21415

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

(6) Preferably, write the answers in sequential order.

MARKS

1. A) Attempt **any three** : (4×3=12)

   a) Define metrology and state its four objectives.

   b) What is the meaning of $35H_8f_8$? State meaning of each term.

   c) Draw a labeled diagram of universal bevel protractor. State its uses.

   d) Define median, mode, range and standard deviation.

   B) Attempt **any one** : (6×1=6)

   a) Draw a labeled diagram showing the working mechanism of dial indicator.

   b) Describe with neat sketch the working "The Parkinson Gear Tester".

2. Attempt **any four**: **(4×4=16)**

   a) List the minimum no. of slip gauges to be wrung together to produce an overall dimension of 73.975 mm using a set of 87 pieces. The set contain

Range (mm)	Step	Pieces
1.005	–	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) State the Taylor's principle of gauge design.

   c) Differentiate between angle gauges and slip gauges (at least four points).

   d) How major diameter is measured using floating carriage micrometer ?

   e) Write the various steps in constructing $\overline{X}$ and R charts. Consider suitable example.

3. Attempt **any four** : **(4×4=16)**

   a) Discuss the characteristics of line standard and end standard.

   b) An angle of 139°30′27″ is to be developed using angle gauge set of (1°3°9°27°41°) (1′3′9′27′) (3″6″18″30″) and square block. Show arrangement with neat sketch.

   c) Differentiate between variable charts and attribute charts (any four).

d) List the types of errors in screw thread.

e) State the meaning of

   i) Sampling length

  ii) Lay

 iii) Waviness

 iv) Roughness w.r. to surface finish.

4. A) Attempt **any three** : **(4×3=12)**

   a) Explain how will you determine whether the given surface is concave or convex by using optical flat and monochromatic light.

   b) What is S.Q.C. ? State the benefits of S.Q.C.

   c) Differentiate between Hole Basis System and Shaft Basis System.

   d) What is quality of conformance ? List the factors controlling quality of conformance.

B) Attempt **any one** : **(6×1=6)**

   a) Explain the meaning of optimum quality of design with the help of graph.

   b) Enlist different sampling plans and explain double sampling plan.

5. Attempt **any two** : **(8×2=16)**

a) Explain with neat sketch construction and working of pneumatic comparator.

b) Draw a neat sketch of vernier gear tooth caliper and write the procedure for measuring chordal tooth thickness.

c) What is an O.C. curve ? Draw ideal and actual O.C. curve and explain

   i) Producer risk

  ii) Consumer risk.

6. Attempt **any two** :   **(8×2=16)**

   a) The following table gives the no. of errors in alignment observed at the final
       inspection of a certain model of an aeroplane, prepare a C-chart and comment
       on it.

Aeroplane Number	01	2	3	4	5	6	7	8	9	10	11	12	13
No. of alignment defect	07	6	6	7	4	7	8	12	9	9	8	5	5

Aeroplane Number	14	15	16	17	18	19	20	21	22	23	24	25
No. of alignment defect	9	8	15	6	4	13	7	8	15	6	6	10

   b) What is Quality Audit ? And state the step by step procedure to implement it
       in manufacturing organisation.

   c) i) Define CLA and RMS values as applied to surface roughness
          measurement.

      ii) Distinguish between 'Alignment test' and 'performance test' of machine
          tool.

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