# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

**(A Constituent College of JKUAT)**

***Faculty of Engineering and Technology***

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

**DIPLOMA IN BUILDING & CIVIL ENGINEERING**

AMA 2206: STATISTICS

**END OF SEMESTER EXAMINATION**

SERIES: APRIL 2012

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are clearly shown
This paper consists of **THREE** printed pages

**Question 1 (30 marks)**

The state police, using radar, checked the speeds (in mph) of 30 passing motorists at a checkpoint. The results are listed below.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 44 | 38 | 41 | 50 | 36 | 36 | 43 | 42 | 49 | 48 |
| 35 | 40 | 37 | 41 | 43 | 50 | 45 | 45 | 39 | 38 |
| 50 | 41 | 47 | 36 | 35 | 40 | 42 | 43 | 48 | 33 |

a) Form a frequency table (10 marks)

b) Calculate:

| | | |
|---|---|---|
| (i) | Mean | (2 marks) |
| (ii) | Standard deviation | (5 marks) |
| (iii) | Median | (2 marks) |
| (iv) | Mode | (2 marks) |
| (v) | Coefficient of skewness | (2 marks) |
| (vi) | Range | (1 mark) |
| (vii) | Variance | (1 mark) |
| (viii) | Coefficient of variation | (2 marks) |

c) 1 Q test scores are normally distributed with a mean of 100 and standard deviation of 15. An individual's 1Q score is found to be 120. Calculate the z – score (3 marks)

**Question 2 (20 marks)**

An airline knows from experience that the distribution of the number of suitcases that get lost each week on a certain route is approximately normal with mean = 15.5m and S.D = 3.6

a) What is the probability that during a given week the airline will lose less than 20 suitcases (10 marks)

b) What is the probability the airline will lose between 10 to 20 suitcases (10 marks)

**Question 3 (20 marks)**

a) What is the probability that the $4^{th}$ occurrence of a 10 year flood will be on the $40^{th}$ year? (5 marks)

b) Assume that during a certain November, a rainy day occurred. Also assume that at this particular location the occurrence of rain on any day is independent of whether or not it rained on any previous day. A sample of 5 days is selected at random and then climatic data analysed. What is the probability that:

| | | |
|---|---|---|
| (i) | 3 of these days were raining? | (8 marks) |
| (ii) | Less than 3 of these days were raining | (7 marks) |

**Question 4 (20 marks)**

On a certain stream, the probability that the maximum peak flow during a 1 year period will be less than 5000 cf..s is 0.2 and the probability that it will be between 5000 c.f.s and 10,000 c.f.s is 0.4.
In a 20 year period, what is the probability of 4 peak flows less than 5000 c.f.s and 8 peak flows between 5000 and 10,000 c.f.s (20 marks)

**Question 5 (20 marks)**

a) What is the probability a 20 year flood will occur for the $1^{st}$ time during the $8^{th}$ year after the completion of a project (10 marks)

b) What is the probability that it will be at least the $8^{th}$ year before a 20 year flood occurs (10 marks)