

---

UNIVERSITI SAINS MALAYSIA

First Semester Examination  
2009/2010 Academic Session

November 2009

**MSG 387 – Computer Graphics**  
***[Grafik Komputer]***

Duration : 3 hours  
*[Masa : 3 jam]*

---

Please check that this examination paper consists of FIVE pages of printed materials before you begin the examination.

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

**Instructions:** Answer **all three** [3] questions.

**Arahan:** Jawab **semua tiga** [3] soalan.]

In the event of any discrepancies, the English version shall be used.

*[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai].*

1.
  - (a) Define a cubic Hermite interpolating function
  - (b) Extend the cubic Hermite function to a bi-cubic Hermite interpolating function.
  - (c) Write a MATLAB code to visualize the data, generated from the following function
$$F(x, y) = x^2 + y^2, 0 \leq x \leq 5, 0 \leq y \leq 5$$
using a bi-cubic Hermite interpolation.

[40 /100]

2.
  - (a) Define the equation of the line in slope intersect form.
  - (b) Write a MATLAB code to draw a line passing through three points.
  - (c) Write the Hardware and Software tools for Computer Graphics.
  - (d) Write the differences between Raster graphics and Vector graphics.
  - (e) Define World, Normal and User coordinate systems.

[30 /100]

1. (a) *Takrif suatu fungsi interpolasi kubik Hermite.*
- (b) *Perluaskan fungsi Hermite kubik kepada fungsi interpolasi bikubik Hermite.*
- (c) *Tuliskan kod MATLAB untuk menampakkan data yang diperolehi daripada fungsi berikut*

$$F(x, y) = x^2 + y^2, 0 \leq x \leq 5, 0 \leq y \leq 5$$

*menggunakan fungsi interpolasi Hermite bikubik .*

[40 /100]

2. (a) *Takrif persamaan garis dalam bentuk kecerunan.*
- (b) *Tulis kod MATLAB untuk melukis garis yang melalui tiga titik.*
- (c) *Tulis alat perkakasan dan perisian untuk grafik komputer.*
- (d) *Tulis perbezaan antara grafik 'raster' dan grafik 'vektor' .*
- (e) *Takrif sistem koordinat Dunia, Normal dan Pengguna.*

[30 /100]

3. (a) In Three-Dimensional Graphics Transformation, write
- (i) Translation,
  - (ii) Scaling and
  - (iii) Rotation
- in a matrix forms.
- (b) In OpenGL, write a code to draw a
- (i) Line,
  - (ii) Triangle and
  - (iii) Polygon.
- (c) What are the four basic GKS output primitives?
- (d) What would be the GKS command to plot the square?

[30 /100]

3. (a) *Dalam Tranformasi Grafik dalam Tiga Dimensi, tuliskan*
- (i) *Translasi,*
  - (ii) *Penskalaan dan*
  - (iii) *Putaran*
- menggunakan bentuk matriks.*
- (b) *Dalam OpenGL, tulisk kod untuk melukis*
- (i) *Garis,*
  - (ii) *Segi tiga dan*
  - (iii) *Poligon.*
- (c) *Apakah empat asas output primitif GKS?*
- (d) *Apakah arahan GKS untuk memplot segi empat sama.*

[30/100]