DOODHSAKHAR MAHAVIDYALAYA, BIDRI

DEPARTMENT OF STATISTICS

Expt. N0. 1.1 B. Sc. III Date :-

**Model sampling from Laplace and Cauchy distribution**

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Q.1 Draw a random sample of size 15 from the distribution .

f(x)=(1/16)exp(-1/8|x-7|) - ∞<x<∞

Find sample mean and variance. Compare it with theoretical values.

Q.2 Draw a random sample of size 10 from the distribution.

f(x)= K (exp(-1/3 |x-5|) - ∞<x<∞

Where K is constant and obtain median and mean of your sample.

Q.3 Draw a random sample of size 12 from the distribution.

f(x)=(1/2)exp|-x| - ∞<x<∞

Find mean and standard deviation of your sample.

Q.4 Draw a random sample of size 15 from the distribution.

f(x)=K exp(-3/2 |x| ) - ∞<x<∞

Q.5 Draw a random sample of size 15 from a standard Laplace distribution and obtain the mean and median of your sample.

Q.6 Draw a random sample of size 11 from the distribution.

f(x)= - ∞<x<∞

Q.7 Draw a random sample of size 15 from the Cauchy distribution with x=4and μ=5 and obtain standard derivation of your sample . . Compare it with theoretical values.

Q.8 Draw a random sample of size 10 from the distribution.

f(x)= - ∞<x<∞

Obtain mean of your sample.

Q.9 Draw a random sample of size 13 from the distribution.

f(x)= - ∞<x<∞

Q.10 Draw a random sample of size 15 from the distribution.

f(x)= - ∞<x<∞

Q.11 Draw a random sample of size 15 from the standard Cauchy distribution. . Compare it with theoretical values.

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Expt. N0. 1.2 B. Sc. III Date :-

**Model sampling from Pereto distribution**

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1. Draw a random sample of size 12 from pereto distribution.

α =3, β=1.

Calculate mean and variance and compare with theoretical values.

1. Draw a random sample of size 10 from pereto distribution.

α =3, β=3.

Calculate mean and variance and compare with theoretical values.

1. Draw a random sample of size 10 from pereto distribution.

α =3, β=4.

Calculate mean deviation about mean.

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Expt. N0. 1.3 B. Sc. III Date :-

**Model sampling of Truncated Poisson and Binomial distribution**

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Q.1 Draw a model sample of size 7 from B(8,0.5) truncated at x=0 and obtain sample Q.D.

Q.2 Draw a model sample of size10 from B(12,1/3) truncated at x=0. . Compare it with theoretical values.

Q.3 Draw a model sample of size 10 from B(5,0.25) truncated at x=0.

Q.4 Draw a model sample of size10 from Poisson distribution with λ=0.5 truncated at x=0.

Q.5 Draw a model sample of size 8 from Poisson distribution with Mean 3.2 truncated at x=0.

Q.6 Draw a model sample of size 9 from Poisson distribution with λ=2 truncated at x=0. . Compare it with theoretical values.

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Expt. N0. 1.4 B. Sc. III Date :-

**Model sampling of Truncated Normal and Exponential distribution**

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Q.1 Draw a model sample of size10from normal distribution with mean 3 & variance 25

truncated to the left below 4. . Compare it with theoretical values.

Q.2 Draw a model sample of size 5 from normal distribution with mean 3.2 & variance 4

truncated to the right above 6 .

Q.3 Draw a model sample of size 9 from N(5,16) truncated of both sides below 7 and above 15.

Q.4 Draw a model sample of size12 from exponential distribution with parameter 0.32 truncated

below 2 . Also compare sample mean with theoretical mean .

Q.5 Draw a model sample of size15 from exponential distribution with mean 7.5 truncated at

a =5. Obtain M.D. from mean of the sample. . Compare it with theoretical values.

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Expt. N0. 1.5 B. Sc. III Date :-

**Model sampling from bivariate Normal distribution**

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Q.1 Let (X,Y) follows bivariate normal distribution with parameter μ1=5,μ2=10,σ1=1,σ2=5,P=0.8 draw a random sample of size 10 from this distribution.

