Question 11 **(13 marks)**

Data for the total occupancy of rooms for each season of the year at a Perth hotel is shown below.

n	Year	Season	Total rooms occupied	Seasonal mean	4-point centred moving average	Total rooms occupied as a percent of seasonal mean
1	2015/16	Spring	1770	1660.5		106.59
2		Summer	1904			**B**
3		Autumn	1591		1644.375	95.81
4		Winter	1377		1622.5	82.93
5	2016/17	Spring	1641	1610.25	1618	101.91
6		Summer	1858		1614.75	115.39
7		Autumn	1601		1602.25	99.43
8		Winter	1341		1584.75	83.28
9	2017/18	Spring	1577	1524.0	1558	103.48
10		Summer	**A**		1532.375	116.93
11		Autumn	1463		1526.875	96.00
12		Winter	1274		1525.125	83.60
13	2018/19	Spring	1600	1519.75	**C**	105.28
14		Summer	1745		1525.25	114.82
15		Autumn	1504			98.96
16		Winter	1230			80.93

(a) Calculate the value of **A**, **B** and **C**. (3 marks)

(b) Complete the table showing the seasonal index for each season. (1 mark)

Summer	Autumn	Winter	Spring
1.1545		0.8268	1.0432

(c) Calculate the deseasonalised value for Winter 2017/18. (2 marks)

(d) Comment on the effect the seasonal index had on the value found in part (c). (1 mark)

(e) The least-squares line using deseasonalised data is $R = -12.071n + 1681.25$. Use this line to predict the total number of rooms occupied during Spring 2020/21. (2 marks)

When a prediction was made for Spring 2020/21, using the least-squares line based on the 4-point centred moving averages, the answer was 1481.

(f) Explain why this is different from the answer obtained in part (e). (1 mark)

The manager of the hotel attended a meeting with the owners of the hotel. She explained to the owners that the reduction in occupancy was due to the downturn in the Western Australian economy in recent years.

(g) Comment on the statement made by the hotel manager. (2 marks)

(h) What practical advice, in the context of the question, would you give to the manager of the hotel? (1 mark)