

### **Module 4D Questions:**

1. Rejecting a null hypothesis of a Poisson distribution of successes implies that
  - A- Success are not independent
  - B- The probability of a success occurring is constant over time or space.
  - C-The probability of a success occurring is NOT constant over time or space.
  - D- A and B
  - E- A and C
2. Researchers observe the number of **grooming bouts** made by mice during a standardized 10-minute behavioral test. Previous studies suggest that grooming behavior follows a **Poisson distribution with mean  $\lambda = 4$**  bouts per 10 minutes.  
A sample of 50 mice is recorded, and the counts of grooming bouts are grouped into categories:

Number of Grooming Bouts	Observed Count	Expected Count
0–1	6	
2–3	18	
4–5	17	
6–7	7	
8+	2	

Using a chi-squared goodness-of-fit test and assuming grooming counts should follow a **Poisson( $\lambda = 4$ )** distribution:

1. **State the null and alternative hypotheses** for this test.
2. **Explain how to compute the expected counts** for each category using the Poisson distribution and **compute the expected counts**.
3. **Calculate the chi-squared test statistic** from the observed and expected counts.
4. **Explain what it would mean to reject the null hypothesis** in this context.