NATIONAL
SENIOR CERTIFICATE

GRADE 11

MATHEMATICS

COMMON TEST

MARCH 2019

MARKS: 75

TIME: 1½ hours

This question paper consists of 6 pages and 2 Diagram Sheets.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1.   This question paper consists of 5 questions.

2.   Answer ALL the questions.

3.   Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.

4.   Answers only will NOT necessarily be awarded full marks.

5.   You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.

6.   If necessary, round off answers correct to TWO decimal places, unless stated otherwise.

        Diagrams are NOT necessarily drawn to scale.
7.

        Write neatly and legibly.
8.

        Diagrams for QUESTION 4.1, QUESTION 4.2, QUESTION 5.1 and QUESTION 5.2
9.   on the DIAGRAM SHEETS provided.
        Detach the DIAGRAM SHEETS and hand in together with your Answer Book.

QUESTION 1

1.1 Solve for x:

    1.1.1 $7x^2 - 2x - 3 = 0$ (correct to TWO decimal places)   (3)

    1.1.2 $(x - 2)^2 - 4 = 0$ (3)

    1.1.3 $\sqrt{7x + 2} + 2x = 0$ (4)

    1.1.4 $x^2 - x - 56 < 0$ (3)

1.2   Solve for x and y simultaneously: $2x + y = 1$ and $2x^2 - xy + y^2 = 4$ (6)

    [19]

QUESTION 2

2.1   Solve for x without the use of a calculator : $x^{\frac{3}{4}} = 64$ (2)

2.2   Simplify without the use of a calculator :

    2.2.1 $\dfrac{5^{-x}.125^{1-x}.25^{2x}}{5}$ (3)

    2.2.2 $\sqrt{12} - \sqrt{147} + 3^{1,5}$ (3)

2.3   If $\dfrac{5^{2006} - 5^{2004} + 24}{5^{2004} + 1} = a$, calculate a without the use of a calculator.   (3)

    [11]

QUESTION 3

ANSWER QUESTION 3 WITHOUT USING A CALCULATOR.

3.1   Given: $\tan \theta = -\dfrac{9}{40}$ and $180° < \theta < 360°$.

    Use a sketch to determine the value of $\sin \theta + \cos \theta$.   (4)

3.2   Simplify fully:

    $\dfrac{\sin(90° - \theta).\tan(360° - \theta).\sin(\theta - 180°)}{1 - \cos^2 \theta}$ (6)

3.3 Determine the value of the following in terms of p, if $\cos 32° = p$:

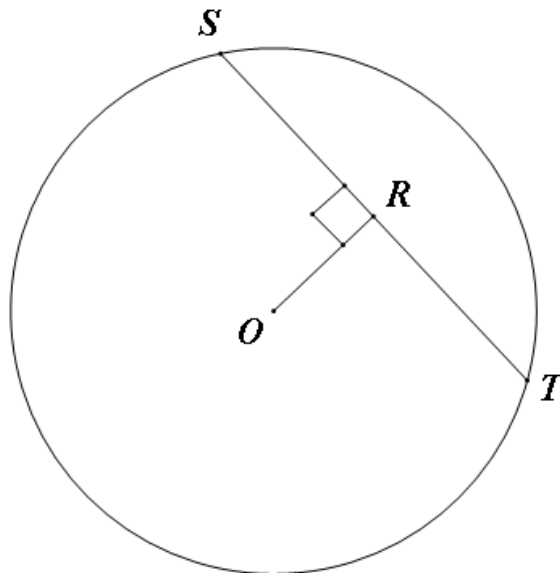   3.3.1 $\cos 212°$ (2)

      3.3.2 $\sin(-328°)$ (3)

[15]

**GIVE REASONS FOR YOUR STATEMENTS AND CALCULATIONS IN QUESTIONS 4 AND 5.**

QUESTION 4

4.1 In the diagram, O is the centre of the circle and R is a point on chord ST, such that OR is perpendicular to ST.

      Prove the theorem which states that SR = RT.   (5)

