📘 Chi-Square Test Assignment: Practical Applications (10 Questions)

🔹 Q1. Chi-Square Goodness-of-Fit – Candy Color Distribution

A candy company claims its jellybean colors are distributed as follows:

Red: 25%, Green: 25%, Yellow: 25%, Orange: 25%.

You count 100 jellybeans:

Red: 20, Green: 30, Yellow: 25, Orange: 25

Tasks:

State null and alternative hypotheses

Calculate expected frequencies

Perform Chi-Square test manually

Interpret the result at α = 0.05

🔹 Q2. Chi-Square Test for Independence – Gender vs. Streaming Service Preference

A survey is conducted to see if gender is independent of preferred streaming service.

Netflix Amazon Prime Hotstar Total

Male 30 20 25 75

Female 25 30 20 75

Total 55 50 45 150

Tasks:

Form hypotheses

Calculate expected values

Perform Chi-Square Test of Independence

Conclude if preference is gender-dependent

🔹 Q3. Chi-Square Test – Customer Feedback (Good, Average, Bad)

A store received the following feedback from 100 customers:

Good: 50

Average: 30

Bad: 20

The manager believes feedback is evenly distributed.

Tasks:

Test the manager's belief

Use α = 0.05

🔹 Q4. Construct a Contingency Table

Create your own 2x3 contingency table for:

Age Group (Under 30, Over 30)

Choice of Phone Brand (Apple, Samsung, Xiaomi)

Perform the Chi-Square Test and analyze the relationship.

🔹 Q5. Textbook Preference Survey

50 students were surveyed:

Stream Textbook A Textbook B Total

Science 15 10 25

Commerce 5 20 25

Total 20 30 50

Tasks:

Determine whether textbook preference depends on stream.

Use α = 0.01

🔹 Q6. Chi-Square Calculator Practice

Using any online chi-square calculator:

Input the data from Q2 and Q5

Record:

Chi-square statistic

Degrees of freedom

P-value

Compare with manual calculation (if done)

🔹 Q7. Political Preference and Education Level

Create your own data table to test whether political preference is related to education level. Have:

3 education levels

3 political parties

Perform:

Hypothesis formation

Chi-square test

Final interpretation

🔹 Q8. Fit to Expected – Dice Roll Simulation

Roll a fair die 60 times and record the outcomes.

Example count:

1: 10, 2: 8, 3: 12, 4: 9, 5: 11, 6: 10

Tasks:

State hypotheses (expected = 10 for each face)

Calculate chi-square

Interpret

🔹 Q9. Survey-Based Data Collection

Surveyed 30 people about:

Their preferred browser (Chrome, Firefox, Safari, Edge)

Tasks:

Formulate hypothesis: Is the preference uniform?

Conduct goodness-of-fit test

Interpret result

🔹 Q10. Analyze a Public Dataset (e.g., Titanic Dataset)

Use the Titanic dataset (available on Kaggle):

Tasks:

Create a contingency table for Sex vs. Survival

Test independence between gender and survival

Use Python or manual calculation