UNIVERSITY OF SWAZILAND
FACULTY OF EDUCATION
MAIN EXAMINATION PAPER 2016

TITLE OF PAPER: CURRICULUM STUDIES IN MATHEMATICS

COURSE CODE: EDC 381/CTE532

PROGRAMME: B.ED 3/PGCE

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS: ANSWER ANY **FOUR** QUESTIONS. EACH QUESTION IS WORTH 25 MARKS.

This paper contains 6 pages including this one

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Question 1

(a) List **ten** difficulties associated with language in the teaching and learning of school mathematics. [10]

(b) Some people have suggested mathematics be taught in the first language in the early years of schooling. Discuss the advantages and disadvantages of this to the learning of mathematics [15]

Question 2

(a) Explain in your own words each of the following phrases in relationship to national examinations:

    (i)   Learner unreliability [5]

    (ii)   Administrative unreliability [5]

(b) You have to refer to appendix 1 and 2 for this part of the question

    (i)   Critique the marking scheme (appendix 2) prepared by a student teacher for question 8 (appendix 1) [10]

    (ii)   Correct every mistake you identify on the marking guide [5]

Question 3

(a) One of the advantages of objective testing is that it makes it possible to attain wide syllabus coverage. Expound on this advantage, showing how it is of assistance to both teachers and learners. [10]

(b) A student teacher gave item 1(appendix 3) in a test. Analyse the item and say with support why it is a good or a bad item. [5]

(c) Objective testing skills can be used to break down a conventional examination question into objective test items for diagnostic purposes. Break down part (b) of the examination question in appendix 4 into completion type objective test items. [10]

Question 4

(a) How would you use any **three** of the leadership styles you learnt in this course to head the Mathematics department at a typical government school [15]

(b) What factors influence the choice of a leadership style [10]

Question 5

Write an essay to highlight at **least five** gender differences in learning mathematics. In the essay show how you would use this knowledge to promote equity in the learning of school mathematics [25]

8 A packet of sweets contains chocolates and toffees.

(a) There are x chocolates which have a total mass of 105 grams.

Write down, in terms of x, the mean mass of a chocolate.

(b) There are $x + 4$ toffees which have a total mass of 105 grams.

Write down, in terms of x, the mean mass of a toffee.

(c) The difference between the two mean masses in **parts (a)** and **(b)** is 0.8 gram

Write down an equation in x and show that it simplifies to $x^2 + 4x - 525 = 0$.

(d) **(i)** Factorise $x^2 + 4x - 525$.

(ii) Write down the solutions of $x^2 + 4x - 525 = 0$.

(e) Write down the total number of sweets in the packet.

(f) Find the mean mass of a sweet in the packet.

Appendix 2

(a) The mean mass of a chocolate is $\dfrac{105}{x}$ A$_1$

(b) The mean mass of a toffee is $\dfrac{105}{x+4}$ A$_1$

(c) $\dfrac{105}{x} - \dfrac{105}{x+4} = 0.8$ M$_1$

$105(x + 4) - 105x = 0.8x(x + 4)$ M$_1$

$105x + 420 - 105x = 0.8x^2 + 3.2x$ M$_1$
$0.8x^2 + 3.2x - 420 = 0$ M$_1$
$8x^2 + 32x - 4200 = 0$ M$_1$
$x^2 + 4x - 525 = 0$ A$_1$

(d) (i) $x^2 + 4x - 525 = (x + 25)(x - 21)$ B$_1$
　　(ii) $x = -25$ or $x = 21$ B$_2$

(e) There are 21 chocolates and 25 toffees. In all there are 46 sweets. B$_3$

(f) The mean mass of sweets is $210 \div 46 = 4.57$ grams M$_1$ A$_1$

Appendix 3

Factorise fully: $9m^3 + 6m^2 - 3m$

A $3m(3m^2 + 2m - m)$

B $3m(3m^2 + 2m - 1)$

C $m(9m^2 + 6m - 3)$

D $3m(3m^3 + 6m^2 - 3m)$

Appendix 4

4 [The surface area of a sphere of radius r is $4\pi r^2$ and the volume is $\frac{4}{3}\pi r^3$.]

(a) A solid metal sphere has a radius of 3.5 cm.

One cubic centimetre of the metal has a mass of 5.6 grams.

Calculate

    (i) the surface area of the sphere,

    (ii) the volume of the sphere,

    (iii) the mass of the sphere.
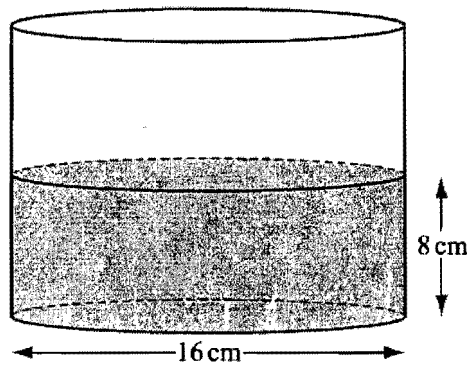
(b)

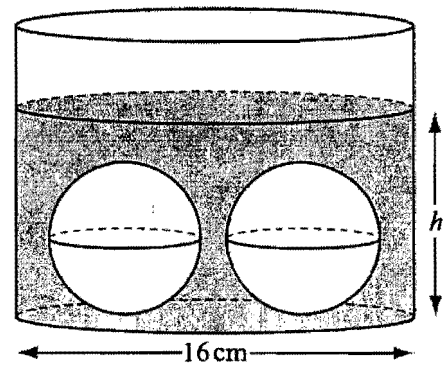NOT TO SCALE

8 cm

16 cm

Diagram 1

h

16 cm

Diagram 2

Diagram 1 shows a cylinder with a **diameter** of 16 cm.

It contains water to a depth of 8 cm.

Two spheres identical to the sphere in **part (a)** are placed in the water. This is shown in Diagram 2.

Calculate h, the new depth of water in the cylinder.

(c) A different metal sphere has a mass of 1 kilogram.

One cubic centimetre of this metal has a mass of 4.8 grams.

Calculate the radius of this sphere.