4.2   In the diagram, O is the centre of the circle and D is a point on chord AC such
that AD = DC = 24 mm. OD is drawn and produced to meet the circle at B.
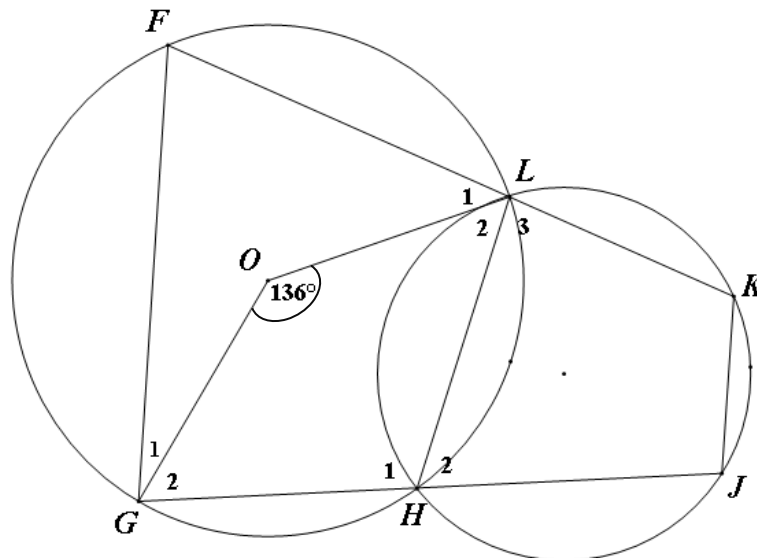OD = 7 mm. OA and OC are drawn.
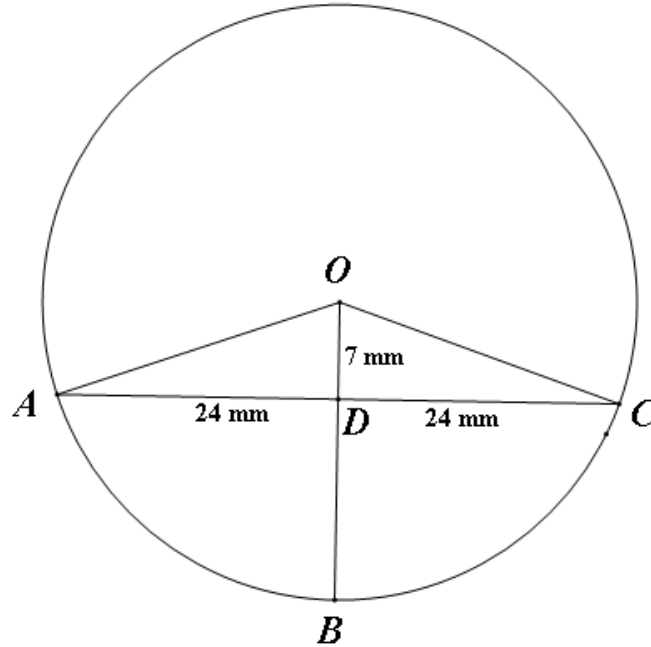
Calculate the length of BD.   (5)
[10]

QUESTION 5

5.1   In the diagram two circles intersect at L and H. O is the centre of the circle
passing through F, G, H and L. GO and LO are drawn. LHJK is a cyclic
quadrilateral. FLK and GHJ are straight lines. $\hat{GOL} = 136°$

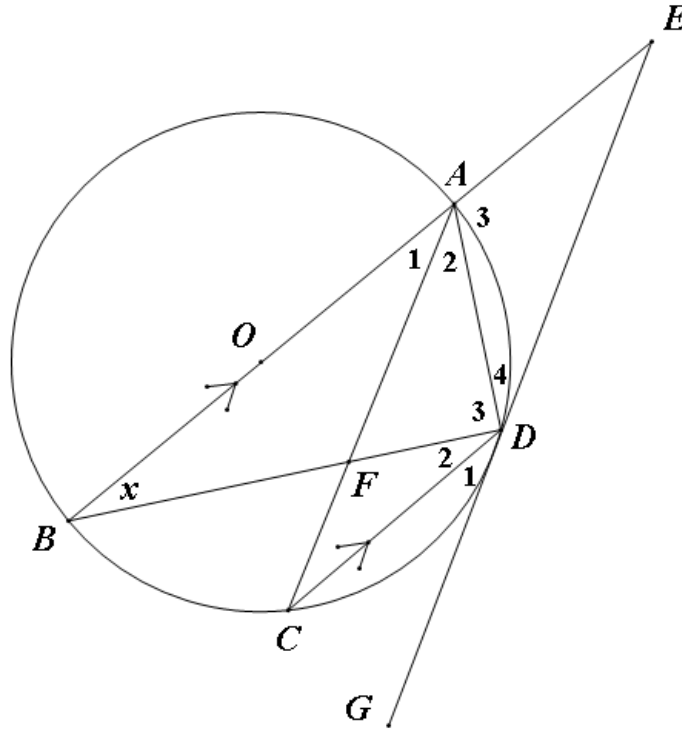   5.1.1   Calculate the size of $\hat{F}$.   (2)

