**Term 2 - 2022**

**MATHEMATICS (121/1) –PAPER 1**

**FORM FOUR (4)**

**Time: 2 ½ Hours (MARKING SCHEME)**

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  |  | M1  M1  A1 | Removal of decimal places  Expressing as product of prime factors |
|  | **Total** | **3** |  |
|  | Also  Hence | M1  M1  M1  A1 | Expressing as a fraction  Expressing as a fraction  Difference between the 2 fractions |
|  | **Total** | **4** |  |
|  | Other number | M1  M1, A1 | Expressing HCF, GCD and the 2 given numbers in power form |
|  | **Total** | **3** |  |
|  | From the graph,  and  Hence  and | M1  A1  B1 | Factorization by grouping |
|  | **Total** | **3** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | Hence | B1  M1  A1 |  |
|  | **Total** | **3** |  |
|  | Curved Surface Area of cylinder  Number of revolutions | M1  M1  A1 |  |
|  | **Total** | **3** |  |
|  | Total cost | M1  M1  A1 | Total cost in USD  Conversion of USD to Ksh |
|  | **Total** | **3** |  |
|  | Let  Also | M1  M1  A1 | Expressing AB in terms of  tan 320 and tan 400  Equating AB to AB  145.9 seen |
|  | **Total** | **3** |  |
|  |  |  |  |
|  | **Total** | **3** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  |  | M1  M1  A1 | Expressing right hand side in terms of base 3 |
|  | **Total** | **3** |  |
|  | Let the slant length of the smaller cone be | M1  M1, M1  A1 |  |
|  | **Total** | **4** |  |
|  |  | B1  B1  B1 | For and  Compound inequality shown  Number line drawn |
|  | **Total** | **3** |  |
|  | Frequency distribution table   |  |  | | --- | --- | | Marks |  | | 10 – 14 | 2 | | 15 – 19 | 5 | | 20 – 24 | 7 | | 25 – 29 | 12 | | 30 – 34 | 4 |   Ʃ | B1  B1  B1 | All classes/class boundaries 🗸  All frequencies 🗸  Total frequency30 seen |
|  | **Total** | **3** |  |
|  | Logarithms   |  |  |  | | --- | --- | --- | | Number | Std Form | Logarithm | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | M1  M1  M1  M1 | All logs 🗸  Correct +/- of logs  Correct multiplication by 2 and division by 3  Accuracy |
|  | **Total** | **4** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | Commission  Total value | M1  M1  A1 | Amount from commission  Expression for excess of 80 000 |
|  | **Total** | **3** |  |
|  | 1. Lines of symmetry      1. Net | B1  B1  B1 | For all the 4 lines of symmetry drawn  Correct net drawn  Correct measurements transferred from the solid |
|  | **Total** | **2** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. (i) Equation of   (ii) If – -intercept   1. (i) Gradient of   (ii) Equation of   1. Equation of 2. Acute angle of and -axis | M1  A1  B1  B1  M1  A1  B1  M1  A1 | Substituting in  seen  2.5 or equivalent seen  seen |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. Amount of water delivered in 1 minute   Capacity   1. Area of base of tank   Time difference   1. Monthly water bill   Bill | M1  A1  B1  M1  M1  M1  A1  M1  M1, A1 | Time difference  Capacity in 400 minutes  Expression for base area |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. (i) Equations   (ii) Cost of each item     1. Let the number be   Hence the number is | B1  B1  B1  M1  M1  M1  A1  M1  M1  A1 | Accept if all elements as fractions  Matrix equation  Premultiplying by  Both values 🗸  Forming 2 equations in and  Solution for and using any method |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. Consider ΔAPT 2. Shaded area   Let ∠ in ΔAPT  Area of segment  Both segments  Area of APBQ  Shaded area | M1  A1  B1  M1, M1  A1  M1  M1  M1  A1 | Angle APT  Area of sector, area of ΔAPB  Area of both segments  Area of APBQ  Shaded Area |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. (i) ∠RTP   ∠RQT – opposite angles of cyclic quadrilateral QRST are supplementary  ∠TQP∠UPT – angle between a chord and a tangent is equal to the angle subtended by the same chord on the circumference of the alternate segment.  ∠RQP  Hence  ∠RTP – opposite angles of cyclic quadrilateral QRTP are supplementary  (ii) Join O to Q and consider ΔRQO  ∠RQO – base angles of isosceles ΔRQO  ∠ROQ – sum of angles in ΔRQO is 1800  ∠RTQ – angle at the centre is twice angle at the circumference  Hence  ∠QTP   1. Consider   ∠QPT ∠TQO  In ΔQPT  Let M be the midpoint of QT  Consider ΔOQM | B1  B1  B1  B1  B1  B1  M1  M1  M1  A1 | ∠RQT  ∠RQP  ∠RTP  ∠ROQ  ∠RTQ  ∠QTP  Sine Rule applied  Half of QT  Attempt to get radius |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. Time   Total length  Relative speed     1. (i) Value of m   (ii) No acceleration  (iii) Deceleration  Hence, a deceleration of | M1  M1  M1  A1  M1  M1  A1  B1  M1  A1 | Total length  Relative speed  Equation distance to area of trapezium  Collecting like terms |
|  | **Total** | **10** |  |

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| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. Sketch  1. Value of for maximum volume   For maximum volume  Either  And  Hence   1. Mass of empty box   External dimensions  cm by cm by  Internal dimensions  188 cm by 68 cm by 24 cm | B1  B1  M1  M1  A1  B1  M1  M1  A1 | Correct sketch  Dimensions shown on the sketch  Expression for volume  Equating volume to 0 at maximum volume  Both values of  Value of  Internal and external dimensions |
|  | **Total** | **10** |  |
| **NO.** | **WORKING** | **MARKS** | **REMARKS** |
|  | 1. Table  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  1. Graph      1. Roots   – all | B2  S1  P1  C1  B1  B1  M1  L1  B1 | All the values 🗸 (B1 for at least 5 values 🗸)  Linear scales used on both axes – accommodates all table values  All points plotted within the graph paper  Smooth curve drawn  shown or implied in the roots  All the values of 🗸  🗸 attempt to get  Line drawn  🗸 value of |
|  | **Total** | **10** |  |