ICM

MARCH 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. Jonah invested £110,000 in a new retail business and spent 55% on commercial buildings, 25% on computer equipment and 15% on advertising and marketing. Calculate how much money he has left to spend on stock to sell. [4]

2. Andy works as a technician for a computer repair shop. He receives a basic salary of £24,375 per year and receives a performance bonus of 7.5% of his annual salary each year. His tax allowance is £10,600 for the tax year 2015/2016.
   a) Calculate his gross pay for the year. [4]
   b) If the basic rate of tax is 20%, calculate his net pay for the year. [5]
   c) It is proposed to increase the tax free allowance to £11,000 for the 2016/2017 tax year. Calculate the amount of tax he will pay in the next tax year. [5]

3. Turnips are supplied by a local smallholding in 50kg bags. Each of the turnips 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
Turnips	8	51	99	71	34	9

   a) Calculate the cumulative frequency for turnips. [3]
   b) Draw the cumulative frequency curve. [5]

4. Red Quadrant Engineering produce electric fuel pumps for cars. The fixed costs are £120 and the variable cost per fuel pump is £13.
   a) Give 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 190 fuel pumps are produced. [3]
   c) Prepare a graph of the expression for total costs. [8]

continued overleaf

PART B (Answer THREE questions from this section)

5. The quantities of electronic assemblies produced by Iconic Productions during the year ended 31 December 2015 and the related costs are as below:

Month	Production	Factory costs
	000's	£000's
January	7	45
February	10	59
March	13	75
April	14	80
May	11	65
June	7	46
July	5	35
August	4	30
September	3	25
October	2	20
November	1	15
December	5	35

Assume that the costs remained stable throughout the year.

a) Draw a scatter diagram related to the data provided above and plot on it the line of best fit. [10]

b) i Calculate the expected factory cost if 15,000 assemblies were produced in a particular month.

ii Estimate Iconic Productions' monthly fixed costs. [5 each]

6. Lateral Plastics have just received an order for piping made of PVCU. The section of piping has an outer diameter of 16cm and the plastic is 6mm thick. The section of piping is 200cm long and 1,500 pipes have been ordered. Calculate:

a) the internal diameter of the pipe in centimetres [3]

b) the area of plastic in the cross-section of the pipe when looking at the pipe from the end [5]

c) the volume of plastic used in the making of EACH section of pipe [5]

d) the total cost of the order, if the cost of the plastic is £7.50 per cm^3 [7]

7. Quest Projects is an international import-export company dealing in manufactured products of all types. The majority of their business is with China and they are very aware of how fluctuations in exchange rates can influence the profitability of their business with countries such as China. They need to convert £Sterling to Chinese Yuan and vice versa.

a) Draw a conversion graph given that the conversion rate is £1 = 9.65 Chinese Yuan. [6]

b) Use your graph to convert:

i 10,000 Chinese Yuan to £Sterling

ii £2,450 to Chinese Yuan [2 each]

c) One of the contracts requires the import of partly completed manufactured components to India for final completion. This requires the conversion from the Chinese Yuan to Indian Rupees. Draw a further conversion graph to reflect a conversion rate of 1 Chinese Yuan to 10.37 Indian Rupees. [6]

d) Use your graph to convert:

i 2,500 Chinese Yuan to Indian Rupees

ii 165,000 Indian Rupees to Chinese Yuan [2 each]

8. The costs of employing a member of staff at Country Freezer Foods includes the wage the employee receives, employer National Insurance contribution, employer occupational pension contribution, uniform costs, together with additional costs associated with the payroll, etc. For an employee earning £23,350 per year and assuming one year as 52 weeks, calculate the following:

a) Employer National Insurance cost which is levied at the rate of 13.8% on all earnings in excess of £156 per week [4]

b) Pension contribution which would be 6% of the employee's wage, which equals the employee's contribution [3]

c) Additional costs which would be £75 per week [3]

d) Total annual costs of employing this member of staff, using your findings in a), b) and c) and the cost of uniform at £225 [2]

e) Show a breakdown of the costs as a pie chart [8]