

**MT-2005: Probability &
Statistics BSCS (Part A)**
(A, B, C, D, E, F, G, H, J, K)

Tuesday, 27th February , 2024

Course Instructor(s)

Dr. Muhammad Usman Ashraf, Dr. Neelam,
Ms. Amara , Ms. Kiran

Sessional-I Exam

Total Time: 0.5 Hour

Total Marks: 25

Total Questions: 02

Semester: SP-2024

Campus: Islamabad

Dept: Computer Science

Student Name

Roll No

Section

Student Signature

Vetted by

Vetter Signature

CLO #:

Q1: The following data gives the weight of 40 students at a university:

138	164	150	132	144	125	149	157
147	136	148	152	144	168	126	138
163	119	154	165	146	173	142	147
140	135	161	145	135	142	150	156
158	140	153	128	146	176	135	145

Construct a frequency distribution by taking a class interval of width 9 and starting first class interval from the minimum observation of the data. [10 marks]

CLO #:

Q2:

Part A:

A sociologist has been studying the yearly changes in the number of convicts assigned to the largest correctional facility in the state. His data are expressed in terms of the

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percentage increase in the number of prisoners (a negative number indicates a percentage decrease). The sociologist's most recent data are as follows:

1999	2000	2001	2002	2003	2004
– 5%	6 %	9 %	4 %	7 %	– 6 %

(a) Calculate the average percentage increase using only the 1999-2002 data.

(b) A new penal code was passed in 1998. Previously, the prison population grew at a rate of about 2 percent per year. What seems to be the effect of the new penal code?

Part B:

Following are the marks obtained a Mathematics course by a class of 20 students

11	53	72	48	38	39	39	67	24	61
36	56	57	69	55	70	65	43	42	42

Compute Mean and Standard deviation of the marks [08 marks+ 07 marks = 15 marks]

**MT-2005: Probability &
Statistics BSCS (Part B)**
(A, B, C, D, E, F, G, H, J, K)

Tuesday, 27th February , 2024

Course Instructor(s)

Dr. Muhammad Usman Ashraf, Dr. Neelam,
Ms. Amara , Ms. Kiran

Sessional-I Exam

Total Time: 0.5 Hour

Total Marks: 30

Total Questions: 02

Semester: SP-2024

Campus: Islamabad

Dept: Computer Science

Student Name

Roll No

Section

Student Signature

Vetted by

Vetter Signature

CLO #:

Q1:

Part A:

Differentiate between the following terms with example

- a) Parameter and statistics
- b) Primary source and secondary source of data.
- c) Quantitative variable and qualitative
- d) Discrete and continuous variables

Part B:

The following data indicate income (x) and percentage expenditure on food (y) of families. Construct a bivariate frequency table classifying x into intervals 200 – 300, 300 – 400, . . . and y into 10 – 15, 15 – 20,

x	y	x	y	x	y	x	y
550	12	225	25	680	13	202	29
689	11	623	14	310	26	300	25
255	27	523	12	310	18	640	20

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425	16	492	18	317	18	420	16
512	18	555	15	587	21	384	17
600	15	690	12	325	23	643	19
400	19						

[08 marks+ 07 marks = 15 marks]

CLO #:

Q2:

The distribution of the insurance money paid by an automobile insurance company to owners of automobiles in a particular year is given below:

Amount paid	Frequency
below 1500	52
1500–1999	108
2000–2499	230
2500–2999	528
3000–3499	663
3500–3999	816
4000–4499	993
4500–4999	825
5000 and above	650

- Calculate the median amount of money paid.
- Calculate 85th percentile and lower quartile for amount of money paid.

