**Chi-square distribution:**

Question1: The grades in a statistics course were as follows

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade | A | B | C | D | E |
| Frequency | 14 | 18 | 32 | 20 | 16 |

Test the distribution of grades is uniform at 0.05 level of significance.

Question2: A die is tossed 180 times and following result is obtained.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 |
| F | 28 | 36 | 36 | 30 | 27 | 23 |

At 0.01 level of significance, is the die is balanced?

Question3: In 100 tosses of a coin, 63 heads and 37 tails are observed. Is this a fair coin? (α= 0.05)

Question4: Fit a binomial distribution to the following observed data obtained by tossing a coin 4 times.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No of heads | 0 | 1 | 2 | 3 | 4 | Total |
| f = Oi | 10 | 40 | 50 | 20 | 05 | 125 |

Question5: Fit a Poisson distribution to the following data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 |
| f = Oi | 109 | 65 | 22 | 03 | 01 |

Question6: Fit a normal distribution to the following set of data

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Weights | 28-31 | 32-35 | 36-29 | 40-43 | 44-47 | 48-51 | 52-55 | 56-59 | 60-63 | 64-67 |
| Frequency | 01 | 14 | 56 | 172 | 245 | 263 | 156 | 67 | 23 | 03 |

Question7: A machine is supposed to fix peanuts, hazelnuts, cashews and pecans in the ratio of 5:2:2:1. A can contain0ng 500 of these mixed nuts was found to have 269 peanuts, 112 hazelnuts, 74 cashews and 45 pecans. At the 0.05 level of significance, test the hypothesis that the machine is mixing the nuts in the ratio 5:2:2:1.

Question8: In an experiment to study the independence of hypertension on smoking habits, the following data was taken on 180 individuals.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Non-smoker | Moderate smoker | Heavy smoker |
| Yes | 21 | 36 | 30 |
| No | 48 | 26 | 19 |

Test the hypotheses that the presence or absence of hypertension is independent of smoking habits. Use 0.05 level of significance.

**Central Limit Theorem:**

Question 1. An electrical firm manufactures light bulbs that have a length of life that is approximately normally distributed, with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a random sample of 16 bulbs will have an average life of less than 775.

**T-Distribution:**

Question 1. A chemical engineer claims that the population mean yield of a certain batch process is 500 grams per milliliter of raw material. To check this claim he samples 25 batches each month. If the computed *t*-value falls between *−t*0*.*05 and *t*0*.*05, he is satisfied with this claim. What conclusion should he draw from a sample that has a mean= 518 grams per milliliter and a sample standard deviation *s* = 40 grams? Assume the distribution of yields to be approximately normal.