

22342

22232

3 Hours / 70 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.

**Marks**

**1. Attempt any FIVE :**

**10**

- (a) State any four objectives of Metrology.
- (b) Define Line standard.
- (c) State the advantages of interchangeability. (Minimum two)
- (d) Draw neat sketch of metric screw thread profile.
- (e) State any two applications of V block.
- (f) List out the methods used for checking straightness.
- (g) Define sampling length.

**2. Attempt any THREE :**

**12**

- (a) Differentiate between systematic errors and random errors.
- (b) Differentiate between mechanical and pneumatic comparator. (minimum four points)
- (c) Describe Selective Fit assembly with suitable example.
- (d) Explain working principle of 'Tool Maker's' microscope.

**3. Attempt any THREE :**

**12**

- (a) Explain need of inspection in industry.



- (b) Define Least Count. Explain the procedure for calculating the least count of the Vernier callipers.
- (c) Explain the working principle of mechanical comparator with neat sketch.
- (d) Interpret meaning of 35H7f8 with respect to fit basis system. State types of fit.
- 4. Attempt any THREE :** **12**
- (a) Draw slip gauge accessories (any two) and describe the use of it.
- (b) State and explain with neat sketch Taylor's principle of gauge design.
- (c) A shaft of  $30 \pm 0.005$  mm is to be checked by means of GO and NOGO gauge. Design the dimensions of a gauge required.
- (d) An angle of  $39^{\circ}6'9''$  is to be developed using standard angle gauge set of [ $1^{\circ}$ ,  $3^{\circ}$ ,  $9^{\circ}$ ,  $27^{\circ}$ ,  $41^{\circ}$ ] [ $1'$ ,  $3'$ ,  $9'$ ,  $27'$ ] [ $3''$ ,  $6''$ ,  $18''$ ,  $30''$ ] and one square block. Select minimum gauges required and show the arrangement with neat sketch.
- (e) In measurement of surface roughness height of 10 successive peak and troughs were measured from a datum and were 29, 20, 30, 19, 25, 27, 33 and 22 microns. If these measurement were obtained on 10 mm length. Determine CLA and RMS values of surface roughness.
- 5. Attempt any TWO :** **12**
- (a) Describe with neat sketch measurement of effective diameter of screw thread by using two wire method.
- (b) Describe the procedure of measurement of tooth thickness using 'Base Tangent Method' with neat sketch.
- (c) Draw the following alignment test of Lathe Machine :
- (i) Parallelism of tail stock
- (ii) True running of lathe main spindle
- 6. Attempt any TWO :** **12**
- (a) The angle of taper plug gauge is to be checked using sine centre and slip gauges. Sketch the set-up and describe the procedure.
- (b) Suggest the instrument, which is used to measure the adjacent angle. Explain its principle.
- (c) Explain procedure to determine, whether the given surface is concave or convex by using optical flat and monochromatic light.
-