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**Paper : statistic inference**

 **Part “A”**

 **MCQ’S**

 **i) ( A )**

 **ii) (B)**

 **iii) (A)**

 **iv) ( B )**

 **v) (B)**

 **vi) (D)**

 **vii) ( A)**

**viii) ( 5% )**

 **ix) (Null )**

 **x) ( T- test )**

**Part “B”**

**Question 1: Part a**

1. **The normal person has an average IQ of 100.**

H0: μ = 100

HA: μ ≠ 100

1. **More than 65% of cola drinkers prefer Coke to Pepsi.**

H0: π = 0.65

HA: π ≠ 0.65

1. **Waiting time to place an order has changed from the mean time of 4.5 min.**

H0: μ = 4.5

HA: μ ≠ 4.5

Question 1: part b

**Z = - 1.57**

1. **So – 3 .06 lies in rejection region**
2. **So 3.06 lies in acceptance region**
3. **So 0.8 lies in acceptance region**

**Question (2): “a”**

For 80% Confidence Level = 1.021 ≤ σ2 ≤ 2.5089

 For 98% Confidence Level = 0.7573 ≤ σ2 ≤ 3.9486

**Question (2): “b”**

**Write t value and chi square value**

* + - n = 12 , α = 1 % t – value = 3.1058
		- Chi Square 𝛑2 = 26.757

**Write f value**

n1= 25 , n2 = 5 α = 0.01

* For V1 = n1 – 1

 25 – 1 = 24

* For V2 = n2 – 1

 5 – 1 = 4

 f table value is

when V1 = 24 & V2 = 4

f – table value = 20.03

* when V1 = 4 & V2 = 14

f – table value = 4.89

* **Write z table value**:

Z = -2.22 Value in table = 0.0132

Question (3): “B” (a):

 $μ=8 $ $σ=0.15$ n = 50 x = 7.955 ∝ = 1% = 0.01

P = X / n $=\frac{7.955}{50}=0.1591$

1. H0 : μ = 8

 H1 : μ ≠ 8

1. ∝ = 0.01
2. Z – Test

 Z= $\frac{x- μ}{σ /√n} $

Acceptance Region

Rejection Region

Z < - 2.14 = 0.9951

Z > 2.14

 1 – 0.9838 = 0.0162

2.58

- 2.58

1. Z**=** $\frac{x- μ}{σ /√n}$

Z = $\frac{7.955-8}{0.15/\sqrt{50}}=\frac{-0.045}{0.15/7.07} =\frac{-0.045}{0.021} =- 2.14$

**Now P – value;**

P (Z > 2.14) = 0.9838

 1 – 0.9838 = 0.0162

P (Z < - 2.14) = 0.0162

P = 0.0162 + 0.0162

= 0.0324

* + P is less than α and we reject H0 and accept HA.

Question (3): “B” (b):

Answer (3): “B” (b):

 $0.4080<\frac{\sqrt{σ}}{\sqrt{σ}}<3.839$

**Question (4): “A”**

Answer (4): “A”

$μ=1000 $ $S=9$ ∝ = 1% = 0.01

1. H0 : μ = 1000

H1 : μ < 1000

1. ∝ = 0.01

1 – 0.01 = 0.99 Finding “t” From Table t = 2.33, t < - 2.33

1. t – Test

t > - 2.33

t = $\frac{Ẍ - μ}{S /√n} $

Acceptance Region

Rejection Region

- 2.33

1. **t =** $\frac{Ẍ - μ}{S /√n} $

t = $\frac{980-1000}{9/\sqrt{8}}=\frac{-20}{9/2.8284} =\frac{-20}{3.1819} =-6.285$

Value – 6.28 is less – 2.33 so we reject H0 and accept H1

for example, population mean contest is less than 1000kpa, - 6.29 lies in rejection region.

**Question (4): “B”**

 P – value = 0.002

 α = 0.01

 P – value < α

 0.002 < 0.01

So we reject H0 and accept H1.