Q.2 Let (X,Y) follows bivariate normal distribution with parameter μ1=3,μ2=1,σ1=4,σ2=5,P=0.6 draw a random sample of size 15 from this distribution.

Q.3 Let (X,Y)~BN(0,0,,8,1,0.5)draw

I )A model sample of size 10 from this distribution.

ii)A model sample of size 7 from conditional distribution of X given Y=3

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Expt. N0. 1.6 B. Sc. III Date :-

**Fitting of Truncated binomial distribution**

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Q.1 Fit a truncated binomial distribution truncated at x=0 to the following data and test the

goodness of fit.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| F | 3 | 10 | 16 | 24 | 20 | 12 | 5 | 5 |

Q.2 Fit a truncated binomial distribution truncated at x=0 to the following data.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 |
| Y | 15 | 81 | 136 | 215 | 147 | 16 |

Q.3 Fit a truncated binomial distribution truncated at x=0 to the following data .

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 |
| F | 5 | 25 | 35 | 20 | 13 | 7 |

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Expt. N0. 1.7 B. Sc. III Date :-

**Fitting of Truncated Poisson distribution**

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Q.1 Fit a truncated Poisson distribution truncated at x=0 to the following data .

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No of females (x) in the family | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| No of females (f) | 216 | 60 | 56 | 30 | 12 | 3 | 0 | 2 |

Also test goodness of fit.

Q.2 Fit a truncated Poisson distribution truncated at x=0 to the following data .

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| F | 110 | 60 | 15 | 8 | 3 | 2 | 1 | 1 |

Q.3 Fit a truncated Poisson distribution truncated at x=0 to the following data .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| F | 90 | 42 | 12 | 9 | 3 | 1 | 0 |

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Expt. N0. 1.8 B. Sc. III Date :-

**APPLICATION OF MULTINOMIAL DISTRIBUTION**

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1. A die is rolled five times, then find the probability of getting 2 ones and 3 sixes.
2. Suppose that two chess players had played numerous games and it was determined that probability that player A win is 0.4, probability that player B win is 0.35 and the game would end in a draw is 0.25. Then find the probability that player A win 7 games and player B win 2 games and 3 games would be drawn in the playing of 12 games together.
3. The box contains 10 marbles 2 of which are red, 3 are green and 5 are blue. We randomly selected 4 marbles from the box with replacement. Then what is the probability that selecting 2 green and 2 blue marbles?
4. A fair die is rolled 6 times. Find the probability that number 1 appear 2 times, number 2 or3 appears 2 times, number 4 or 5 appears 1 time and 6 appear one time.

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Expt. N0. 1.9 B. Sc. III Date :-

**Application of bivariate Normal distribution**

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Q.1 Let the bivariate normal distribution with

determine the parameters & find the value of C

Q.2 Let (X,Y) ~BN (3,1,42,52,0.6).

Find i)P[-2<Y<3] ii)P[X≥2] iii)P (3<Y<8/X=7) and v) P (-3<X<3/Y=-2 )

Q.3 The following is the summary of scores obtained by candidates in 2 different tests.

|  |  |  |
| --- | --- | --- |
|  | Test A | Test B |
| Mean | 85 | 90 |
| Variance | 10 | 16 |

Assume that the scores in 2 tests A&B have a bivariate normal distribution with correlation coefficient 0.8.i) If the score of a candidate in test A is 80 what is the probability that score in test B will be greater than 90.ii)What is the probability that that the sum of scores in two tests of a candidate will be greater than 200

Q.4 Let (X ,Y) follows bivariate normal distribution with parameters (3,1,42,52,p)

If P(-3<x<9/y=0.9378)than find p

Q.5 Let(X,Y )be BVN (μ1, μ2 , σ12 , σ22 , ρ) for which

E(X/Y=y) =3.7-0.15y

E(Y/X=x)=0.4-0,6 x and var (Y/X)= 3.64

Find the parameters of the bivariate normal distribution.

