Assignment - 6

§13

Q:- A car company believes that the percentage of resident in city ABC that owns a vehicle is 60% or less. A sales Manager disagrees with this. He conducts a Hypothesis testing surveying 250 residents and found that 170 responded yes to owning a vehicle?

(a) State the Null & Alternate Hypothesis.

(b) At 10% of significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less?

⇒ **Step-1** :- Null Hypothesis → $H_0 \leq 60\%$ [i.e, Percentage of resident in city ABC that owns a vehicle is 60% or less.]

Alternate Hypothesis → $H_1 \not\leq 60\%$ [i.e, Percentage of resident in city ABC that do not owns a vehicle is 60% or less.]

$n = 250$ ~~resd~~ resident , $x = 170$ residents owns a vehicle

$\hat{P} \Rightarrow \frac{x}{n} \Rightarrow \frac{170}{250} \Rightarrow 0.68$

$q_0 \Rightarrow 1 - P_0 \Rightarrow 1 - 0.6 \Rightarrow 0.4$ (i.e 40%)

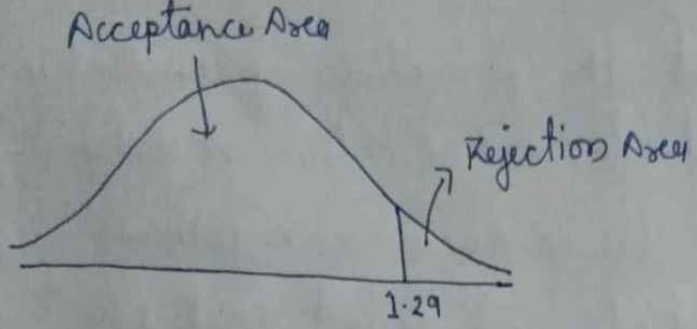
Step-2 Significance value = 0.1 C.I = 90% (i.e, $1-\alpha$)

$\Rightarrow 1 - 0.1 \Rightarrow 0.9$

↓ at

$+1.29$

Step-3 Decision Boundary :- 523



Step-4 Test Statistics :-

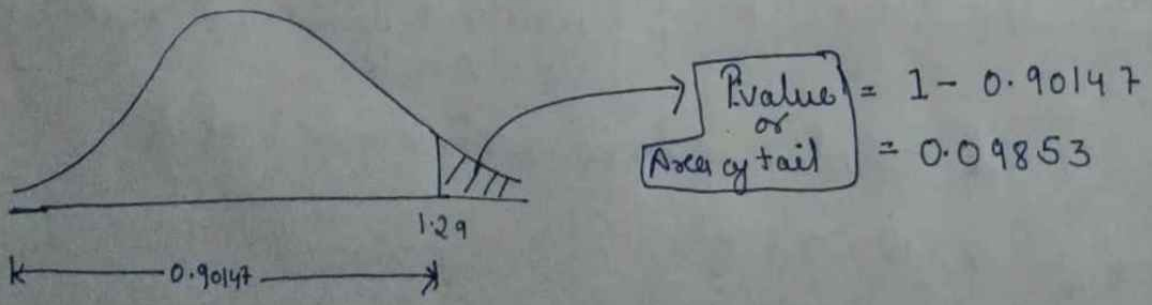
$$Z_{test} \Rightarrow \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} \Rightarrow \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} \Rightarrow \frac{0.08}{\sqrt{\frac{0.24}{250}}} \Rightarrow \frac{0.08}{\sqrt{0.00098}} \Rightarrow \frac{0.08}{0.03098}$$

$$\Downarrow$$

$$2.582$$

$\therefore Z_{test}$ i.e $2.582 > +1.29$ so reject the Null Hypothesis, the vehicle ownership in city ABC is not less than & equal to 60%.

For P-value :- Area of the body = 0.90147



P-value = 0.09853

Significance value (α) = 0.1

$\therefore \alpha >$ P-value (i.e $0.1 > 0.09853$) so rejects the Null Hypothesis.