



JUNE 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 (Answer ALL questions in this section)

- 1. 'Buena Vista Holidays' offer a 25% discount on all holidays booked before 1st December in the year previous to travel. How much will a family of 4 adults and 6 children, aged 3, 5, 8, 13, 15 and 16, pay for a holiday whose advertised price is £325 each with a 40% reduction for children under 14 years of age? [4]
- 2. Karen is a sales director, working for a motor car dealership. She receives a basic salary of £69,000 per year and commission of 5% on sales, which for this year is £12,500. Her tax free allowance is £11,000 for the tax year 2016/2017. The basic rate of tax is 20%, up to £32,000 above the tax free allowance and 40% from £32,001-£150,000. Calculate:
 - a) i her gross pay for the year [4]
 - ii the amount of tax she pays in the year [6]
 - iii her net pay for the year [3]
- b) The company is considering the introduction of a performance related bonus for all employees of 10% of salary, instead of a commission-based supplement. The employees have been asked to give their approval of such a scheme. Comment on whether Karen would be advised to accept the new scheme, given that the bonus is only paid when the company is in profit and this has been falling recently. [6]
- 3. SOS Traders offer a discount of 6% of an invoice if it is paid on time by their customers and a further discount of 1/40th of the invoice value for early payment within 10 days. Calculate the fraction of the invoice that is deducted for early payment. [4]
- 4. Apex Plastics produce large storage units for the catering industry. The fixed costs for the units are £110 and the variable cost per unit is £6.
 - a) Calculate an expression for total costs (c) in terms of q, the quantity produced. [3]
 - b) Use your answer in a) to determine the total costs if 250 units are produced. [3]
 - c) Prepare a graph of the expression for total costs. [5]
 - d) Use your graph to determine the total cost if 175 units are produced. [2]

PART B (Answer THREE questions from this section)

5. Charlotte Holloway has a small business making and selling homemade meals in a can. She produces a chicken curry, which is sold in $\frac{1}{2}$ litre (500cc) cans. Charlotte decides to change the shape of the can while keeping the capacity the same.
- She decides on a height of 12 cms. Calculate the diameter that she should order from the manufacturers of the cans. [3]
 - She decides to have another can which is broader than its height and orders a diameter of 14 cms. Calculate the height of the new can. [3]
 - A number of customers have asked for larger capacity cans in $\frac{3}{4}$ litre and 1 litre sizes, but also like the idea of having different shape cans. Calculate:
 - the diameter of a can with a height of 12 cms, for a capacity of $\frac{3}{4}$ litre and 1 litre [2 each]
 - the height of a can of $\frac{3}{4}$ litre and 1 litre with a diameter of 14 cms [2 each]
 - Calculate the surface area of metal required to produce the $\frac{3}{4}$ litre and 1 litre cans. [6]
6. Hamell Commercials are an international import-export company dealing in electrical components. The majority of their imports are manufactured in China and sent to Germany, from where they are exported. The company are concerned about the fluctuations in exchange rates that can affect their profitability. They need to convert £Sterling to Euros and vice versa.
- Draw a conversion graph given that the conversion rate is £1 = €1.26. [6]
 - Hamell Commercials receive an order for 24 electric motors, which cost €125.69 each. With the aid of your graph, calculate the total cost of the order in £Sterling. [3]
 - Following an increase in base lending rates announced by the Bank of England, the exchange rate changed to £1 = €1.157. Draw a further curve on the same conversion graph for this new rate. [6]
 - With the aid of the new graph and assuming that Hamell Commercials' profit margin is 75%, calculate the selling price in £Sterling for this new exchange rate. [5]
7. CKF Productions recently purchased a new robotic machine for their production facility. The value of the machine is to be depreciated by the reducing balance method and the value of the machine is given as below:

Time (years)	0	1	2	3	4	5
Value (£)	25,000	20,000	16,000	12,800	10,240	8,192

- Draw a graph of value V against time t. [10]
 - Calculate the value of the machine after $3\frac{1}{2}$ years. [4]
 - Calculate the cumulative rate of depreciation after 5 years. [2]
 - At the end of year 5, the resale value of the machine is actually £9,500. Comment on whether CKF should sell the machine and replace it or keep the machine for another 2 years. [4]
8. When Mega-Mart, a large multinational retailer, wish to sell products in large quantities, they drop the prices to significantly increase sales, whilst considerably undercutting their competition.
- Plot the points (x, y) given in the table below for product A: [5]

Price per unit (x) (pence)	25	20	15	10
Demand per week (y) (in thousands)	4	9	14	19

- Draw a line to fit the points. [2]
- Find an equation for your line. [6]
- At 5 pence per item, the demand increased to 26,000 for product A. Comment on this result. [7]