23124

3 Hours / 70 Marks   Seat No.

Instructions :   (1)   All Questions are *compulsory.*

(2)   Answer each next main Question on a new page.

(3)   Illustrate your answers with neat sketches wherever necessary.

(4)   Figures to the right indicate full marks.

(5)   Assume suitable data, if necessary.

(6)   Use of Non-programmable Electronic Pocket Calculator is permissible.

(7)   Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   **Attempt any FIVE of the following :**   **10**

(a)   Define 'Metrology'.

(b)   Define Line Standard and End Standard.

(c)   Write Taylor's principle of gauge design.

(d)   Explain errors in gear (i) Run out (ii) Backlash.

(e)   List down instruments used in angular measurement.

(f)   Define primary and secondary texture w.r.t. surface finish.

(g)   Explain the following terms used in surface finish measurement :

(i)   Lay

(ii)   Sampling length

2. **Attempt any THREE of the following :** 12

   (a) List any four objectives of metrology.

   (b) Differentiate between line standard and end standard (Any four points).

   (c) Draw hole and shaft assembly and show

      (i) Limit

      (ii) Allowance

      (iii) Tolerance

      (iv) Maximum material condition

   (d) Find the diameter of best size of wire (in mm) for measuring effective diameter of a metric thread (included angle is 60º) of 30 mm diameter and 3 mm pitch using two wire method.

3. **Attempt any THREE of the following :** 12

   (a) Explain parallax error with neat sketch.

   (b) Explain the working principle of sigma comparator with neat sketch.

   (c) Explain Hole basis System with neat sketch. Why is it preferred over shaft basis ?

   (d) Differentiate between Precision and Accuracy (Any four points).

4. **Attempt any THREE of the following :** 12

   (a) Enlist the slips to be wrung together to produce an overall dimension of 63.875 mm using set of 87 pieces :

Range	Step (mm)	Pieces
1.0005	–	1
1.001 to 1.009	0.001	9
1.01 to 1.49	0.01	49
0.5 to 9.5	0.5	19
10 to 90	10	9

(b) Interpret the meaning of 25 H_8S_6 with respect to basis of system.

(c) Draw the diagram indicates a reading of 35.08 mm on vernier calliper.

(d) Differentiate between Unilateral and Bilateral tolerances (Any four points).

(e) State how surface finish is designated on drawing.

5. Attempt any TWO of the following :   **12**

(a) Explain with neat sketch construction and working of Parkinson's Gear Tester.

(b) Explain procedure of major diameter measurement of screw thread using floating carriage micrometer with neat sketch.

(c) In the measurement of surface roughness height of successive 10 peaks and troughs are 33, 25, 30, 19, 22, 27, 29, 20, 18, 32 microns. It is obtained for 10 mm length. Find CLA and RMS values of surface roughness.

6. Attempt any TWO of the following :   **12**

(a) An angle of value 33º 10' 12" is to be measured and to be set with the help of following standard angle gauges :

[1º, 3º, 9º, 27º, 41º], [1', 3', 9', 27'], [3", 6", 18", 30"]

Calculate the gauges required and show the arrangement.

(b) Describe stepwise procedure carried out in laboratory for small angle measurement with neat sketch.

(c) Draw the following alignment test of lathe machine :

(i) True running of head stock centre

(ii) Parallelism testing of lathe axis with lathe bed

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