**SHAHAB ULLAH**

**12958**

**ASSIGNMENT**

**SUBMITTED TO SIR RAZA**

Attempt all the questions, each question having (5) marks

Q1. Take 100 observations randomly and construct the followings:

* Discrete group frequency distribution table

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45 | 50 | 51 | 54 | 53 | 53 | 52 | 55 |  |
| 57 | 54 | 58 | 60 | 62 | 59 | 61 | 61 |  |
| 62 | 64 | 63 | 48 | 65 | 53 | 66 | 65 | 54 |
|  |  |  |  |  |  |  |  |  |
| 45 | 50 | 51 | 54 | 53 | 53 | 52 | 55 |  |
| 57 | 54 | 58 | 60 | 62 | 59 | 61 | 61 |  |
| 62 | 64 | 63 | 48 | 65 | 53 | 66 | 65 | 54 |
|  |  |  |  |  |  |  |  |  |
| 45 | 50 | 51 | 54 | 53 | 53 | 52 | 55 |  |
| 57 | 54 | 58 | 60 | 62 | 59 | 61 | 61 |  |
| 62 | 64 | 63 | 48 | 65 | 53 | 66 | 65 | 54 |
|  |  |  |  |  |  |  |  |  |
| 45 | 50 | 51 | 54 | 53 | 53 | 52 | 55 |  |
| 57 | 54 | 58 | 60 | 62 | 59 | 61 | 61 |  |
| 62 | 64 | 63 | 48 | 65 | 53 | 66 | 65 | 54 |

* Contentious Class Boundaries Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | F | Class boundaries | Mid-point(x) | fx |
| 45-49 | 8 (f0) | 44.5-49.5 | 47 | 367 |
| 50-54 | 36 (fm) | 49.5-54.5 | 52 | 1872 |
| 55-59 | 16 (f1) | 54.5-59.5 | 57 | 912 |
| 60-64 | 28 | 59.5-64.5 | 62 | 1736 |
| 65-69 | 12 | 64.5-69.5 | 67 | 804 |
| Total | 100 |  |  | ∑fx=5700 |

Q2 Find

* Arithmetic Mean

AM=$\frac{∑fx}{∑f}$

Putting the values

 =5700/100

 =57

* Geometric Mean

|  |  |  |  |
| --- | --- | --- | --- |
| X | F | Logx | f.logx |
| 47 | 8 | 1.6720 | 13.376 |
| 52 | 36 | 1.7160 | 61.776 |
| 57 | 16 | 1.7558 | 28.0928 |
| 52 | 28 | 1.7923 | 50.1844 |
| 57 | 12 | 1.8260 | 21.912 |
|  | ∑f=100 |  | ∑f.logx=175.3412 |

Putting the values

GM=antilog [ $\frac{∑f.logx }{∑f}$]

GM=antilog [175.3412/100]

GM=antilog [1.753412]

GM=56.6776

* Harmonic Mean

HM=$\frac{∑f}{∑( f/x)}$

|  |  |  |
| --- | --- | --- |
| F | X | f/x |
| 8 | 47 | 0.1702 |
| 36 | 52 | 0.6923 |
| 16 | 57 | 0.2807 |
| 28 | 62 | 0.4516 |
| 12 | 67 | 0.1791 |
| ∑f=100 |  | ∑(f/x)=1.7739 |

Putting the values

HM=$\frac{∑f}{∑( f/x)}$

 =100/1.7739

 =56.37

* Median and Mode

Median= $\frac{L+h}{f}$(n/2-c)

|  |  |  |  |
| --- | --- | --- | --- |
| Marks | f | Class boundaries | cf |
| 45-49 | 8 | 44.5-49.5 | 8 |
| 50-54 | 36 | 49.5-54.5 | 44 |
| 55-59 | 16 | 54.5-59.5 | 60 |
| 60-64 | 28 | 59.5-64.5 | 88 |
| 65-69 | 12 | 64.5-69.5 | 100 |
|  |  |  |  |

