(3 Hours)   Total marks: 80

N.B.:   1. **Question No.1 is Compulsory**
   2. Attempt any **three** questions out of the remaining **five** questions.
   3. Assume suitable data if required.
   4. Figures to the right indicate full marks to that question.
   5. Support your answers with appropriate sketches wherever required.

Q.1.   **Attempt any four questions of the followings.**

a)   Briefly explain the concept of optical flat with neat diagram   05

b)   Draw a neat sketch of an involute gear tooth and indicate its terminology.   05

c)   Distinguish between accuracy and precision with an example.   05

d)   List the classification of comparators.   05

e)   Explain with neat sketch principle of interference of light.   05

f)   Explain clearance and interference fit with examples.   05

Q.2. a)   What do you mean by best wire size diameter? Derive an expression for   10
           the same in case of screw threads. (by Two wire Method)

      b)   Define the following terms with suitable engineering examples.   10
           (i) Flatness (ii) Parallelism (iii) Roundness (iv) Concentricity

Q.3. a)   Determine the R_a index number of a surface for which the graph was   08
           drawn to a vertical magnification of 18000 and a horizontal
           magnification of 150, and the areas above and below of the datum line
           were
           Above   160   90   180   50 mm^2
           Below   95   65   170   150 mm^2
           Assume sampling length = 0.8mm

      b)   Explain Juran's trilogy with diagram   06

      c)   Explain in brief Control charts for variables, Control chart for attributes 06
           and Process Capability.

Q.4. a)   Briefly explain the Principles of TQM.   10

      b)   Explain Bench Marking and its significance   06

      c)   Explain quality of design and quality of conformance   04

55797   Page 1 of 2

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Q.5. a) Determine the control limits for X and R chart if, $\sum X=357.50$ $\sum R=9.90$ **10**
Number of subgroups = 20. It is given that $A_2=0.18$ $D_3=0.41$ $D_4=1.59$
and $d_2=3.735$ Also, find the Process Capability.

    b) Explain fringe patterns with neat diagrams   **10**

Q.6. Write short notes on **any four** from the following   **20**

        1. Interchangeability

        2. Sampling inspection and its significance.

        3. OC curve

        4. 3D coordinate measuring machine

        5. Errors in Gear

        6. Explain The ISO 27001:2005

        7. Explain The ISO 9001:2000