

22342

22232

3 Hours / 70 Marks

Seat No.

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- 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 ± 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° , 3° , 9° , 27° , 41°] [$1'$, $3'$, $9'$, $27'$] [$3''$, $6''$, $18''$, $30''$] 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 measurements 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.
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