DIPLOMA MECHANICAL ENGINEERING

Term-End Examination

December, 2012

BIME-027 : METROLOGY AND QUALITY CONTROL

Time : 2 hours   *Maximum Marks : 70*

*Note : Attempt **any five** questions. All questions carry **equal** marks. Use of scientific calculator is **permitted**.*

1. (a) What is the relationship between sensitivity and range ? What is the disadvantage of very sensitive instrument ?   **7+7=14**

   (b) What is the difference between standard gauges and limit gauges ?

2. (a) By means of simple diagrams representing the hole and shaft, show the essential condition for :   **7+7=14**

   (i) a clearance fit, and

   (ii) an interference fit

   (b) When inspecting cylindrical work a ring gauge or a gap gauge may be employed. Explain the advantages of using both types.

3. (a) Describe the precautions that should be taken to prevent corrosion of highly finished surfaces. **7+7=14**

   (b) The divisions on the main scale of Vernier calipers are 0.5mm apart. The Vernier has 100 divisions equal to 98 main scale divisions. To what accuracy can the instrument be used ?

4. (a) List the advantages and disadvantages of a micrometer and Vernier calipers. **7+7=14**

   (b) Give unit (SI) of the following :
      (i)   Force
      (ii)   Work
      (iii) Power
      (iv)   Potential difference
      (v)   Luminous intensity
      (vi)   Amount of substance
      (vii) Temperature

5. (a) Define tolerance. Find the type of fit and the maximum and minimum clearance/ interference for a pair of shaft and hole defined as follows : **7+7=14**

   shaft dia : $45^{+\,0.055}_{0.050}$

   hole dia : $45^{0.050}_{-0.025}$

(b) Sketch and describe (**Any one**) :

(i) Tool maker's microscope

(ii) Profile projector

(iii) Gear tooth Vernier Caliper

(iv) Floating carriage micrometer

6. (a) Why is inspection of manufactured part necessary and what is the primary responsibility of the inspection department ?   **7+7=14**

(b) Explain in brief Total Quality Management (TQM).

7. (a) What is Tree diagram ? Write the steps to construct a tree diagram.   **7+7=14**

(b) Discuss the benefits of cause and effect diagram.

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