Total Pages—4

(Set-K)

B.Tech-6th
Inspection and Metrology

Full Marks : 70

Time : 3 hours

Answer any six questions including Q.No.1

The figures in the right-hand margin indicate marks

1. Answer the following questions : 2 × 10

   (a) Distinguish between readibility and repeatability.

   (b) What is the function of an optical flat ?

   (c) Distinguish between accuracy and precision.

   (d) Name and give symbol of flatness and runout tolerance.

   (e) Name two instruments for angular measurement.

   (f) What is selective assembly ?

(g) What is least count ?

(h) What is Taylor's principle for gauge design ?

(i) What is wear tolerance for gauge design ?

(j) What is interchangeability ?

2. (a) With neat sketches explain the use of position gauge. 2

(b) Determine the GO and NOGO dimensions of standard gauge to control the production of 60 mm shaft and hole pairs of H_8e_9 fit as per IS specification given as follows : 8

(i) 60 mm lies in the diameter step of 50 and 80 mm.

(ii) Fundamental deviation of '*e*' type shaft is $-11\ D^{0.41}$.

(iii) Wear tolerance = 10% of the gauge tolerance

3. (a) Highlight various types of comparator with their merits and demerits. 5

(b) Describe with a neat sketch the working principle of a mechanical type of comparator. 5

4. (a) Explain the following terms : 2 × 3

(i) Cut-off length

(ii) CLA value

(iii) Peak count.

(b) Describe various inderect methods of measuring the surface roughness of a machined product. 4

5. (a) Show how the principle of interferometry can be applied to check the error in the step gauge. 4

(b) State the machine-vision system principle. 6

6. (a) State the working principle of an autocollimator. 6

(b) Explain how three wire method is used for measuring the effective pitch diameter in a screw thread. 4

7. (a) How can various types of errors be tested in a gear ? 5

(*b*) How can the flatness be tested by an optical flat ? 5

8. Write short notes on the following (any *two*) : 5×2

(*i*) Sine bar

(*ii*) Non-destructive testing

(*iii*) SWIPE concept

(*iv*) Laser inspection

(*v*) Co-ordinate measuring machine.