AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

ANNUAL EXAMINATIONS (THEORY) 2023

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.

List of Formulae

Note:

- The symbols have their usual meanings.

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

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

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

$$\text{variance} = \frac{\Sigma\, fx^2}{\Sigma\, f} - \left(\frac{\Sigma\, fx}{\Sigma\, f}\right)^2 \qquad \text{SD} = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

Counting Techniques and Probability

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

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

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

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)

The given table provides information about the likes of different sports by students in a school.

Draw a pie chart by completing the given table.

Sports	Likes (%)	Angle of Sector
Cricket	35	
Football	25	
Hockey	20	
Table Tennis	10	
Badminton	10	

Space for Pie Chart

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

Q.2. (Total 3 Marks)

a. A college physical training instructor noted the time of 60 students in a race and recorded the information in the given table.

Time (seconds)	Number of Students	Cumulative Frequency
50 - 54	6	
55 - 59	20	
60 - 64	18	
65 - 69	16	

Calculate median time of the students by completing the given table.

b. A random sample of 15 employees at an organisation were asked about the screen time during their working hours. The data obtained is

3, 4, 6, 7, 2, 3, 5, 4, 6, 7, 5, 8, 8, 10, 5

Find the first and the third quartiles of the data.

Q.3. (Total 3 Marks)

The standard deviation of a variable X is 6. Using the property of standard deviation and variance find the value of the

i. standard deviation of $2X + 5$ (1 Mark)

ii. variance of $X + 5$ (1 Mark)

iii. variance of $3X - 5$. (1 Mark)

Q.4. (Total 4 Marks)

Calculate Paasche's index number for the given data, taking 2010 as the base year.

Commodity	Price		Quantity		$\sum P_o\ Q_n$	$P_n Q_n$
	2010	2011	2010	2011		
A	6.60	7.10	240	330		
B	4.15	4.90	185	210		
C	1.25	2.00	315	345		
D	0.65	1.30	260	115		

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

Q.5. (Total 4 Marks)

a. How many 6 digits' odd numbers are possible using digits 1, 2, 3, 4, 6, 7 and 9 if digits can be repeated but all the numbers start with digit 2?

Use the given table to find the possible answer.

Placement of Digits at Different Place Values						**Possible Odd Numbers**
Lac	**Ten Thousand**	**Thousand**	**Hundred**	**Ten**	**Unit**	

(4 Marks)

b. In an experiment**,** two fair dice are rolled and a balanced coin is tossed simultaneously.

i. Find the possible numbers of outcomes of the experiment. (1 Mark)

ii. List the possible outcomes if both the dice show the same number. (2 Marks)

iii. Find the probability of the event that both dice show the same number and coin shows the tail. (1 Mark)

Q.6. (Total 3 Marks)

Complete the given table to find the coefficient of correlation.

S. No.	X	Y	X^2	Y^2	XY
1	5	7	25		
2	6	9	36		
3	8	15	64		
4	10	20	100		
5	12	10	144		
Total	41	61	369		

END OF PAPER

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