Correlation – 2022 GCE Statistics Further Math A Y542

1. June/2022/Paper_ Y542/01/No.2

The directors of a large company believe that there are more computer failures in the Head Office when temperatures are higher. They obtain data for the Head Office for the maximum temperature, T°C, and the number of computer failures, X, on each of 12 randomly chosen days.

(a) State which of the following words can be applied to T.

Dependent Independent Controlled Response **[1]**

The data is summarised as follows.

$n = 12$ $\Sigma t = 261$ $\Sigma x = 41$ $\Sigma t^2 = 5869$ $\Sigma x^2 = 311$ $\Sigma tx = 1021$

(b) Calculate the value of the product moment correlation coefficient r. **[2]**

(c) The directors wish to investigate their belief using a significance test at the 1% level.

(i) Explain why a 1-tail test is appropriate in this situation. **[1]**

(ii) Carry out the test. **[6]**

(d) One of the directors prefers the temperatures to be given in Fahrenheit (°F), rather than Centigrade (°C). The relationship between F and C is $F = \frac{9}{5}C + 32$.

State the value of r that would result from using temperatures in Fahrenheit in the calculation. **[1]**