**Section: A**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q1:** | a)    Determine the value of *x* in the following equation:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_487804193_945520520.jpeg  *x* =      b)    Express *p* in terms of *q* in the following equation:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_487804193_-314060967.jpeg  *p* =      c)    A truth table is given below in Table A1. Determine the truth value of *r*.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_487804193_1591162150.jpeg  *r* = | **Mark (6)** |

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**Section: B**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q2:** | a)    Which option in Table B1 represents the set notation for the shaded region in Venn diagram shown in Figure B1?  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_120664746_1197979814.jpeg  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_120664746_398915695.jpeg     Option =      b)    Convert 2348 to its decimal number form.      c)    Find the sum of 1216 and CD16, expressing your answer in hexadecimal number form.  16 | **Mark (6)** |

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**Section: C**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q3:** | a)    Determine the gradient of the line: 3*y* = 12*x* + 9      Gradient =      b)    Line AB passes through the points (0*,* –13) and (10*,* 7). Given that the equation of Line AB is in the form of *y* = *mx* + *c*, determine the value of *m*.  *m* =    c)    Determine the *y*-intercept of the quadratic function, *y* = 2*x*2 + 7*x* – 6.  *y*-intercept =    d)    Determine the *x*-coordinate of the point at which the minimum value of the quadratic function, *y* = (*x* – 11)2 + 2 occurs.  *x* = | **Mark (8)** |

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**Section: D**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q4:** | The cost of two purchases involving three types of household items from a supermarket are summarised in Table D1 as shown below. It is known that the price for each type of item is the same in each purchase.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_1689804661_1783571619.jpeg    a)    By observing the rows, what is the total cost of purchasing 8 toothpastes, 4 shampoos and 6 body washes?      $  b)    By observing the rows, what is the total cost of purchasing 3 toothpastes, 1 shampoo and 3 body washes?      $  c)    In order to determine the unit price of each item, a third purchase information is provided:       The total cost of purchasing 5 toothpastes, 3 shampoos and *p* body washes.  By observing the rows in Table D1, what is the value of *p* which would **not** let us determine the unit price of each item?  *p* = | **Mark (6)** |

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**Section: E**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q5:** | a)    Determine the value of *A* in the following equation:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-205687358_1871610676.jpeg  *A* =    b)    Determine the value of *x* in the following equation:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-205687358_70372595.jpeg  *x* =    c)    Determine the value of *y* in the following equation:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-205687358_332381966.jpeg  *y* =    d)    C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-205687358_-139495844.jpeg | **Mark (8)** |

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**Section: F**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q6:** | Figure F1 below shows the displacement-time graph of a cyclist cycling along a straight path at East Coast Park.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_1941249600_-1060485785.jpeg  a)    What is the instantaneous velocity (in m/s) at *t* = 700 s?  m/s  b)    What is the average velocity (in m/s) between *t* = 0 s and *t* = 640 s?  m/s    c)    What is the total **distance** travelled (in m) from *t* = 0 s to *t* = 1500 s?  m | **Mark (6)** |

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**Section: G**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q7:** | Figure G1 below shows the speed-time graph of a motorbike travelling along a straight stretch of road.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-249168629_1156591351.jpeg  a)    What is the instantaneous speed (in km/h) at *t* = 1.5 h?  km/h    b)    What is the average speed (in km/h) between *t* = 3 h and *t* = 6 h?  km/h  c)    Given that the distance travelled in the first 2 hours is 112 km, determine the value of *k*.  *k* = | **Mark (6)** |

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**Section: H**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q8:** | 200 students went for a medical examination and their blood types were recorded. Figure H1 below shows the distribution of their blood types.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_1896451606_1421689152.jpeg  a)    Given that the number of students who have blood type O is *x*, determine the value of *x*.  *x* =    b)    Determine the **percentage** of students who have blood type AB.  %    c)    Determine the **relative frequency** of students who have blood type B. | **Mark (6)** |

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**Section: I**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q9:** | 120 people were surveyed on the number of hours they slept at night. The information is tabulated in Table I1 below.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_1780781169_1905976101.jpeg    a)    Determine the mean number of hours slept.    b)    Determine the median number of hours slept.    c)    After *x* more people are surveyed and their responses are included in Table I1, the modal number of hours slept becomes 8 **only**. Determine the smallest possible value of *x*. | **Mark (6)** |

