THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

MATHEMATICS

Time: 3 Hours **Friday, 11th May 2012 a.m.**

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in section A and **two (2)** questions from each of sections B and C.
3. Sections A and B carry 30 marks each, section C carries 40 marks.
4. Mathematical tables and non-programmable calculators may be used.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

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SECTION A (30 Marks)

Answer **all** questions in this section.

1. Using a non programmable scientific calculator, find the value of $\frac{\sqrt{3}}{e^5\sqrt{\ln 32 \log 32}}$ to four decimal places.

2. Determine the area of the region bounded by the graphs of the functions $y = x^2 - 1$ and a line $y = 0$.

3. Given a circle with radius r and central angle subtends arc AB, derive the relationship arc $AB = r\theta$.

4. (a) If vector A = 6i + 4j + 8k and B = 8i – 2j + 4k, find the projection of vector A onto vector B.

   (b) Calculate:
   (i) A×B
   (ii) $B \bullet A$

5. From Figure 1, $\overline{XY}$ is perpendicular to $\overline{WZ}$, Y is the midpoint of segment $\overline{WZ}$.

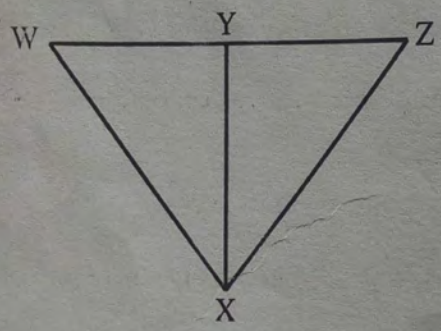


Figure 1

Prove that, $\Delta XYZ \cong \Delta XYW$.

6. Briefly describe the terms, 'sequence' and 'scope' in mathematics.

7. Give out three points to describe the relationship between mathematics learning and mathematics assessment.

8. Highlight three advantages of using reference materials in lesson preparation.

9. Describe three situations in which mathematics is important to society.

10. Give three reasons why a student teacher learns mathematics teaching pedagogy.

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SECTION B (30 Marks)

Answer **two (2)** questions from this section.

(a) Using scientific calculator, find:

(i) $\tan^{-1}\left(-\frac{2}{3}\right)+\sin^{-1}\left(\frac{4}{5}\right)$

(ii) $\log_6 9-\ln\left(\frac{3}{8}\right)$

(b) Calculate the mean and standard deviation of the distribution table below:

x	1.195	1.395	1.595	1.795	1.995	2.195	2.395	1.595
Frequency (f)	14	26	35	32	28	7	1	1

12. (a) Using laws of algebra, simplify the following propositions:

(i) $(p\vee q)\wedge\sim q$

(ii) $p\wedge(p\vee q)$

(iii) $\sim(p\wedge q)\wedge(\sim p\vee q)$

(b) Test the validity of the following argument:
"If I study, then I will not fail mathematics. If I do not play basketball, then I will study. But I failed mathematics. Therefore, I played basketball."

13. Show that $\sinh^{-1} x=\ln\left(x+\sqrt{x^2+1}\right)\quad x: x\in\Re$. Hence, find $\frac{dy}{dx}$ if $y=\sinh^{-1} x$.

14. (a) Differentiate $\cosh^{-1}\left(x^4\cos^3 x\right)$ with respect to x.

(b) The base and height of triangle is 5 m each, find the increase in area of a triangle when its side expands by 0.01 m.

SECTION C (40 Marks)

Answer **two (2)** questions from this section.

15. (a) Describe four reasons of using different strategies during classroom instruction.

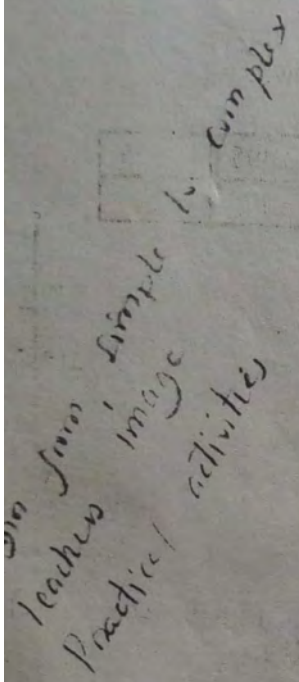
(b) Explain briefly the steps for mathematics problem solving using jig saw strategy.

16. Describe four reasons why teachers do analysis of the syllabus.

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17. Using the tangent properties, explain how you can guide students to construct tangents to a circle from a point.

18. Assume you have been assigned to teach a concept of distance along the great circle to form three students. Prepare 80 minutes lesson plan which show the procedures that you will follow in teaching that concept.



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