17530

11819

3 Hours / 100 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.

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

(7) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. a) **Attempt any THREE of the following:** **12**

(i) Define metrology and state its four objectives.

(ii) Differentiate between comparator and measuring instrument. (atleast four points)

(iii) State Taylor's principle of gauge design with example.

(iv) Define mean, mode, median and standard deviation.

b) **Attempt any ONE of the following:** **6**

(i) Differentiate between line standard, end standard and wavelength standard (atleast six points with example)

(ii) Classify control charts and explain procedure to draw any one of them.

Marks

2. Attempt any FOUR of the following: **16**

a) Draw a labelled diagram of gear tooth vernier calliper.

b) Explain why sine bar is not used for measurement of angle greater than 45°.

c) Explain relation between 'cost of quality' and 'value of quality' with the help of graph.

d) State the methodology of six sigma improvement and explain any one of them.

e) Enlist any four factors affecting accuracy of instruments.

3. Attempt any FOUR of the following: **16**

a) Draw the labelled sketch and write the stepwise procedure for squareness testing of drilling machine spindle with table.

b) An angle of 121°36′27″ is to be developed using angle gauge set of (1°, 3°, 9°, 27°, 41°) (1′, 3′, 9′, 27′) and (3″, 6″, 18″, 30″) with a square block. Show the arrangement with neat sketch using minimum number of gauges.

c) Interpret the meaning of 35H6f8 with respect to fit and basis of system.

d) Enlist errors in gears. Explain any one of them with neat sketch.

e) With respect to surface texture explain primary and secondary texture.

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

(i) Explain measurement of tooth thickness by constant chord method.

(ii) Prepare a neat labelled diagram to designate surface finish on drawing.

Marks

(iii) State the importance of "Quality audit"

(iv) State different types of sampling plans and explain any one of them.

b) **Attempt any ONE of the following:** **6**

(i) Draw labelled sketch of Sigma Comparator and write its advantages. (Any three)

(ii) Derive equation for two wire method to calculate effective diameter of screw thread.

5. Attempt any TWO of the following: **16**

a) Sketch ideal and actual O.C. curve showing all parameters on it and define them.

b) In a manufacturing process following observations are recorded: Draw appropriate control charts and conclude.

Observation Table :

Sample No.	Defective found out of 50
1	4
2	5
3	0
4	3
5	2
6	5
7	1
8	6

c) Write advantages and limitations of ISO 9000 (Four each).

6. Attempt any TWO of the following: **16**

a) (i) Explain process capability, $\pm 3\sigma$ (Sigma)

(ii) Draw screw thread profile and show all elements on it.

b) Explain the terms:

(i) Straightness

(ii) Wringing of slip gauges

(iii) Pitch of screw thread

(iv) Tolerance

Marks

c) The values of $\Sigma\overline{X}$ and ΣR for a process for 20 subgroups of 5 samples are 3596.2 and 196 respectively. Specification limits for processes are $171^{\pm 11}$. Determine the control limits for $\overline{X}$ and R charts. Take $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.11$)

———