Section A (3)

Marks:15

**Q1:**

A rocket motor is manufactured by bonding together a propellant, an igniter and a sustainer. To ensure good reliability of the motor, a study was conducted to test whether there is a relation between the shear strength of the bond (y, in kN/m2) and the age of the propellant (x, in weeks) when the motor is cast.  
The following is the output of Excel Data Analysis – Regression:

1. What is the correlation strength between the bond shear strength and the propellant age when the motor is cast?         (1 mark)
2. What is the meaning of ‘Multiple R’ and its value?    (2 marks)
3. What is the least squares regression line equation? Round the regression coefficients to 4 decimal places.        (2 marks)
4. Can the equation be used for making predictions? Explain. (2 marks)
5. Predict the shear strength of the bond when a 13-week-old propellant is used. Round your answer to 2 decimal places.       (2 marks)

(a) The correlation strength is 0.938819053.

(b) This is the correlation coefficient. It tells you how strong the linear relationship is. For example, a value of 0.938819053 means a very strong positive relationship.

(c)y = mx + c.

From the table, the equation would be approximately:

y = 17645.3407– 252.4777X

(d) The least squares regression model has a significant slope coefficient (2.199E-07 < 0.05) and significant intercept coefficient (5.3671E-16 < 0.05). The least squares regression line equation can be used for predictions since both coefficients are significant.

(e) Sub 13 as X

17645.3407– 252.4777X

17645.3407– 252.4777(13) = 14363.13(2.d.p)

Hence the sheer strength is estimated at 14363.13kN/m2

Note: You can enter a maximum of 8000 characters and you have already entered 702 characters. Enter a value that is equal to or less than 8000 characters to proceed.

**Marks:9**

**Q2:**

John wishes to test whether the number of traffic accidents and the number of thefts in a month are correlated. Arrange he following actions in their correct order.

Collect 12 months of traffic accidents and thefts data

Plot a X-Y scatter chart

Use Data Analysis ToolPak to perform regression analysis

**Marks:3**

**Q3:**

Match the following Excel functions/tool to their applications.

To summarize, analyze, explore, and present data

Answers:

VLOOKUP

To fill in multiple data with reference to another table

COUNTIF

To count labels that appear several times in a large data table

SUMIF

To add up numbers associated with a certain label that appear several times in a large data table