2012 ME6303 Advanced Metrology and Computer Aided Inspection – Test 1

Max. Marks: 20   Approved tables are permitted   Time: 60 minutes

1. Describe Eli Whitney's contribution to "manufacture".

(2 marks)

2. Define the terms Accuracy, Precision and Trueness according to VIM 2008.

(2 marks)

3. Explain the purpose of calibration.

(2 marks)

4. Describe the historical developments in the definition of the SI unit metre.

(2 marks)

5. The annual rainfall over Southern India for the last ten years is given in table below. Predict the rainfall for 2011 assuming a straight line relationship with respect to year. Also determine a 99% uncertainty interval for the slope in the regression model.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rain	659.4	506.7	648	617.4	807	684.5	902.1	692.5	682.3	848.1

(7 marks)

6. The time period of oscillations of a simple pendulum is given by $T = 2\pi \sqrt{\dfrac{l}{g}}$, where l is the length of the pendulum, and g the acceleration due to gravity. Determine the time period along with its standard uncertainty of a pendulum in the moon, where g is known to be one-sixth that of earth. The value of g for earth is obtained from a handbook as 9.81 with uncertainty not exceeding 0.1 m/s^2. The length of the pendulum is 150 cm with uncertainty triangularly distributed between +/- 1 cm.

(5 marks)