



# ICM

SEPTEMBER 2016

NUMERACY & STATISTICS

**Instructions to candidates:**

- a) Time allowed: Three hours (plus an extra ten minutes' reading time at the start – do not write anything during this time)
- b) Answer ALL questions in Part A and any THREE questions in Part B
- c) Part A carries 40% of the marks and Part B carries 60% of the marks
- d) Marks for each question are shown in [ ]
- e) Non-programmable calculators are permitted in this examination

**PART A**

- 1. 'Trendago' offer a 20% discount on all holidays booked before 1 November in the year previous to travel. How much will a family of 4 adults and 5 children aged 5, 7, 9, 13 and 16 pay for a holiday whose advertised price is £375 each with a 35% reduction for children under 15 years of age? [4]
- 2. Julia is a senior sales executive, working for a large building supplier. She receives a basic salary of £39,750 per year and is also paid commission on sales which averages £150 per week. Her tax allowance is £11,000 for the tax year 2016/2017. The basic rate of tax is 20%.
  - a) Calculate:
    - i her gross pay for the year [4]
    - ii the amount of tax she pays in this tax year [6]
    - iii her net pay for the year [3]
  - b) Julia's employer has asked if she would prefer to join the company bonus scheme instead of receiving a commission on sales. The bonus is based on 15% of employees' basic salary. Comment on whether Julia is better off receiving commission or the company bonus scheme. [6]
- 3. Metro Wholesalers offer a discount of 5% of an invoice if it is paid on time and a further discount of 1/40th of the invoice for early payment within 10 days. Calculate the fraction of the invoice that is deducted for early payment. [4]
- 4. Sweet potatoes are supplied by the local wholesaler in 50kg bags. Each of the sweet potatoes in the bag is weighed to the nearest gram. The following table was produced:

| MASS (Grams) | 50-99 | 100-149 | 150-199 | 200-249 | 250-299 | 300-349 |
|--------------|-------|---------|---------|---------|---------|---------|
| Potatoes     | 10    | 53      | 101     | 73      | 36      | 11      |

  - a) Calculate the cumulative frequency for sweet potatoes. [3]
  - b) Draw the cumulative frequency curve. [6]
  - c) Find the mean mass of sweet potatoes. [4]

**PART B**

- 5. When Budget-Buys, a large retail chain, wish to sell products in large quantities, they drop the prices to increase the sales significantly, whilst undercutting their competition.
  - a) For a chocolate product called Sweeter, plot the points (x, y) given in the table below: [5]

|  |    |    |    |    |
|--|----|----|----|----|
| Price per unit (x) (pence) – Sweeter         | 25 | 20 | 15 | 10 |
| Demand per week (y) (in thousands) – Sweeter | 9  | 14 | 19 | 26 |
  - b) Draw a line to fit the points. [2]
  - c) Find an equation for your line. [6]
  - d) At 5 pence per item, the demand for Sweeter increases to 32,000. Comment on this outcome. [7]

*continued overleaf*

6. Richard invested £15,240 in a Tax Free Cash Instant Savings Account (ISA) in the tax year 2016/2017. The account attracts an interest rate of 1.7% per annum, subject to interest rate changes.
- Calculate the amount of interest paid into the account at the end of the first year. [2]
  - Draw a table to show the amount of money in the account at the end of each year, for a ten year period. [4]
  - Draw a curve to illustrate the growth of this investment. [6]
  - If no money is withdrawn from the account, how much is in the account after 7 years? [3]
  - In the 8th year, the bank offered Richard the opportunity to transfer his investment into a higher interest bearing savings account which is taxable at the standard rate of 20%. The interest rate for this new savings account is 2.8% gross. Comment on whether Richard would be better off with this new account at the end of the 8th year. [5]
7. Thomas Projects depreciates the value of its machinery and equipment each year. Using the reducing balance method, the company gives the value of one of the computer controlled lathes at the end of each year for the first 5 years as:
- | Time (years) | 0      | 1      | 2      | 3      | 4      | 5      |
|--------------|--------|--------|--------|--------|--------|--------|
| Value (£'s)  | 35,000 | 31,500 | 28,350 | 25,515 | 22,964 | 20,667 |
- Draw a graph of value (v) against time (t). [10]
  - Calculate the value of the computer controlled lathe after 6 years. [2]
  - The company has the option to sell the computer controlled lathe at the end of the 7th year for £19,750, with a view to purchasing a new and more efficient machine for £45,000. Comment on whether this is a suitable option or whether the company should keep the existing machine until the end of its 10th year. [8]
8. The cost of employing a member of staff at Donington Mill, a household item superstore, is not solely the wage the employee receives. In addition, Donington Mill must pay National Insurance contributions, employer's pension contributions, uniform costs, together with other additional costs. For a weekly paid employee earning £19,760 per year and assuming one year as 52 weeks, calculate the following:
- Employer's Annual National Insurance costs which are levied at the rate of 13.8% on all earnings in excess of £156 per week. [4]
  - Employer's Annual Pension contributions which are 6.5% of the employee's weekly wage before NI contributions. [3]
  - Additional payroll costs which are £18 per week. [3]
  - Total annual costs of employing this member of staff, using your findings in a), b) and c), plus the annual cost of uniforms at £185. [2]
  - Show a breakdown of the costs as a pie chart. [8]