

Q.P. Code : 4989

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No.1 is compulsory.
(2) Solve any three out of remaining questions.
(3) Assume suitable data if required and mention it clearly.
(4) Figures to the right indicate marks.
1. (a) State and explain any one most primitive length standards used in measurements. State reasons why these standards were replaced by optical/length standards. 5
(b) What are objectives of quality control. 5
(c) Enlist and explain characteristics of a good comparator. 5
(d) Draw and explain various surface roughness symbols. 5
2. (a) Explain following terms with suitable diagram. 10
(i) Basic size
(ii) Fundamental deviation
(iii) Grades of tolerance
(iv) maximum and minimum metal conditions
(v) Allowance.
(b) Derive necessary expression to calculate the best wire diameter. With the help of suitable diagram explain three wire method used in screw thread measurements. 10
3. (a) Explain construction and working of laser interferometer. 10
(b) How will you maintain compromise between quality and cost. 10
4. (a) Explain following concepts with suitable diagrams. 10
(i) importance of surface conditions
(ii) Roughness and waviness
(iii) Ra value
(b) Explain use of \bar{X} & R charts in quality control. 10

5. (a) Explain construction and working of Parkinson's Tester. 10
- (b) A certain product is given 100% inspection as it is manufactured and the resultant data are summarised by the hour in following table 16 hrs of data is recorded. calculate the central line and variable control limits of P chart using 3-sigma control limits and indicate the values that are out of control. 10

Hour Inspected	No. of units Outside spec.	Number of units
1	48	5
2	36	5
3	50	0
4	47	5
5	48	0
6	54	3
7	50	0
8	42	1
9	32	5
10	40	2
11	47	2
12	47	4
13	46	1
14	46	0
15	48	3
16	39	0

6. Write short notes on :

- (a) Tool naker's microscope
- (b) 3D co-ordinate measuring machine
- (c) OC curves
- (d) Doube sampling plans.