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**Section: J**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q10:** | a)    How many ways can all the letters of the word ‘MOTHER’ be arranged?      b)    Determine the number of ways to choose 3 students from a class of 18 students.      c)    During a family photo shoot, the father and mother sat at the front row and the 7 children stood at the second row. If the 4 daughters have to stand together and the 3 sons have to stand together, determine the number of ways to arrange the family members. | **Mark (6)** |

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**Section: K**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q11:** | a)    A fair six-sided die, numbered 1 to 6, is rolled 100 times. Determine the **expected frequency** of the score being even.      b)    One card is drawn at random from a deck of 20 cards. Each of the cards is numbered from 1 to 20. What is the probability of getting a number **greater** than 17?      c)    A bag consists of only 15 black balls and 6 white balls. Two balls are picked randomly one after another, **without replacement**. What is the probability of picking two balls of the same colour? | **Mark (6)** |

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**Section: L**

**Write your answers in the blanks provided. Your workings need not be shown.**

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| **Q12:** | A survey was carried out and found that 72% of the students from AAA school wear spectacles. A random sample of 10 students is selected. Assuming a **Binomial distribution**, answer the following questions and **round off your answers to 3 significant figures**.  a)    Determine the probability that all the 10 students wear spectacles.      b)   Determine the probability that less than 8 students wear spectacles.    c)   Determine the probability that at least 2 students **do not** wear spectacles.      d)    Another group of 10 students from AAA school is randomly selected. Out of these two groups, determine the probability that both groups each have more than 5 students wearing spectacles. | **Mark (8)** |

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**Section: M**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q13:** | It is known that the monthly salary of employees in ABC company follows a normal distribution with a mean salary of $2800. This distribution is shown in Figure M1 with some additional information.    C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_2051838123_993693675.jpeg    a)    What is the probability that a randomly chosen employee from this company has a monthly salary more than $2800?    b)    What is the probability that a randomly chosen employee from this company has a monthly salary between $2100 and $4500? | **Mark (4)** |

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**Section: N**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q14:** | a)    A random sample of 50 batteries produced by a factory is selected. The mean lifetime of this sample is 40 hours with a sample variance of 90 hours. Determine the **estimated standard deviation** of the distribution of the sample means.      b)    An online merchant claimed that when an online purchase is made, the average delivery time of the product is 5 days. A group of students suspected that the actual average delivery time of the product is **more than** what the merchant claimed and conducted their investigations to verify the claim.  After surveying 50 randomly selected people who had made online purchase with this merchant, the distribution of the sample means is illustrated in Figure N1 below.  What should the **critical value** be if a hypothesis test is to be carried out using a 10% level of significance?    C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_2034773364_-1241992259.jpeg    c)    A health report claims that the average BMI of students in XYZ school is 26. Billy felt that the report has overstated the average BMI and decided to conduct a hypothesis test to check on the claim.  From a randomly selected sample of 70 students in XYZ school, an average BMI of 24.5 with a sample standard deviation of 7 is obtained. The distribution of the sample means is illustrated in Figure N2. Suppose Billy conducts the hypothesis test at various levels of significance, which option in Table N1 is true about the conclusions?  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_2034773364_-620266268.jpeg  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_2034773364_-1424379596.jpeg  Option = | **Mark (6)** |

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**Section: O**

**Write your answers in the blanks provided. Your workings need not be shown. Give non-exact numerical answers correct to 2 decimal places unless a different level of accuracy is specified in the question.**

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| **Q15:** | a)    Determine the value of *k* in the following equation, where *a* and *b* are positive constants:  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-687054021_-2136861725.jpeg  *k* =    b)    *w*, *x*, *y* and *z* are integers such that 0 < *w* < *x* < *y* < *z*. These four integers have a mean of 8 and a median of 3. Determine the value of *z*.  *z* =      c)    How many positive integers between 900 and 8000 that are divisible by 5 can be formed using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9, without any of the digits getting repeated?        d)    Box A contains only 5 red balls, 7 green balls and 2 blue balls. Box B contains only 2 red balls and 7 green balls. One ball is randomly chosen from Box A and transferred to Box B. Subsequently, one ball is randomly drawn from Box B. **Given that** the drawn ball is red, determine the probability that the transferred ball is green. | **Mark (12)** |

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