Q.6 For (X, Y) with the following p .d.f . f(x ,y)=c exp [ -(9x2+16xy+16y2-27x-16y)]

Find i) P (0.6<x<2.8/y=-0.6)

ii) p (-0.25<y<0.65/X=2.4)

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Expt. N0. 1.10 B. Sc. III Date :-

**DATA INPUT / OUT PUT**

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Q. 1 Enter the following small data sets :

i) 4, 5, 6, 3, 8, 10, 9, 2, 7.

Using C- function and scan function.

ii) 1,1,1,1,2,2,2,3,3,7,9,9,10.

Use rep function along with C function.

iii) 1, 2, 3, 4, 5, 100, 105, 110, 115, 120.

Use seq function and sequence operator (:).

iv) 1, 1, 1, 1, 25, 30, 35, 40, -4, -3, -2, -1.

Use rep, seq, and sequence operator (:) along with C function.

Q.2 Following table shows the frequency distribution of light of electric bulb (in hrs.)

Sr. No. Mid point No. of Bulbs

1 650 88

2 750 77

3 850 184

4 950 78

5 1050 36

Enter the data using the functions (a) data frame (b) matrix (c) edit

Q. 3 Enter the following vectors :

X= (1,2,3,7) Y= (7,8) W = 15 Z= (1,4,7)

Compute :

1. X+Y (2) Y -W (3) X+Z (4) Z / W (5) W+Z.

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Expt. N0. 1.11 B. Sc. III Date :-

**DIAGRAMATIC REPRESENTATION OF DATA**

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Q. 1 Following table gives the Birth rates per thousand of different countries over a certain

Period.

Country Birth rate

India 83

Germany 16

U.K. 20

China 40

New Zee land 30

Sweden 15

Plot simple bar diagram.

Q.2. A group of 25 people are surveyed as to their soft-drinking preference.

The categories are:

1 - Limca 2 - Coca-Cola 3 - Pepsi 4 - 7 up

The data are :

3 4 1 1 3 4 3 3 1 3 2 1 2

1 2 3 2 3 1 1 1 1 4 3 1

Plot simple bar diagram.

Q.3. For the following data set construct subdivided Bar diagram.

Year Tables Chairs

1990 185 146

1991 242 182

1992 169 254

1993 126 488

19 94 96 112

1995 148 162

1996 176 242

1997 194 286

Q.4. The number of blood donations in the years 1995, 2000 &2005 in various blood group are as

follows.

Year O A B AB

1995 1154 586 775 155

2000 1700 1125 1280 560

2005 1500 1410 1440 756

Represent the data by multiple bar diagram.

Q.5. Below is given average expenditure per month of some families in a year.

Item Expenditure

Food 945

Clothing 325

Rent 520

Medical 210

Other 400

Draw a pie diagram for the data given above.

Q.6. Distribution of Marks in statistics and mathematics for the students in a certain test are given below.

Student No. : 1 2 3 4 5 6 7 8 9 10

Stat. : 25 24 32 36 38 40 39 42 41 45

Maths. : 70 80 55 75 59 65 48 50 54 56

Draw a scatter plot. @@@@@

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Expt. N0. 1.12 B. Sc. III Date :-

**Graphical Representation of Data**

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Q.1

Consider a data of 30 observations:

29.5 25.5 28.6 13 13.3 7.5 3 2.2 1.5 1.2 0.7 0.5 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.1 24.5 24 25 25.6 14 15 15.2 0.5 28 30.

Plot Histogram for above data.

Q.2. The monthly profits in rupees of 100 shops are distributed as follows.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Profit  (in Rs.) | 0-100 | 100-200 | 200-300 | 300-400 | 400-500 | 500-600 |
| No. of  Shops | 12 | 18 | 27 | 20 | 17 | 6 |

1. Plot Histogram
2. Plot Frequency polygon.

Q.3 The weekly wage (in Rs.) of 160 workers of a firm is as follows.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Wage in Rs. | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 |
| No. of Workers | 10 | 13 | 18 | 21 | 24 | 28 | 20 | 10 | 8 | 7 |

1. Draw less than ogive curve.
2. Draw greater than ogive curve.

Q.4.

