A manufacturer of a certain brand of 9-volt batteries claims that the average life of the battery is 40 hours when used in a radio, with Standard Deviation of 5 hours. To test the manufacturer’s claim, a random sample of 100 batteries was tested and it showed as average life of 38 hours. What can you conclude about the manufacturer’s claim at the level of significance α=0.05? Calculate p-value.

**SOLUTION**

X= Life of 9-V Batteries

Sample Mean= 38hrs

Sample Size= 100

One-Sample Z

Descriptive Statistics

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **Mean** | **SE Mean** | **95% CI for μ** |
| 100 | 38.000 | 0.500 | (37.020, 38.980) |

μ *mean of Sample  
Known standard deviation = 5*

Test

|  |  |
| --- | --- |
| Null hypothesis | H₀: μ = 40 |
| Alternative hypothesis | H₁: μ ≠ 40 |

|  |  |
| --- | --- |
| Z-Value | P-Value |
| -4.00 | 0.000 |

Since p-value =0.000 << α=0.05, we strongly reject H0 at 5% level of significance. Since, sample mean is 38 hours and the test is significant, we can conclude that average life of batteries is significantly lower than 40 hrs.

Hence, the manufacturer claim is not valid.

Further, there is 90% chance that the population mean is between 37.02hrs to 38.98hrs