MA 542: REGRESSION ANALYSIS

QUIZ - 8 **Name** Key

A personal officer in a governmental agency administrated for newly developed aptitude test to each of 25 applicants for entry-level clerical position in the agency. After a probationary period, each applicant rated for proficiency on the job. X_1, X_2, X_3 and X_4 are the scores on the four tests and Y is job proficiency score. The following is the summary output for the fitted model for Y using all the predictors X_1, X_2, X_3 and X_4 and **using the first 20 observations (cases)** of the data set. **The second table shows the other five observations.**

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -130.66586   11.98507 -10.902 1.59e-08 ***
X1             0.29539    0.04912   6.013 2.38e-05 ***
X2             0.03705    0.07565   0.490 0.631417
X3             1.29438    0.20129   6.430 1.13e-05 ***
X4             0.60603    0.14698   4.123 0.000903 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.199 on 15 degrees of freedom
Multiple R-squared:  0.9639,   Adjusted R-squared:  0.9543
F-statistic: 100.1 on 4 and 15 DF,  p-value: 1.25e-10
```

	Y	X_1	X_2	X_3	X_4
21	67	74	121	91	85
22	109	96	114	114	103
23	78	104	73	93	80
24	115	94	121	115	104
25	83	91	129	97	83

From the given information, check the predictive ability of the fitted model. Explain.

Fitted model is : $\hat{y} = -130.6658 + 0.29539X_1 + 0.03705X_2 + 1.29433X_3 + 0.60603X_4$

Predictions :

21 $\longrightarrow$ $\hat{y} = 64.9792$

22 $\longrightarrow$ $\hat{y} = 111.8957$

23 $\longrightarrow$ $\hat{y} = 71.6191$

24 $\longrightarrow$ $\hat{y} = 113.4647$

25 $\longrightarrow$ $\hat{y} = 76.8494$

$$MSPR = \frac{\sum (y_i - \hat{y}_i)^2}{n^*} = \frac{93.3796}{5} = 18.6759$$

~~But~~ $MSE = 17.6316$

Since MSPR and MSE are approximately same, the predictive ability of the model is good (ie the model is valid).