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**Final Term Paper Solution/Answers**

Part “A” (Objectives).

**Choose the best answer:**

 **i) Chi square distribution is**

 a. Normal

**ii) A hypothesis is a claim about**

 b. population parameter

**iii) Type 1 error in hypothesis testing is related to**

 a. Rejecting a true null hypothesis

**Part iv) and v) are related to following condition**

A manufacturer of fluorescent light bulbs claims that the mean life of these bulbs is 2500 years. A consumer agency wanted to check whether or not this claim is true. The agency took a random sample of 36 such bulbs and tested them. The mean life for the sample was found to be 2447 hours with a standard deviation of 180 hours.

 **iv) The null and alternative hypotheses are:**

b) 

**v) The test statistic is:**

1. z = -1.76

**vi) f distribution is associated with**

 d. Two population variance.

**vii) If p-value is greater than α, we will**

 a. Accept the null hypothesis

**viii)** If value of αi.e. the level of significance isn’t specified, then we take it at……....

Ans: 5%

 **ix)** Acceptance and rejection region in the critical region approach is associated with ……. hypothesis.

Ans: Null

 **x) ………….** test is used when σ is unknown.

Ans: T- test (t – statics)

Part “B” (Question)

# Question (1): “a”

**Answer (1): “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): “b”**

**Answer (1): “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”**

**Answer (2): “a”**

For 80% Confidence Level = 1.021 ≤ σ2 ≤ 2.5089

 For 98% Confidence Level = 0.7573≤ σ2 ≤ 3.9486

**Question (2): “b”**

**Answer (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):**

Answer (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”**

Answer (4): “B”

 P – value = 0.002

 α = 0.01

 P – value < α

 0.002 < 0.01

So we reject H0 and accept H1.