PGDE(Sec/Lower Sec) School Mathematics Mastery Test (SMMT) / December 2019

PGDE(JC / Sec / Lower Sec) SMMT – Attempt One

Date: 7 December 2019 (Saturday)

Time: 0930 to 1130

Venue: **NIE Lecture Theatres**
The exact venue will be broadcasted through PGDE blackboard to you one week before the test and will be shown outside the test venue.

Release of Results:
30 December 2019. Refer to blackboard after 10 am on that day.

PGDE(JC / Sec / Lower Sec) SMMT – Attempt Two

Date: 30 May 2020 (Saturday)

Time: 0930 to 1130

Venue: **NIE Lecture Theatres** (will be released one week before the actual test)

PGDE(JC / Sec / Lower Sec) SMMT – Attempt Three

Date: 29 Aug 2020 (Saturday)

Time: 0930 to 1130

Venue: NIE Tutorial Room (to be confirmed one week before the actual test)

Student teachers who did not pass Attempt Two will be required to attend QUM511classes, please refer to the flowchart on the last page.

PGDE(JC / Sec / Lower Sec) Teaching of Mathematics at Secondary Level – Content Upgrading

Introduction

Trainee teachers graduating from the National Institute of Education (NIE) with Mathematics as one of their curriculum subjects are expected to be able to teach Mathematics at the Secondary School level, both in terms of sound pedagogy and proficient content knowledge. PGDE(JC / Sec / Lower Sec) trainees are expected to have a certain level of mastery of secondary school mathematics content when they enter the programme as the Curriculum Studies Mathematics will deal with mainly pedagogy on the assumption of adequate content mastery.

Experience has shown that preparing and passing the School Mathematics Mastery Test (SMMT) often helps develop trainees' confidence in their teaching potential.

Procedure

There are two versions of SMMT:

(1)   SMMT (JC / Sec) is for trainee teachers who will take the PGDE(JC / All Sec) Mathematics module as CS1 or CS2 level;

(2)   SMMT (Lower Sec) is for trainee teachers who will take PGDE(Lower Sec) Mathematics module.

Trainee teachers must remember which version of SMMT they are required to sit, and MUST sit the correct version of SMMT.

Topics Tested in SMMT

SMMT(JC / Sec) and SMMT(Lower Sec) will cover the following major topics in OLevel Mathematics:

1) **Arithmetic**
   The number system and the four operations: whole numbers, rational and irrational numbers, the four operations, rate, ratio and proportion, computation and interpretation of percentage, estimation, standard form.

2) **Algebra**
   Rules of surds and indices, standard algebraic functions and graphs, practical graphs, algebraic expressions and equations, simultaneous equations, inequalities, *Set Theory, Matrix Algebra*.

3) **Mensuration**
   Conversion of units, areas and volumes of familiar figures and solids including composite solids and figures

4) **Geometry**
   Angles, triangles and polygons, geometrical constructions, congruency and similarity tests for triangles, some geometrical proofs, symmetry, angle and tangent and symmetric properties of circles, coordinate geometry.

5)   **Trigonometry**
Pythagoras' Theorem, trigonometric ratios, solution of basic trigonometric equations, sine and cosine rules for triangles, solution of 3-D problems, bearings.

6)   **Functions and Graphs**
Graphs of standard functions, transformation of graphs.

7)   **Probability and Statistics**
Computation and interpretation of probability, data representation, measures of central tendency, dispersion and their applications.

8)   **Vectors**
Computation involving vectors, geometrical proofs using vectors.

In addition, SMMT(JC / Sec) will include the following topics from Additional Mathematics:

9)   **Higher Algebra**
Binomial Theorem, ***Partial Fractions***, Remainder & Factor Theorems, ***more on quadratic equations (including the relations between roots and coefficients of a quadratic equation)***, expressions and inequalities, more on Surds, Indices and Logarithms.

10)   **Calculus**
Techniques of Differentiation and Integration and their applications, interpretation of definite integrals, application to kinematics.

