UNIVERSITY OF ESWATINI
FACULTY OF EDUCATION
RE-SIT EXAMINATION PAPER 2020

TITLE OF PAPER: CURRICULUM STUDIES IN MATHEMATICS

COURSE CODE: CTE532

PROGRAMME: 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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TO DO SO BY THE INVIGILATOR**

Question 1

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

      (i)   Learner unreliability   [5]

      (ii)   Administrative unreliability   [5]

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

      (i)   Critique question 3 (Appendix 1) and the marking scheme (Appendix 2) prepared by a student teacher   [10]

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

Question 2

(a) One of the disadvantages of objective testing is the backwash. Discuss this disadvantage and show how it is a drawback to both teachers and learners.   [10]

(b) A student teacher gave item 1(Appendix 3) in a multiple-choice 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 the examination question in Appendix 4 into completion type objective test items where this would be necessary for you to diagnose the learners' difficulties in this question.   [10]

Question 3

(a) Discuss **five (5)** difficulties associated with language in the teaching and learning of school mathematics as outlined by Orton (2004).   [10]

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

[In each case illustrate your points with examples from Eswatini]

Question 4

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

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

Question 5

Write an essay on heading a mathematics department in a government school in Eswatini. The essay must highlight the following aspects: organisation, monitoring and liaison.   [25]

Appendix 1

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 $\dfrac{105}{x}$ B1

(b) the mean mass of a toffee is $\dfrac{105}{x+4}$ B1

(c) $\dfrac{105}{x} - \dfrac{105}{x+4} = 0.8$ M1

$105(x + 4) - 105x = 0.8x(x + 4)$ M1
$105x + 420 - 105x = 0.8x^2 + 3.2x$ M1
$0.8x^2 + 3.2x - 420 = 0$ M1
$8x^2 + 32x - 4200 = 0$ M1
$x^2 + 4x - 525 = 0$ A1

(d) (i) $x^2 + 4x - 525 = (x + 25)(x - 21)$ B1
    (ii) $x = -25$ or $x = 21$ B2
(e) there are 21 chocolates and 25 toffees. In all there are 46 sweets. B3
(f) the mean mass of sweets is $210 \div 46 = 4.57$ grams M1 A1

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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   (a) Calculate the volume of a metal sphere of radius 15 cm and show that it rounds to 14 140 cm³, correct to 4 significant figures.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

(b) **(i)** The sphere is placed inside an empty cylindrical tank of radius 25 cm and height 60 cm.
The tank is filled with water.
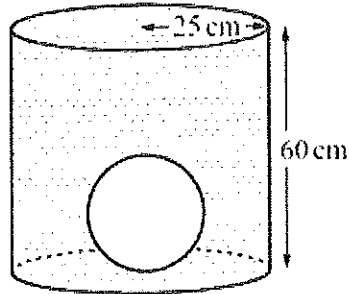
Calculate the volume of water required to fill the tank.

(ii) The sphere is removed from the tank.
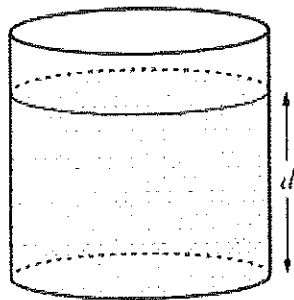
Calculate the depth, d, of water in the tank.

(c) The sphere is melted down and the metal is made into a solid cone of height 54 cm.

(i) Calculate the radius of the cone.
[The volume, V, of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

(ii) Calculate the **total** surface area of the cone.
[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi r l$.]

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