

**May 2022 (ENDSEM) EXAM, T.Y./ B. TECH. (SEMESTER - II)**  
**COURSE NAME: DATA ANALYTICS, COURSE CODE: MEUA32181D**  
**(PATTERN 2018)**

**Solution: Set II**

Q.1a) One tail test.  $Z_{\text{observed}} = -1.42$  and  $Z_{0.05} = -1.645$ .  $Z_{\text{observed}} > Z_{\text{critical}}$ .  $H_0$  is accepted.

b) One-tailed test.  $Z_{0.05} = 1.645$ ,  $Z_{\text{observed}} = 2.44$ . As  $Z_{\text{observed}} > Z_{\text{critical}}$ , Reject  $H_0$ .

'ABC' residents who drink milk as the primary beverage for breakfast is higher than the national proportion.

b)  $n_r = 50$ ,  $\bar{X}_r = 21.45$ ,  $\sigma_r = 346$ .  $N_p = 50$ ,  $\bar{X}_{pbar} = 24.6$ ,  $\sigma_p = 2.99$ .

$$-4.42 \leq \mu_1 - \mu_2 \leq -1.88$$

Q.2a) Independent variables: 2, 4 levels for column (variable 1) and 2 levels for variable 2 (Row), Degrees of freedom: Row = 1, Column = 3, Interaction = 3, Error = 16, Total = 23.

b)  $y = 16.5 + 0.1623x$ , St. error = 3.9429

b)

	SS	df	MS	F
SSC	66.67	2	33.93	13.04
SSE	15.33	6	2.56	
SST	82	8		

$F_{0.01, 2, 6} = 10.92$ . As  $F_{\text{observed}} > F_{\text{critical}}$ , Reject  $H_0$ .

Q.3a)  $Y = 380 - 0.24x_1 + 34.6x_2 + 0.88x_3 - 0.032x_4$

Independent variables =  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$ . For every 1% increase in  $x_1$ , predicted  $y$  decreases by 0.24% keeping the other parameters constant. Similarly, for every 1% increase in  $x_2$ , predicted  $y$  increases by 34.6% keeping the other parameters constant. Similarly, for every 1% increase in  $x_3$ , predicted  $y$  increases by 0.88% keeping the other parameters constant.

At  $x_1 = 11$ ,  $x_2 = x_3 = 0$ , and  $x_4 = 6$ ,  $Y = 377.168$

b) No. of independent variables: 2,  $Y = 203.3937 + 1.1151x_1 - 2.2115x_2$ ,

$F = 24.55$  with  $p$  value of 0.0000013 is less than  $\alpha$  value of 0.01, therefore Reject  $H_0$ . As  $p$ -value for  $x_1$  and  $x_2$  is less than  $\alpha$ . Therefore,  $x_1$  and  $x_2$  are significant factors.

b)  $Y = 203.3937 + 1.1151x_1 - 2.2115x_2$ . For  $x_1 = 50$ ,  $x_2 = 60$ ,  $Y = 126.4587$

As  $p$ -value for  $x_1$  and  $x_2$  is less than  $\alpha$ . Therefore,  $x_1$  and  $x_2$  are significant factors.

Standard error = 51.761 indicate that 68% of the residuals are within  $\pm 51.761$ . And 95% of the residuals are  $\pm 2(51.761) = \pm 103.522$ .

$R^2 = 0.663$  and Adjusted  $R^2 = 0.636$ : Difference in  $R$ -squared values shows that some inflation in the  $R^2$  value.