5.1.2　　　Calculate the size of $\hat{K}$.　　　　　(4)

5.2   In the diagram, O is the centre of the circle. Diameter BOA is produced to E
       such that EDG is a tangent to the circle at D. C is a point on the circle such that
       BA ∥ CD. AD, BD and AC are drawn. F is a point of intersection of AC and
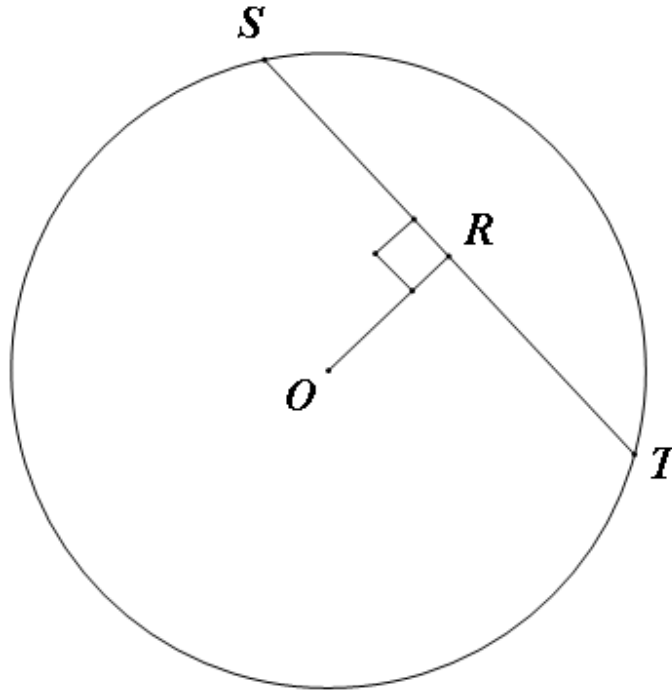   BD. Let $\hat{B} = x$.

