AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

MODEL EXAMINATION PAPER 2023 AND ONWARDS

Business Statistics Paper II

Time: 1 hour 5 minutes Marks: 20

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

I agree that this is my name and school. **Candidate's Signature**

RUBRIC

2. There are SIX questions. Answer ALL questions. Choices are specified inside the paper.

3. When answering the questions:

   Read each question carefully.
   Use a black pointer to write your answers. DO NOT write your answers in pencil.
   Use a black pencil for diagrams. DO NOT use coloured pencils.
   DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
   Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ( ).

5. A formulae list is provided on page 2. You may refer to it during the paper, if you wish.

6. You may use a scientific calculator if you wish.

Aga Khan University Examination Board

List of Formulae for Business Statistics XII

Note:

- The symbols have their usual meanings.
- The same formulae list will be provided in annual and re-sit examinations.

Measures of Central Tendency and Quartiles

$$\overline{X} = \frac{\sum wx}{\sum w} \qquad \overline{X} = \frac{\sum x}{n} \qquad \overline{X} = \frac{\sum fx}{\sum f}$$

$$\text{Median} = l + \frac{1}{f}\left(\frac{n}{2} - c\right) \times h \qquad \text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

Measures of Dispersion

$$\text{variance} = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2 \qquad \text{R} = x_{\max} - x_{\min}$$

$$\sigma^2 = \frac{\sum \left(x - \overline{X}\right)^2}{n} \qquad \sigma = \sqrt{\frac{\sum \left(x - \overline{X}\right)^2}{n}}$$

$$\sigma^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2 \qquad \sigma = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

Quadratic Equation, Function and their Graph

Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Counting Techniques and Probability

$${}^{n}P_r = \frac{n!}{(n-r)!} \qquad {}^{n}C_r = \frac{n!}{(n-r)!r!}$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \qquad P(A \cap B) = P(A) \times P(B/A)$$

$$P(A \cap B) = P(A) \times P(B) \qquad P(A \cap B) = P(B) \times P(A/B)$$

Scatter Diagram and Correlation

$$r = \frac{n \sum XY - (\sum X)(\sum Y)}{\sqrt{\left[n \sum X^2 - (\sum X)^2\right]\left[n \sum Y^2 - (\sum Y)^2\right]}}$$

Q.1. (Total 3 Marks)

In an under 19 cricket camp, the weights of 25 players were recorded as follows.

35, 40, 40, 40, 45, 45, 45, 44, 37, 37, 36, 50, 50, 38, 38, 39, 41, 46, 47, 47, 48, 43, 43, 42, 42

i. Use the given table to construct the frequency distribution of the given data. (2 Marks)

ii. Complete the column for the cumulative frequency in the table. (1 Mark)

Weight (kg)	Tally Mark	Number of Participants	Cumulative Frequency
35 – 37			
38 – 40			
41 – 43			
44 – 46			
47 – 49			
50 – 52			

(ATTEMPT EITHER PART a OR PART b OF Q.2.)

Q.2. (Total 3 Marks)

a. In the given table, Bilal recorded the time, in seconds, of 30 people to complete a race.

Time (s)	Number of People	Cumulative Frequency
51 – 55	4	4
56 – 60	10	14
61 – 65	11	25
66 – 70	5	30

Find the second quartile of this data.

(**ATTEMPT EITHER PART a OR PART b OF Q.2.)**

b. The weights (in kilograms) of 150 members of a health club, who are following a diet plan, are represented by the given frequency distribution.

Complete the given table to find the mean weight of the club members.

Weight (kg)	**Number of Members**	**Class Mark** (x)	$f \times x$
55– 64	22		
65– 74	38		
75 – 84	50		
85 – 94	23		
95 – 104	17		
Total		–	

Q.3. (Total 3 Marks)

Samina is fond of reading books. She noted her reading time for the first 12 days of a month. The time noted (in hours) is as follows:

Time (t) (hours)	2	3	6	8	6.5	4.5	3	3.5	2	4	5	6
t^2	4	9	36	64	42.25	20.25	9	12.25	4	16	25	36

Find the variance and the standard deviation of her reading time.

Q.4. (Total 4 Marks)

For the given data in the table, calculate Paasche's index number using base year 2010.

	2010		2015			
Commodity	**Quantity (kg)**	**Price/ kg (Rs)**	**Quantity (kg)**	**Price/ kg (Rs)**		
Wheat	100	10	120	13		
Rice	50	100	40	110		
Cotton	35	148	40	160		
Butter	12	600	10	750		
Mutton	48	500	35	600		
Total	-	-	-	-		

(ATTEMPT EITHER PART a OR PART b OF Q.5.)

Q.5. (Total 4 Marks)

a.

i. How many passwords of four letters are possible by using the letters of the word 'SOUTH', if

I. repetition is NOT allowed? (1 Mark)

II. the password started with letter S? (1 Mark)

ii. There were 9 persons in the waiting list to book a flight to Gilgit. If 5 seats were cancelled and are now available, then find the possible number of ways of selection of 5 people from the waiting list. (2 Marks)

(**ATTEMPT EITHER PART a OR PART b OF Q.5.)**

b. A bag contains eleven cards. Each letter of the word MATHEMATICS is written on a separate card kept in the bag. If two cards are randomly drawn without replacement, then find the probability that

i. both cards have letter M written on them. (2 Marks)

ii. the first card has letter M or the second card has letter T written on it. (2 Marks)

Q.6. (Total 3 Marks)

Complete the given table to find Pearson's coefficient of correlation using the following formula.

$$r = \frac{n\sum XY - \left(\sum X\right)\left(\sum Y\right)}{\sqrt{\left[n\sum X^2 - \left(\sum X\right)^2\right]\left[n\sum Y^2 - \left(\sum Y\right)^2\right]}}.$$

S. No.	Height(X) (cm)	Weight(Y) (kg)	XY	X^2	Y^2
1	45	2.3		2025	
2	47	2.8		2209	
3	48	2.5		2304	
4	52	3		2704	
5	49	2.8		2401	
6	50	3		2500	
7	51	3.2		2601	
8	53	3.1		2809	
9	55	3.5		3025	
10	46	2.5		2116	
Total	**496**	**28.7**		**24694**	

END OF PAPER

Please use this page for rough work

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