[07 marks+ 08 marks = 15 marks]

Data-A

Q No 1

min. value = 119, , max. value = 176

Class limits	Tally	f	C.B.	Mod Point
119 - 127	III	3	118.5 - 127.5	123
128 - 136	NI	6	127.5 - 136.5	132
137 - 145	NI NI	10	136.5 - 145.5	141
146 - 154	NI NI NI	11	145.5 - 154.5	150
155 - 163	NI	5	154.5 - 163.5	159
164 - 172	III	3	163.5 - 172.5	168
173 - 181	II	2	172.5 - 181.5	177
		40		

119 - 128	3	123.5
128 - 137	6	132.5
137 - 146	10	141.5
146 - 155	11	150.5
155 - 164	5	159.5
164 - 173	3	168.5
173 - 182	2	177.5

Q no. 2 (A)

(a) 1999 - 2002

$$\sqrt[4]{95 \times 106 \times 109 \times 104}$$

$$= 103.3647$$

(4)

(b) 102.3293

(4)

increase $\Rightarrow 0.3293\%$ increase in
prison pop after new penal code.

Q no. 2

(1) $\Sigma X = 987$, $n = 20$, $\Sigma X^2 = 53659$

(2) $\bar{X} = \frac{987}{20} = 49.35$

$$S = \sqrt{\frac{\Sigma X^2}{n} - \left(\frac{\Sigma X}{n}\right)^2} = \sqrt{\frac{53659}{20} - (49.35)^2}$$

(4)

$$S = \sqrt{247.5275}$$

$$= 15.7336$$

$$S = \sqrt{\frac{\Sigma (X - \bar{X})^2}{n-1}} = 16.14$$

Part B:

The following data indicate income (x) and percentage expenditure on food (y) of families. Construct a bivariate frequency table classifying x into intervals 200–300, 300–400, ..., and y into 10–15, 15–20, ...

550	12	225	25	680	13	302	29
680	11	525	14	340	26	306	25
255	27	525	12	340	18	640	20
425	16	492	18	347	18	620	16
542	18	555	15	587	21	684	17
608	15	690	12	325	23	643	19
400	19						

Expenditure (y)	Income x					
	under 200	200–300	300–400	400–500	500–600	600–700
Percentage under 10–15					(2)	(4) 6
15–20			(3)	(4)	(2)	(2) 11
20–25			(1)		(1)	1 (1) 3
25–30	(3)		(2)			5
	3	6	6	4	5	25

$$P_{85} = l + \frac{h}{f} \left(\frac{85n}{100} - c \right)$$

$$\frac{85}{100}(n) = 0.85(4865) = 4135.25$$

$$\boxed{\frac{4500 - 4999}{100}} \quad P_{85} \rightarrow \text{group}$$

$$P_{85} = 4500 + \frac{499}{825} (4135.25 - 3390)$$

$$P_{85} = 4950.76333 \quad \text{amount}$$

Question #2 [07 marks+ 08 marks]

The distribution of the insurance money paid by an automobile insurance company to owners of automobiles in a particular year is given below:

Amount paid	Frequency	c.f
below 1500	52	52
1500-1999	108	160
2000-2499	230	390
2500-2999	528	918
3000-3499	663	1581 $\rightarrow Q_1$
3500-3999	816	2397
4000-4499	993	3390 \rightarrow Median
4500-4999	825	4215 $\rightarrow P_{85}$
5000 and above	650	4865

- a. Calculate the median amount of money paid.
b. Calculate 85th percentile and lower quartile for amount of money paid.

(a)
$$\text{Median} = l + \frac{h}{f} \left(\frac{n}{2} - c \right)$$

$$\left(\frac{n}{2} \right)^{\text{th}} \text{ Median} = \frac{4865}{2} = 2432.5$$

$$\boxed{4000 - 4499} \quad \text{Median}$$

$$\text{Median} = 4000 + \frac{499}{993} (2432.5 - 2397) = 4017.83$$

Amount

(b)
$$Q_1 = l + \frac{h}{f} \left(\frac{n}{4} - c \right)$$

$$\left(\frac{n}{4} \right)^{\text{th}} = \frac{4865}{4} = 1216.25^{\text{th}} \text{ observation}$$

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$$Q_1 = 3000 + \frac{499}{663} (1216.25 - 918) = 3224.4747$$

amount