



JUNE 2017

NUMERACY & STATISTICS

Instructions to candidates:

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

PART A

- G & G Ltd offers a discount of 8% of an invoice if it is paid on time and a further discount of $\frac{1}{40}$ th of the invoice value for early payment within 14 days. Calculate the fraction of the invoice that is deducted for early payment and the percentage this also represents. [4]
- Maria is employed as a personal shopper for a large fashion store. She receives a basic salary of £25,750 per year and is also paid commission on sales that she has made, which averages at £80 per week. Her tax allowance is £11,500 for the current tax year 2017/2018. The basic rate of income tax is 20%.
 - Calculate:
 - her gross pay for the year [3]
 - the amount of tax she pays in this tax year [5]
 - her net pay for the year [2]
 - The store management is considering withdrawing commission on sales, but propose a 12% increase in basic salary for all staff to compensate for the loss of income. Sales are also projected to fall by 10% in the next year. Comment on whether Maria would be better off receiving commission or the increased basic salary. [6]
- Solve the following simultaneous equations using algebra:
 $4x + 2y = 48$
 $x + 6y = 36$ [3 each]
- Warun Enterprises produces castings for the motor industry. The fixed costs are £110 and the variable cost per casting is £7.
 - Calculate the formula and show an equation for total costs (c) in terms of q, the quantity produced. [3]
 - Use your answer in a) to determine the total costs if 175 castings are produced. [3]
 - Prepare a graph of the formula for total costs. [5]
 - Use your graph to determine the total cost if 200 castings are produced. [3]

PART B

- Two discount websites, Orinoco and Ego, offer 'bargain packages' of assorted CDs and DVDs for £8.50, stating that the minimum value of the contents is £16.00.
A survey of eight such packages from each of the two websites found that the actual value of the contents was:

Orinoco – value (£)	16.00	15.80	16.85	15.80	17.85	15.30	15.75	15.45
Ego – value (£)	15.95	16.90	16.85	17.85	15.25	17.50	17.00	17.25

- Calculate the Mean and range of the data. [4]
- Comment on the results found in a). [5]
- Find the Median value of the contents for each website. [4]
- Compare the Mean and Median and, with the aid of a suitable diagram, describe the distribution of EACH set of data. [7]

continued overleaf

6. ESE Electrics produces and sells light fittings to electrical retailers. The selling price of a light fitting called 'Glitzzy' is £6.00 each. Estimates of demand and variable costs are as below:

Probability	Demand (Units)	Probability	Variable Cost Per Unit (£)
0.3	5,000	0.1	3.00
0.6	6,000	0.3	3.50
0.1	8,000	0.5	4.00
		0.1	4.50

The unit variable costs do not depend on the volume of sales, i.e. they do not fall as a result of increased volume. Fixed costs are £10,000.

- a) Analyse the information given above and calculate the expected profit for 'Glitzzy'. [10]
 - b) Demand was higher than expected in the latest set of monthly figures published last week. Recalculate the profit if the estimate of demand is increased by 10%. [10]
7. Wiley Precision produces brass blanking plates. The specification for the width of a plate is a minimum of 42mm and a maximum of 46.2mm. A normally distributed batch of plates is produced with a mean of 45mm and a variance of 4mm. With the aid of normal distribution diagrams, calculate:
- a) the percentage of plates that are too small
 - b) the percentage of plates that are too large [10 each]
8. You are employed as a trainee financial adviser and as part of your training you have been asked to carry out the calculations below to assess your knowledge of how interest rates work:
- a) If £9,000 is invested to earn 10% interest for three years and 9% thereafter, calculate the value of the investment at the end of five years. [3]
 - b) A client has invested £12,000 into a long-term investment product for ten years. The annual rate of interest earned is 16% for the first four years, 13% for the next four years and 10% for the final two years. Calculate the value of the investment at the end of ten years. [4]
 - c) A client purchased a piece of equipment for her business, which costs £7,500 now. The annual rates of inflation over the next four years are expected to be 17%, 22%, 14% and 9%. Calculate how much the equipment would cost to purchase at the end of the four years. [5]
 - d) Another client has taken out a £250,000 mortgage over 25 years. Interest is to be charged at 6%. Calculate the monthly repayment. [8]