The Weight in kgs of 240 womens is as follows:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Wt. in Kg. | 38-40 | 40-42 | 42-44 | 44-46 | 46-48 | 48-50 | 50-52 | 52-54 | 54-56 |
| No. of Women | 12 | 25 | 30 | 44 | 60 | 40 | 20 | 6 | 3 |

Draw Histogram, frequency polygon, less than and greater than ogive curve.

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Expt. N0. 1.13 B. Sc. III Date :-

**Computation of probabilities of type –I and type –ll errors and power of test**

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Q.1 A coin is tossed 30 times in order to test whether coin is unbiased the null hypothesis that the coin is unbiased is rejected if more than 22 heads occur. If alternative hypothesis is H1 : P= , where P is probability of getting head in a single toss. Find the probabilities of the both kind of errors and the power of the test .

Q.2 An urn contains 25 marbles of which θ are white and remaining are black to the hypothesis

H0 :θ=10 against H1 :θ=12 , following test procedure is suggested .Draw 4 marbles with replacement from the urn and reject H0 if all of them are white . Calculate the power of test also draw the power curve.

Q.3 A Bernoulli experiment with unknown probability P of success is performed 12 times to test following simple hypothesis H0: P=0.7 against H1: P=0.2 the null hypothesis is rejected if the number of success is greater than 9 . Calculate the probabilities of errors of both the kinds.

Q.4 An urn contains 10 balls of which m are white and remaining black .To test H0 : m=5 against

H1: m=4 the following two tests are used

i)reject H0 if they are of the same colour .ii) reject H0 if they are of different colors .Determine the probabilities of type –I and type –II errors for both the tests (a sample of two balls is selected without replacement)

Q.5 A random sample of size 25 is drawn from N(μ,22)distribution it is desired to test H0 :μ=0 against H1:μ=1 at 5% level of significance .H0 is rejected if ΣX1≥c find the value of the constant c and power of the test.

Q.6 A sample of size one from uniform distribution f(x, θ)=1/θ, o≤x≤θ is drawn to test the hypothesis H0:θ=1 against H1≔2 .The hypothesis H0 is accepted if observed value is X≤0.5 .Find the probabilities of committing type I and II errors and also find the power of the test .

Q.7 A sample of size one from exponential distribution with parameter θ is drawn to test the hypothesis H0 :θ =1 against H1 : θ =2 the hypothesis H0 is accepted if observed value is X≤0.5 find the probabilities of committing type 1 and 2 errors and also find the power of the test .

Q.9 a) Let p is the probability that a given die shows even number . To test H0:p=1/2 against

H1:p=1/3 following procedure is adopted. Toss the die twice and accept H0 if both

times it shows even number . Find probabilities of type-I error and type-II errors.

b) In a shipment of 10 articles θ are defectives. The hypothesis that H0: θ=5 is rejected if two articles drawn at random without replacement are either good or defectives. Otherwise hypothesis is accepted. Obtain if H1: θ=4. Hence draw the power curve.

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Expt. N0. 1.14 B. Sc. III Date :-

**Model sampling from Logistic distribution using R-software**

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1. Draw a random sample of size 12 from Logistic distribution.

μ=0, σ=1. Calculate mean and variance and compare with therotical values.

1. Draw a random sample of size 10 from Logistic distribution.

μ=-2, σ=2. Calculate mean and variance and compare with thereotical values.

1. Draw a random sample of size 10 from Logistic distribution.

μ=2, σ=3. Calculate mean deviation about mean.

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Expt. N0. 1.15 B. Sc. III Date :-

**Fitting of Binomial and Poisson distribution using R-Software**

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Q.1 Following data represent the number of seeds germinated among 10 seeds on damp.

