2. A biologist is studying the noises made by dolphins. The biologist records the frequency, f kHz, of the noise made by a dolphin at 10 different sea depths, d m.

Some summary statistics are given below.

$$\bar{d} = 25.7 \quad \sum f = 15 \quad \sum f^2 = 25.5 \quad \sum df = 433.5 \quad S_{dd} = 1090.6$$

(a) Find the value of S_{ff} and the value of S_{df}

(3)

(b) State, giving a reason, which is the response variable.

(1)

(c) Calculate the value of the product moment correlation coefficient for these data.

(2)

(d) Give an interpretation of your answer to part (c)

(1)

(e) Find the equation of the least squares regression line of f on d, giving your answer in the form $f = \alpha + \beta d$

(3)

(f) Give an interpretation of

(i) the gradient of your regression line,

(ii) the f intercept of your regression line.

(2)

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Question 2 continued

(Total for Question 2 is 12 marks)