5.2.1   Write down, with reasons, four other angles each equal to x.   (6)

5.2.2   Determine the size of $\hat{E}$ in terms of x.   (4)

5.2.3   Prove that CA is a tangent to the circle passing through A, D and E.   (4)

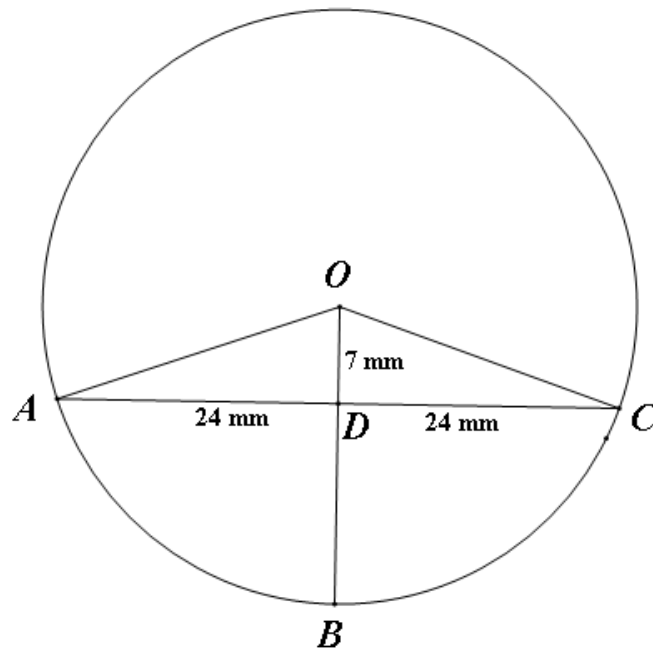   **[20]**
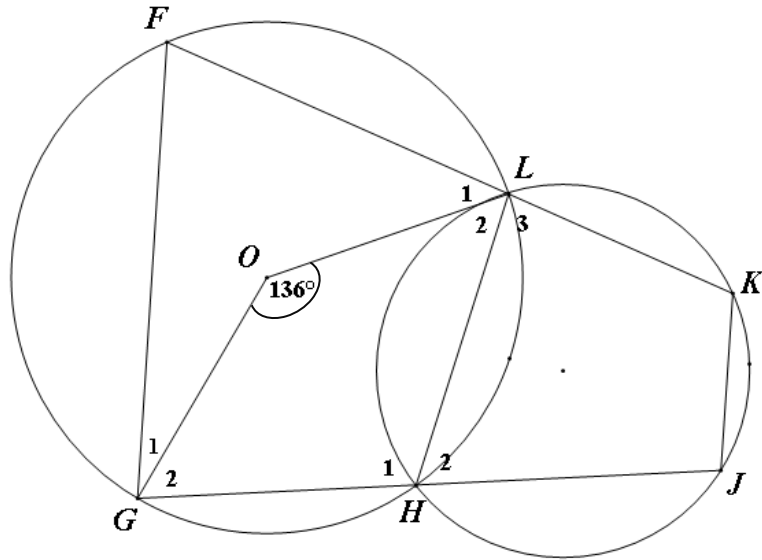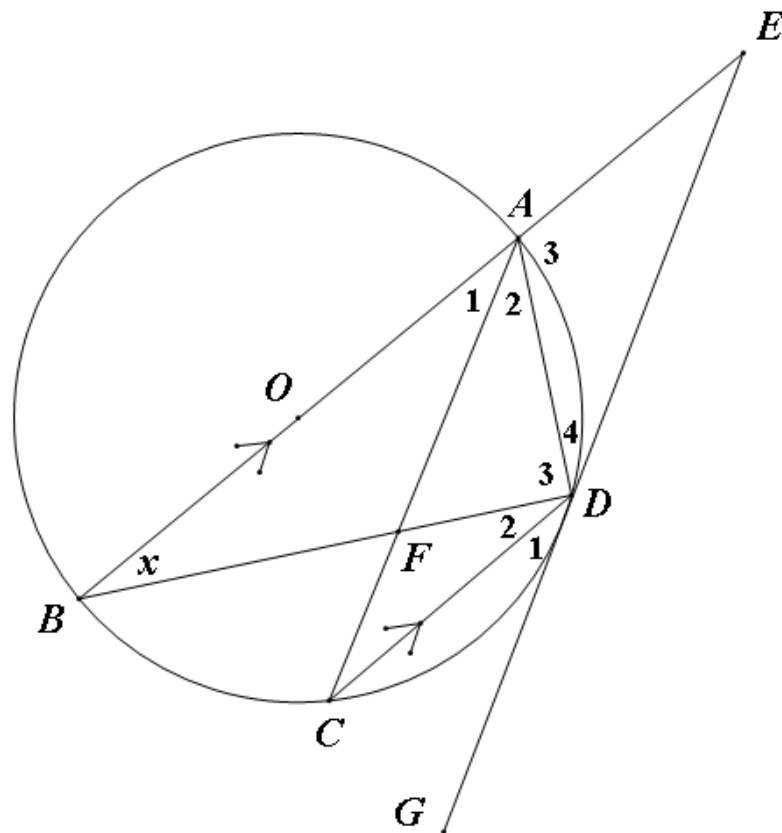
                                                              TOTAL: 75

NAME & SURNAME:

DIAGRAM SHEET 1

QUESTION 4.1

QUESTION 4.2

NAME & SURNAME:

DIAGRAM SHEET 2

QUESTION 5.1

QUESTION 5.2