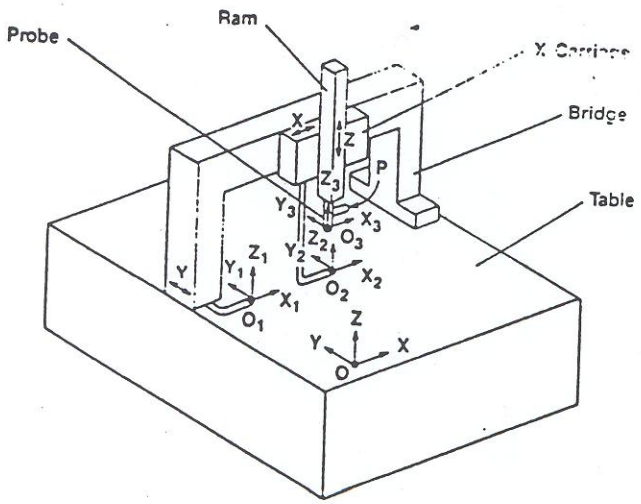
Engineering Metrology
(Answer any four)

Name: _____

1. Describe the procedure used to calculate measurement uncertainty according to GUM with particular emphasis on how TYPE A and TYPE B error sources are handled. How will you compute the uncertainty involved in correcting for measurements made at non-standard temperature?
2. What is the difference between λs and λc in surface texture filtering operation? Describe the main difference between 2CR and Gaussian filter used in filtering of surface profiles and also discuss the need for a Gaussian filter.
3. What is a limacon in the context of out-of-roundness measurement? Describe the types of reference figures used in out-of-roundness assessment. Describe the steps involved in an exchange algorithm to find a minimum circumscribed limacon.
4. List the basic assumptions used in software error correction of CMMs. Describe the mathematical model used in error correction of CMMs. (Use figure given below if necessary)
5. Describe the elements used to characterize a screw thread and show how (any) two of those elements are measured.



$$\overrightarrow{OO_1} = \begin{pmatrix} \delta_x(Y) \\ Y - \delta_y(Y) \\ \delta_z(Y) \end{pmatrix}$$

$$\overrightarrow{O_1O_2} = \begin{pmatrix} X - \delta_x(X) \\ -X \cdot \alpha + \delta_y(X) \\ \delta_z(X) \end{pmatrix}$$

$$\overrightarrow{O_2O_3} = \begin{pmatrix} -Z \cdot \beta_1 + \delta_x(Z) \\ -Z \cdot \beta_2 + \delta_y(Z) \\ Z - \delta_z(Z) \end{pmatrix}$$