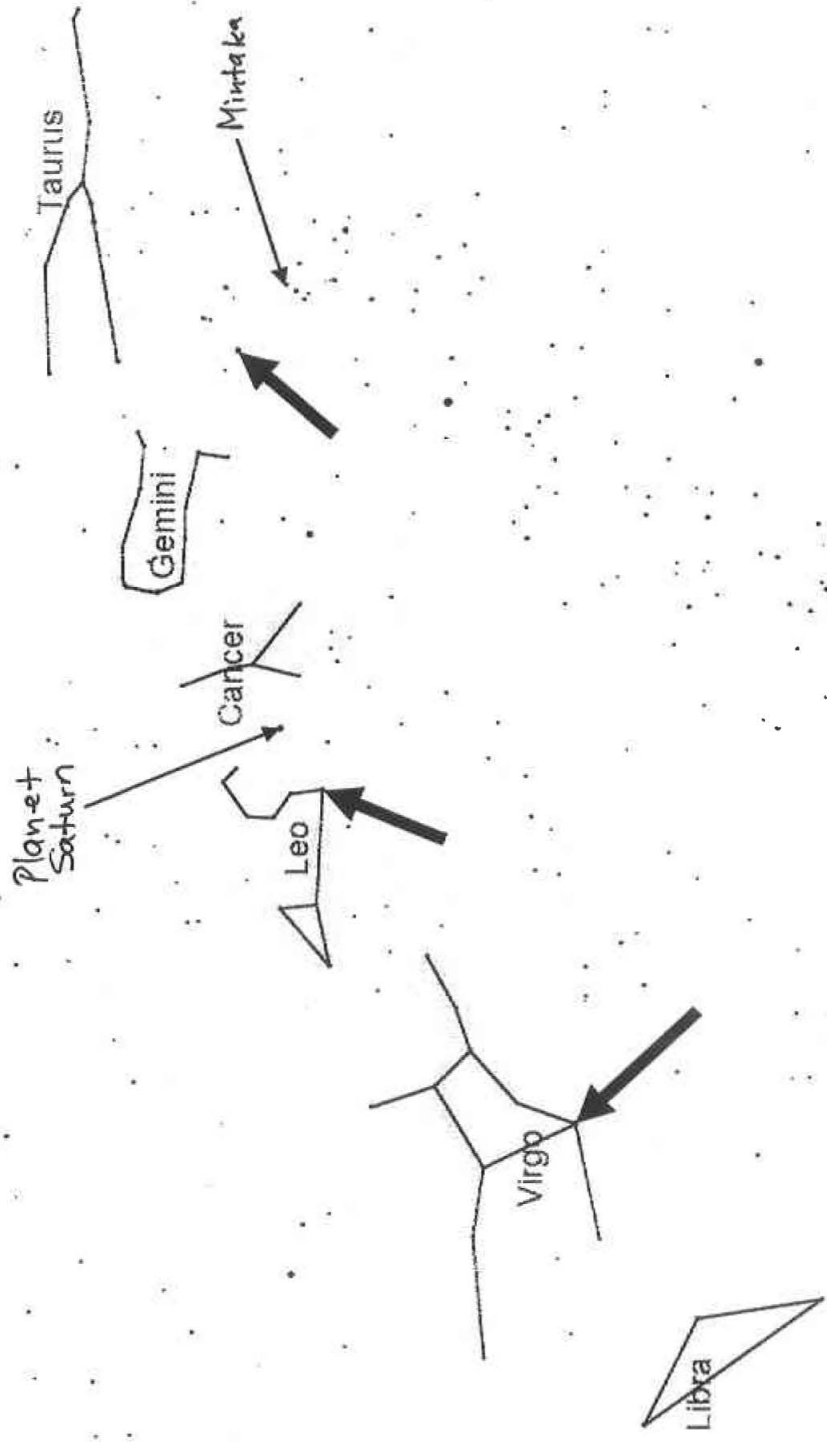


Fig 1