11)   **Further Trigonometry**
Proofs of trigonometric identities and solution of further trigonometric equations involving identities. Addition Formulae, Double Angle Formulae, Factor Formulae are also included.

12)   **Geometrical Proofs**
Include the geometrical proofs of alternate segment theorem, mid-point theorem and intercept theorem and other related results required for the Additional Mathematics syllabus

Criteria for Pass in SMMT

The result of SMMT will be either 'PASS' or 'FAIL'. As trainee teachers are expected to be proficient in the content, a 'PASS' in the SMMT will correspond to at least an 'O' Level distinction.

Format of the Paper

1. Each SMMT paper is of two-hour duration and consists of not more than 20 questions of varying length.
2. All questions must be answered in the space provided. No other writing paper will be required or provided.
3. Silent electronic calculators, mathematical construction sets and flexible ruler are allowed but will not be provided. Bring your own calculator, construction sets and flexible ruler.

4.   Candidates are required to show all necessary working to avoid the loss of marks for essential working.

What if I fail the test in all three attempts?

The SMMT is compulsory for all PGDE (JC / Sec/ Lower Sec) trainee teachers as long as one of their teaching subjects is Mathematics. It is important that trainee teachers have a good grasp of secondary school mathematics content knowledge before they are posted out to schools. Candidates who manage to clear SMMT Attempt One are exempted from the subsequent SMMT Attempts Two and Three. The Mathematics & Mathematics Education (MME) Academic Group of NIE offers the content upgrading course for those who do not clear the SMMT for Attempt Two. The 6-hour face-to-face content upgrading course will be conducted sometime in the week 29 July to 2 August 2019. SMMT Attempt Three is given to ensure that trainee teachers have ample chance to clear the SMMT after content upgrading is conducted for the candidates.

Trainee teachers who do not clear the SMMT by Attempt Three are deemed to have less than adequate mathematics content knowledge to teach Mathematics at Secondary School level. The Ministry of Education will be informed about their poor performance in SMMT. Subsequently, the schools that the trainee teachers are posted will be informed.

Trainee teachers who do not turn up for the SMMT, either due to medical reasons or otherwise, are deemed to have forfeited one attempt. They are required to sit the SMMT for the next attempt. For example, if they miss Attempt Two, they are considered to have forfeited the second attempt for SMMT.

Contact Person

If you need further clarification regarding SMMT, please contact:

Dr Toh Tin Lam
Mathematics and Mathematics Education
National Institute of Education
Room: NIE7-03-43
Telephone: 67903898
Email: tinlam.toh@nie.edu.sg

```
                          ┌─────────────────────────┐
                          │   SMMT – Attempt One    │
-------------------------- └─────────────────────────┘
7 Dec 2019                            │
(Saturday)                            ▼
                          ╱─────────────╲        yes      ┌──────────────┐
                         ╱    Pass?       ╲──────────────▶│   Exempted   │
                          ╲               ╱               └──────────────┘
                           ╲─────────────╱
                         no        │
                                   ▼

30 May 2020               ┌─────────────────────────┐
(Saturday)                │   SMMT – Attempt Two    │
                          └─────────────────────────┘
                                      │
                                      ▼
                          ╱─────────────╲        yes      ┌──────────────┐
                         ╱    Pass?       ╲──────────────▶│   Exempted   │
                          ╲               ╱               └──────────────┘
                           ╲─────────────╱
                         no        │
                                   ▼
20 July – 15 Aug          ┌─────────────────────────────────┐
(6 hours f2f)             │ QUM 511 - Essential Mathematics  │
                          │ for Secondary Teachers           │
                          └─────────────────────────────────┘
                                      │
                                      ▼
29 Aug 2020               ┌─────────────────────────┐
(Saturday)                │  SMMT – Attempt Three   │
                          └─────────────────────────┘
                                      │
                                      ▼
                          ╱─────────────╲
                         ╱    Pass?       ╲
                          ╲               ╱
                           ╲─────────────╱
                         no        │
                                   ▼
                          ┌─────────────────────────┐
                          │      Inform MOE         │
                          └─────────────────────────┘
```