1611

M. Tech 3rd Semester Examination

Metrology & Industrial Inspection

PE-E21

Time : 3 Hours   Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Candidates are required to attempt five questions out of eight questions. Each question carries equal marks.

1. (a) Explain the following term with neat sketches.

    (i) Imperial standard yard

    (ii) International prototype meter   **(6×2=12)**

   (b) Explain the purpose of calibrating the instrument and discuss the primary and secondary calibration.   **(8)**

2. (a) Explain with a neat diagram the measurement of straightness using autocollimators.   **(10)**

   (b) Define fits. Describe the various types of fits with suitable example and sketch.   **(10)**

3. Explain the principle, general construction and observation of stylus type surface texture measuring instruments. What are the disadvantages of these types of instruments? Why are they widely used?   **(20)**

4. (a) Explain the following terms used in surface finish measurement.

    (i) Roughness

(ii)   Waviness

(iii) Sampling length

(iv) Centre line of profile

(v)   Lay

(vi) Primary texture   **(6×2=12)**

(b)   It is not possible to produce perfectly smooth surface. Justify the statement.   **(8)**

5.   (a)   Explain the principle of measurement by light wave interference method. For what type of surfaces interferometeric measurements are possible?   **(10)**

(b)   By using optical flat and monochromatic light explain the procedure to determine whether the given surface is flat or curved?   **(10)**

6.   Write short notes on:

(i) Optical flat (ii) Gauge length interferometer(iii) NPL flatness interferometer (iv) Electrical comparators (v) Pneumati comparators   **(5×4=20)**

7.   (a)   Name and discuss the various elements of the spur gear which are checked for accuracy of the gear. Also explain the constant chord method.   **(15)**

(b)   State the various sources of errors in manufacturing gears.   **(5)**

8.   (a)   Explain the importance of thread micrometer and how screw thread is measured by using one wire, two wire and three wire method.   **(15)**

(b)   Define quality and its various characteristics.   **(5)**