Fit a binomial distribution and test the goodness of fit . Plot expected frequencies

against observed frequencies and comment on adequacy of the binomial model.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| f | 6 | 20 | 28 | 12 | 8 | 6 | 0 | 0 | 0 | 0 | 0 |

Q.2 As a part of quality improvement project focused on a delivery of mail at a department office within large company, data were gathered on the number of different addresses that had to be changed so that the mail could be redirected to the correct mail stop. Fit the binomial distribution and test goodness of fit.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 |
| f | 5 | 20 | 45 | 20 | 10 |

Q.3 When the first 392 pages of a book of 1200 pages were read, the distribution of

printing mistakes was found to be as follows. Fit a Poisson distribution to the data

and test.Also plot expected frequencies against observed frequencies and comment.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 | 5 | >6 |
| f (No. of pages) | 275 | 72 | 30 | 7 | 5 | 2 | 1 |

Q.4 Atmospheric dust particles at a particular location cause an environmental problem. Focusing a powerful microscope on the particle and making counts ,The number (X) of particles within a unit volume of observed. The result of tests on 100 such volumes are shown below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X The number of particle within a unit volume | 0 | 1 | 2 | 3 | 4 | > 5 |
| F | 13 | 24 | 30 | 18 | 7 | 8 |

Fit a Poisson distribution and test goodness of fit.

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Expt. N0. 1.16 B. Sc. III Date :-

**Fitting of Normal Distribution using R-Software**

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Q.1 The following table displays the frequency distribution of heights of trees in a locality. Fit a normal distribution to the data and estimate expected frequencies. Plot expected frequencies versus observed frequencies to judge adequacy of the model.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class  Interval | 65-66 | 66-67 | 67-68 | 68-69 | 69-70 | 70-71 | 72-73 | 73-74 |
| Trees | 2 | 10 | 16 | 37 | 43 | 39 | 20 | 13 |

Q.2 Following is the frequency distribution of daily emission of sulfur oxide (in some units). Fit a normal distribution to this data and test the goodness of fit.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class | 5-9 | 9-13 | 13-17 | 17-21 | 21-25 | 25-29 | 29-33 |
| freq | 3 | 10 | 14 | 25 | 17 | 9 | 2 |

Q.3 The Following table gives Baseball throws for distance by first year high school girls.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance in Feet | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 | 65-75 | 75-85 | 85-95 | 95-105 | 105-115 | 115-125 | ≥125 |
| No. of girls | 1 | 2 | 7 | 25 | 33 | 53 | 64 | 44 | 51 | 27 | 11 | 5 |

Fit a normal distribution and find the theoretical frequencies for the classes of the above frequency distribution.

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Expt. N0. 1.17 B. Sc. III Date :-

**Fitting of Log-normal Distribution using R-Software**

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Q.1 Fit a log normal distribution to the following data on Monthly expenditure on sugar (in Rs)

and test the goodness of fit .

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X | 10-12 | 12-14 | 14-16 | 16-18 | 18-20 | 20-22 |
| No/. families | 34 | 54 | 62 | 50 | 36 | 21 |
| X | 22-24 | 24-26 | 26-28 | 28-30 | 30-32 | 32-34 |
| No/. families | 15 | 9 | 6 | 4 | 2 | 2 |

Q.2 The following table shows monthly consumption of electricity in a certain city .Fit log normal

distribution to the data and test the goodness of fit.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 10 | 14 | 18 | 22 | 26 | 30 | 34 |
| No/.families | 35 | 50 | 53 | 48 | 36 | 26 | 19 |
| X | 38 | 42 | 46 | 50 | 54 | 58 |  |
| No/.families | 8 | 6 | 3 | 4 | 2 | 2 |  |

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Expt. N0. 1.18 B. Sc. III Date :-

**Analysis of Completely Randomized Design(CRD) using R-Software**

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Q.1 An Engineer wishes of asses the effect of 4 treatments on 20 thermal batteries, the observations in second are given below. Perform the analysis of variance and state the conclusion.

|  |  |  |  |
| --- | --- | --- | --- |
| Treatments | | | |
| l | ll | lll | lv |
| 73 | 74 | 68 | 71 |
| 73 | 74 | 69 | 71 |
| 73 | 74 | 69 | 72 |
| 75 | 74 | 69 | 72 |
| 75 | 75 | 70 | 73 |

