



**KIMATHI UNIVERSITY COLLEGE OF TECHNOLOGY**  
**UNIVERSITY EXAMINATIONS FOR 2010/2011 ACADEMIC YEAR**  
**FIRST YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN COFFEE**  
**TECHNOLOGY AND CUPPING**

**TFS 020: STATISTICAL METHODS**

**DATE: 30<sup>TH</sup> MAY 2011**

**TIME: 11.00 AM – 1.00 PM**

=====

**Instructions:** Answer **ALL** Questions in section A and **ANY TWO** Questions in Section B.

**SECTION A (Compulsory)**

1. a.) Briefly define the following terms :
  - i.) Index number as used in statistics. **(2 Marks)**
  - ii.) Cumulative frequency graph **(2 Marks)**
  - iii.) Quantitative data **(2 Marks)**
  
2. Given the following data; **52.8, 63.7, 72.2, 0.6, 92.7, 95.7, 105.9**, calculate the
  - i.) Mean **(2 Marks)**
  - ii.) Second decile ( $D_2$ ) **(2 Marks)**
  - iii.) Seventieth percentile ( $P_{70}$ ) of the data below **(3 Marks)**

3. Calculate the composite index for the cost of breakfast taking year 1999 as the base year.

Item	Weight	Cost (1999)	Cost (2000)
Tea/ coffee pot	1.7	40	60
Slices/ doughnuts	1.0	20	15
Fresh juice	1.2	40	55
Fruit salad	0.8	28	25
Sausage/ bacon	1.3	30	35

**(6 marks)**

4. The probability that a day is rainy is  $\frac{1}{5}$ . The probability that I carry an umbrella on a non rainy day is  $\frac{3}{8}$  and on a rainy day is  $\frac{1}{4}$  Find the probability that:
  - i.) I shall carry an umbrella **(3 Marks)**
  - ii.) It will not be rainy and I carry an umbrella **(2 Marks)**

5. Calculate moving averages of order three for the following profits in a coffee exporting company between 1990 and 1997. **(6 Marks)**

Year	1990	1991	1992	1993	1994	1995	1996	1997
Profit (kshx10 <sup>6</sup> )	1.2	1.32	1.54	1.43	1.7	1.68	1.9	1.99

**SECTION B (Answer any Two questions)**

6. a) i.) Define, briefly time series. **(2 Marks)**  
 ii.) State and explain four components of a time series **(8 Marks)**

b.) The table below shows the quarterly sales of coffee in bags by a coffee farmer to a cooperative society for the years 2008 – 2010

	Number of bags sold (x 100)		
	2008	2009	2010
1 <sup>st</sup> quarter	44	54	59
2 <sup>nd</sup> quarter	21	24	24
3 <sup>rd</sup> quarter	20	23	25
4 <sup>th</sup> quarter	88	98	104

- i.) Plot a graph of the coffee sales **(2 Marks)**  
 ii.) Calculate moving averages of order 5 **(4 Marks)**  
 iii.) On the same graph draw the graph for moving averages of order 5 **(3 Marks)**  
 iv.) Comment on the trend **(1 Mark)**

7. a.) Explain the meaning and significance of “regression” and “correlation” analysis **(6 marks)**

b) The table below shows the ages x and the systolic blood pressures y of 12 people.

<b>Age x</b>	<b>56</b>	<b>42</b>	<b>72</b>	<b>36</b>	<b>63</b>	<b>47</b>	<b>55</b>	<b>49</b>	<b>38</b>	<b>42</b>	<b>68</b>	<b>60</b>
Blood pressure(Y)	147	125	160	118	149	128	150	145	115	140	152	155

- i.) On the graph paper provided, draw a scatter diagram and comment on the correlation (4 marks)  
 ii.) By use of Karl Pearson’s method, CALCULATE the coefficient of correlation for the data (10 marks)

8. The data below shows masses of 35 workers in a coffee factory

43	39	59	56	58	71	40
72	66	47	38	51	61	64
32	78	29	32	45	70	57
52	46	45	39	58	41	55
56	53	66	63	61	82	61

- a.) Group the above data using intervals of size 5 and 25-29 as the first class. (6 Marks)  
 b.) Use the frequency distribution to compute the following statistics:  
 i.) Mean **(2 Marks)**  
 ii.) Standard deviation **(6 Marks)**  
 c.) On a graph paper draw a histogram to represent the above data. Estimate the mode. **(6 Marks)**

9. a.) Define "hypothesis".
- b.) State and explain the two types of errors associated with wrong decisions in statistics **(4 marks)**
- c.) Each year trainees in coffee technology throughout the country sit a test. Over a period of time, it has been established that the marks can be modeled by a normal distribution with mean 70 and standard deviation 6. This year it was thought that trainees from a particular county did not perform well as expected. The marks of the random sample of 25 trainees from the county were scrutinized and it was found that their mean mark was 67.3. Does this provide evidence at the 5% significance level that trainees from this county did not perform well as expected? State:
- $H_0: \mu = 70$  (the trainees have performed as expected) **(7 Marks)**
- $H_1: \mu < 70$  (the trainees have not performed as well as expected). **(7 marks)**