= size of ($\frac{n}{2}$)th item

100/2=50

Putting values

=54.5+5/16 (50-44)

=54.5+5/16 (6)

=54.5+0.3125 (6)

=54.5+1.875

=56.375

* Mode

Mode= L+[$\frac{(fm-f0) }{(2fm-f0-f1)] }$\*h

Taking values from frequency

=49.5[36-8/2(36)-8-16] \*5

=49.5+ [28/72-8-16] \*5

=49.5+ [20/48] \*5

=49.5+. [0.5833] \*5

=49.5+2.9165

Mode=52.416

Q3 find quartiles of the Discrete Frequency Distribution Table:

Q1, Q2 &Q3

Q1=$\frac{L+h}{f}$\*($\frac{N}{4}$-Cf)

|  |  |  |  |
| --- | --- | --- | --- |
| Marks | F | Class boundaries | C.f |
| 45-49 | 8 | 44.5-49.5 | 8 |
| 50-54 | 36 | 49.5-54.5 | 44 |
| 55-59 | 16 | 54.5-59.5 | 60 |
| 60-64 | 28 | 59.5-64.5 | 88 |
| 65-69 | 12 | 64.5-69.5 | 100 |
| Total | 100 |  |  |

Q1= size of [100/4]th item

=size of 25 item

First quartile class is 50-54

So h=54.5-49.5

=5

Therefore

Q1=49.5+[5/36][25-8]

=49.5+[0.1388][17]

=49.5+2.3596

Q1=51.8596

Q2=L+h/f (2N/4-CF)

Q2=size of [2(100)/4]th item

=size of 50th item

2nd quartile class is 55-59

Therefore

Q2=54.5+[5/16]\*[50-44]

Q2=54.5+[0.3125]\*[6]

=54.5+1.875

=56.375

Q3=$\frac{L+h}{f}$[$\frac{N}{4}$-C.f]

Q3= size of [3(100)/4]th item

Q3= size of 75th item

3rd quartile class is 60-64

Therefore

Q3=59.5+[5/28][75-60]

=59.5+[0.1785][15]

=59.5+2.6775

Q3=62.1775

Q4. Find the followings of the Discrete grouped frequency distribution table

* Range

Range=L-S

|  |  |  |
| --- | --- | --- |
| Marks | F | Class boundaries |
| 45-49 | 8 | 44.5-49.5 |
| 50-54 | 36 | 49.5-54.5 |
| 55-59 | 16 | 54.5-59.5 |
| 60-64 | 28 | 59.5-64.5 |
| 65-69 | 12 | 64.5-69.5 |
| Total | 100 |  |

Lower class boundary of the lowest class=S=44.5

Upper class boundary of the highest class=L=69.5

Range=L-S

=69.5-44.5

Range=25

* Quartile range

I.R=Q3-Q1

=62.1775-51.8596

I.R=10.3175

* Semi inter quartile range

QD=$\frac{Q3-Q1}{2}$

=62.1775-51.8596/2

=10.3179/2

QD=5.15895

Variance=S2 =∑f(x-ẍ)2/∑f

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F | X | Fx | x-ẍ | (x-ẍ)2 | F(x-ẍ)2 |
| 8 | 47 | 376 | -10 | 100 | 800 |
| 36 | 52 | 1872 | -5 | 25 | 900 |
| 16 | 57 | 912 | 0 | 0 | 0 |
| 28 | 62 | 1736 | 5 | 25 | 700 |
| 12 | 67 | 824 | 10 | 100 | 1200 |
| Total 100 |  | Total 5700 |  |  | Total 3600 |

* Standard Deviation

S=$\sqrt{}∑f(x-ẍ)$2/∑f

S=$\sqrt{36}$

S=6

* Coefficient of variance

CV=$\frac{S}{ ẍ}$\*100

=$\frac{6}{57}$\*100

=0.1052\*100

CV=10.5263