Q.2 The weight in grams of wires each of one meter length of 5 varieties are given below .Test the hypothesis that there is no difference in the mean Wight of the wires of different varieties.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| varieties. | | | | |
| l | ll | Lll | lv | v |
| 1.30 | 1.28 | 1.32 | 1.31 | 1.30 |
| 1.32 | 1.35 | 1.29 | 1.29 | 1.32 |
| 1.36 | 1.33 | 1.28 | 1.33 | 1.35 |
| 1.35 | 1.34 | 1.31 | 1.31 | 1.35 |
| 1.32 | 1.34 | 1.31 | 1.31 | 1.35 |
| 1.32 | - | 1.33 | 1.32 | - |
| 1.37 | - | 1.30 | - | - |

Q.3 The reflective properties of 4 types of points in 19 tests are as follows.

|  |  |  |  |
| --- | --- | --- | --- |
| l | ll | Lll | lv |
| 195 | 140 | 195 | 120 |
| 150 | 195 | 239 | 155 |
| 205 | 165 | 115 | 150 |
| 110 | 145 | 235 | 150 |
| 160 | - | 225 | - |
| 145 | - | - | - |

Test : 1)Whether the reflective powers of all the points are same

2)Test the difference between the reflective powers of points l and lv,l and lll

Q.4 Types of fertilizers are assigned to plots and the yields of the sugarcane are as follows.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Fertilizers | | | | | | |
| A | 57.0 | 55.0 | 62.1 | 74.5 | 86.7 | 42.0 |
| B | 64.8 | 66.6 | 69.5 | 61.1 | 91.8 | - |
| C | 70.7 | 64.5 | 69.4 | - | - | - |
| D | 63.3 | 67.1 | 69.1 | 72.7 | - | - |
| E | 70.0 | 74.5 | 76.5 | 86.6 | 94.7 | 43.2 |

Test : 1)Analysis the data and test the difference between the fertilizers effects.

2)Test the difference between the effects fertilizers A&B,A&E B&E.

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Expt. N0. 1.19 B. Sc. III Date :-

**Analysis of Randomized Block Design(RBD) using R-Software**

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Q.1 Four varieties of potatoes are planted on 5 plots of same area and each with 5 different fertilizers the observations are as follows.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Varieties | Fertilizers | | | | |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 1.0 | 2.2 | 2.6 | 1.8 | 2.1 |
| 2 | 2.5 | 1.9 | 2.3 | 2.6 | 2.2 |
| 3 | 1.7 | 1.9 | 2.2 | 2.0 | 2.1 |
| 4 | 2.1 | 1.8 | 2.5 | 2.3 | 2.4 |

Analysis the data and test 1) the equality of the effects of varieties 1 and 3, 2 and 4

Q.2 Analyse the R.B.D and give your conclusion about the block effects and the treatment effects. Also test the equality of effects of the fertilizers 1 and 3,2 and 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Blocks | | | | |
| 1 | 2 | 3 | 4 | 5 |
| A-5 | C-3 | A-3 | B-4 | C-4 |
| B-4 | A-2 | C-2 | A-5 | D-4 |
| C-4 | D-0 | D-3 | C-5 | A-3 |
| D-4 | B-1 | B-5 | D-6 | B-1 |

Q.3 Five lots of apples are stored in 6 different temperatures 200,250,300,350,400,450 .The numbers of rotten apples in each case is recorded .Analyze this design as R. B .D

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Temp | | | | | | |
| Apple lots | 20 | 25 | 30 | 35 | 40 | 45 |
| 1 | 8 | 5 | 7 | 10 | 13 | 12 |
| 2 | 14 | 10 | 3 | 5 | 9 | 18 |
| 3 | 12 | 8 | 6 | 9 | 5 | 10 |
| 4 | 9 | 8 | 5 | 7 | 4 | 3 |
| 5 | 12 | 9 | 4 | 8 | 6 | 9 |

Q.4 A series of 5 varieties was grown in 4 blocks of a plot .The yields were as follows.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Blocks |  |  |  |  |
| Varieties | 1 | 2 | 3 | 4 |
| 1 | 750 | 450 | 1550 | 1400 |
| 2 | 1250 | 1320 | 2000 | 1850 |
| 3 | 700 | 100 | 1000 | 850 |
| 4 | 150 | 200 | 1300 | 1500 |
| 5 | 1020 | 1900 | 1330 | 1600 |

Analyse the data and test the equality of the effects of the blocks I and IV and varieties 3 and4.

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