UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2004/2005

March 2005

PGT 312E - Mathematics Teaching Methods II
(Kaedah Mengajar Matematik II)

Duration: 2 hours
(Masa : 2 jam)

Please check that this examination paper consists of **FIFTEEN** pages of printed material before you begin the examination.

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

INSTRUCTION:

Answer **ALL** questions in **SECTION A** and **TWO (2)** questions only in **SECTION B.**

ARAHAN :

Jawab **SEMUA** soalan **BAHAGIAN A** dan **DUA (2)** soalan sahaja daripada **BAHAGIAN B.**

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SECTION A

1. Answer **ALL** questions in the spaces provided

a) The Integrated Curriculum for Secondary School (KBSM) suggested many advantages by taking into consideration the history of mathematics in the teaching and learning of mathematics. State with examples any **FIVE (5)** of the advantages.

i)

ii)

iii)

iv)

v)

(8 marks)

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b) List **FOUR (4)** key features of mathematics diagnostic teaching as proposed by Bell (1993).

i)

ii)

iii)

iv)

(3 marks)

c) Use example 1 below to create a diagnostic mathematics teaching sequence based on the four key features in b.

Example 1
Afif drove to his parents' home for Hari Raya. He covered the 240 km in 4 hours. The trip took him 8 hours. When he returned home one week later, there was a massive traffic jam. .

a. What was Afif's speed in his journey to his parent's home?
b. What was Afif's speed in his journey back to his house?
c. What was Afif's average speed for both journeys?

(5 marks)

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d) State **FOUR (4)** major type of questions normally asked during a mathematics lesson. Give relevant example of each type of question.

i)

ii)

iii)

iv)

(8 marks)

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e) Discuss **FOUR (4)** methods of evaluation in mathematics teaching . Give relevent examples for each method discussed.

i)

ii)

iii)

iv)

(8 marks)

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f) Explain briefly **FOUR** (4) problem solving strategies. Give appropriate example for each strategy that could be used in the teaching and learning of mathematics.

i)

ii)

iii)

iv)

(8 marks)

SECTION B
(ESSAY QUESTIONS)

Answer **TWO (2)** questions only.

2. Two main lesson patterns appear from the TIMSS (Third International Mathematics and Science Study) video which was designed to examine the teaching of mathematics in various countries. Discuss the two lesson patterns with respect to strengths and weaknesses in promoting students' understanding of a particular mathematical concept.

(30 marks)

3. Solve the following equation:

$$x^2 - 3x - 4 = 1/2x - 2$$

(a) Discuss the steps you would take to solve this equation with reference to multiple representations in mathematics.

(b) How does multiple mathematical representations approach in (a) help your students to develop understanding of the concepts in the given equation.

(30 marks)

4. Discuss the issues a teacher needs to consider before implementing the use of technology in his or her mathematics classroom with regards to the following questions:

a) What is the role of technology in the mathematics classroom?

b) When is it appropriate to use technology in the mathematics classroom?

c) How should technology be implemented into the teaching and learning of mathematics?

(30 marks)

5. a) Problem solving is said to be the ultimate aim in mathematics teaching and learning. It can be considered as

i) a goal of learning,
ii) a process of learning,
iii) skills to be acquired in learning mathematics.

Explain with appropriate learning activities as to justify each of the above considerations.

b) Discuss **TWO (2)** learning activities that would normally carried out by mathematics teachers which you consider as reflective teaching.

(30 marks)

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TERJEMAHAN

BAHAGIAN A

1. Jawab **SEMUA** soalan di dalam tempat yang disediakan

a) Kurikulum Bersepadu Sekolah Menengah (KBSM) mencadangkan pelbagai kebaikan dengan mengambilkira sejarah matematik dalam pengajaran dan pembelajaran matematik. Nyatakan dengan contoh yang sesuai **LIMA (5)** kebaikan tersebut.

i)

ii)

iii)

iv)

v)

(8 markah)

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b) Senaraikan **EMPAT (4)** ciri utama pengajaran diagnostik matematik seperti yang dicadangkan oleh Bell (1993).

i)

ii)

iii)

iv)

(3 markah)

c) Gunakan contoh 1 di bawah untuk menyediakan suatu pengajaran diagnostik matematik berdasarkan empat ciri utama dalam b.

Contoh 1
Afif memandu kereta balik berhari raya di kampung. Perjalanan sejauh 240km mengambil masa selama 4 jam. Perjalanan pulang dari kampung seminggu kemudian mengambil masa 8 jam kerana kesesakan jalan raya.

A. Apakah halaju Afif semasa perjalanan ke rumah ibu bapanya?
B. Apakah halaju Afif semasa balik ke rumahnya?
C. Apakah purata halaju Afif untuk kedua-dua perjalanan?

(5 markah)

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d) Nyatakan **EMPAT (4)** jenis soalan utama yang biasa guru kemukakan semasa pengajaran matematik. Beri contoh yang sesuai untuk setiap jenis soalan.

i)

ii)

iii)

iv)

(8 markah)

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e) Bincangkan **EMPAT (4)** kaedah penilaian pengajaran matematik. Beri contoh yang sesuai bagi setiap kaedah.

i)

ii)

iii)

iv)

(8 markah)

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f) Huraikan secara ringkas **EMPAT (4)** strategi yang boleh digunakan dalam penyelesaian masalah matematik. Berikan contoh bagi setiap strategi.

i)

ii)

iii)

iv)

(8 markah)

BAHAGIAN B

SOALAN ESEI

Jawab **DUA (2)** soalan sahaja.

2. Dua pola utama pengajaran guru terdapat dalam kajian video TIMSS *(Third International Mathematics and Science Study)* yang bertujuan mengkaji pengajaran matematik di beberapa buah negara. Bincangkan kedua-dua pola tersebut dengan memberi fokus kepada kekuatan dan kelemahan setiap pola bagi meningkatkan kefahaman pelajar tentang sesuatu konsep matematik.

(30 markah)

3. Selesaikan persamaan berikut:

$$x^2 - 3x - 4 = 1/2x - 2$$

a) Bincangkan langkah-langkah yang akan anda ambil untuk menyelesaikan soalan ini dengan merujuk kepada pelbagai perwakilan matematik

c) Bagaimanakah pelbagai perwakilan matematik dalam (a) dapat membantu pelajar membina kefahaman konsep yang terdapat dalam persamaan yang diberikan.

(30 markah)

4. Bincangkan isu-isu yang perlu guru pertimbangkan sebelum menggunakan teknologi dalam pengajaran matematik dengan merujuk kepada soalan soalan berikut:

a) Apakah peranan-peranan teknologi dalam bilik darjah matematik?

c) Bilakah teknologi sesuai digunakan dalam pengajaran dan pembelajaran matematik?

d) Bagaimanakah teknologi sepatutnya diimplementasikan dalam pengajaran dan pembelajaran matematik?

(30 markah)

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5. a) Penyelesaian masalah dikatakan sebagai matlamat akhir dalam pengajaran dan pembelajaran matematik. Ia juga dianggap sebagai

i) satu matlamat
ii) satu proses
iii) kemahiran yang perlu diperolehi.

Jelaskan dengan aktiviti pembelajaran yang sesuai supaya menepati setiap anggapan tersebut.

b) Huraikan **DUA (2)** aktiviti pembelajaran yang biasa dilaksanakan oleh guru matematik yang boleh anda kelaskan sebagai pengajaran reflektif.

(30 markah)

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