

Scheme - G

## Sample Test Paper-I

Course Name : Diploma in Mechanical Engineering Group

Course Code : ME/PG/PT/MH/MI

Semester : Fifth

Subject Title : Metrology and Quality Control

Marks : 25

**17530**

Time:1 hour

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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. Preferably, write the answers in sequential order.

### Q1. Attempt any Three

3x3=09

- a) Define Metrology. State objectives of metrology.
- b) Compare line standards with end standards.
- c) Define with simple sketch hole and shaft basis system.
- d) List down different instruments used for angular measurement.
- e) List the different errors in threads.

### Q2. Attempt any Two

4x2=08

- a) List down different categories of metrology. State specific use of each of them.
- b) State Taylor's principle of gauge design. State its significance.
- c) Explain with neat sketch principle of working of Clinometer.

### Q3. Attempt any One

8x1=08

- a) With neat labeled sketch explain the construction and working of a Sigma comparator.
- b) State the meaning of selective assembly. State its relation with the concept of interchangeability in mass production.

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## Sample Test Paper-II

Course Name : Diploma in Mechanical Engineering Group

Course Code : ME/PG/PT/MH/MI

Semester : Fifth

Subject Title : Metrology and Quality Control

Marks : 25

**17530**

Time:1 hour

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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. Preferably, write the answers in sequential order.

### Q1. Attempt any Three

3x3=09

- a) Describe with neat sketch the defect of Backlash in case of a gear.
- b) Draw a neat labeled sketch of gear tooth vernier and name its different parts.
- c) What is alignment test of a machine tool. State the instruments/ equipments needed for it.
- d) Define term Quality. State meaning of term quality of produce and quality of services.
- e) State and explain meaning of term 'Quality by variables' and 'Quality by Attributes.'

### Q2. Attempt any Two

4x2=08

- a) State concept of Total Quality Management (TQM) list down its principles.
- b) State meaning of Process capability, how it is determined.
- c) Describe the flatness testing is done by using optical flats.

### Q3. Attempt any One

8x1=08

- a) Describe with neat sketch alignment testing of a lathe machine as per IS standard procedure.
- b) State statistical meaning of Six Sigma. How it is used in quality improvement. State methodology of six sigma for system improvement

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## Sample Question Paper

Course Name : Diploma in Mechanical Engineering Group

Course Code : ME/PG/PT/MH/MI

Semester : Fifth

Subject Title : Metrology and Quality Control

Marks : 100

**17530**

Time: 3 hours

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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. Preferably, write the answers in sequential order.
6. Mobile Phone, Pager and any other Electronic Communication devices are not permitted in examination hall.

### Q.1 (A) Attempt any three

4x3=12

- a) Define metrology and state its four objectives.
- b) Define i) Limits ii) Fits. State their types.
- c) Draw a labeled diagram of bevel protractor. State its uses.
- d) Define mean, mode, median and Standard deviation.

### (B) Attempt any One

6x1=06

- a) Differentiate between Line Standard, End Standard and Wavelength Standard. Give one application of each of them.
- b) Draw a neat labeled sketch of screw thread micrometer and state its principle of working.

### Q.2: Attempt any Four

4x4=16

- a) Draw a well labeled sketch of a pneumatic comparator list down its components.
- b) What is interchangeability? State its need and importance in mass production like Automobile engine components.
- c) What are angle gauges? State procedure to set the gauges.
- d) State principle of three wire method. Where it is used?
- e) State merits and demerits of acceptance sampling.

### Q.3: Attempt any Four

4x4=16

- a) Differentiate between a comparator and a measuring instrument at least 2 points.
- b) Construct an angle of  $29^{\circ} 12' 4''$  using minimum number of angle gauges using standard angle gauge set. Draw the sketch of the arrangement.

- c) State different types of control charts used in SQC. State the types suitably used for Quality by Attributes and Quality by Variables.
- d) Define Quality by Variable and Quality by Attribute with suitable examples.
- e) With neat sketch explain measurement of tooth thickness by constant chord method.

**Q.4(A) Attempt any three**

**4x3=12**

- a) State the procedure for straightness measurement of a lathe bed guides.
- b) Find Mean Mode Median and standard deviation for the following data

105.4	105.2	104.9	106	105.7	105.2	105.4	105.2	106	105.9
105.3	105.4	104.8	105.7	105.3	105.3	105	106	104.8	105.6

- c) Design a plug gauge for checking a hole of dimension  $20^{\pm 0.05}$  considering 2% wear allowance and 1% manufacturing allowance.
- d) How does the cost of rework and repairs affect the cost of quality?

**(B) Attempt any One**

**6x1=06**

- a) State and explain the meaning of i) Quality of design ii) Quality of Conformance and iii) Quality of Performance with suitable examples
- b) List down different types of sampling plans and explain any of them in brief.

**Q.5: Attempt any Two**

**8x2=16**

- a) What is LVDT? With neat sketch explain its principle of working. State where it is used in practice.
- b) List down four types errors in gear metrology. With suitable sketch explain the measurement procedure for any one of them.
- c) What is an OC curve? State the step by step procedure for construction of an OC Curve. State the meaning and significance of important points on the OC Curve.

**Q.6: Attempt any Two**

**8x2=16**

- a) Define the following terminologies as per IS 3073-1967 for surface finish for a machine tool. i) Primary texture ii) Secondary Texture iii) Lay iv) Sample length
- b) What is Quality Audit? State the step by step procedure to implement it in a manufacturing organization.
- c) 10 samples of size 5 each have been collected with following observations.

Sr. No.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	2.008	1.998	1.995	2.001	2.003	1.997	2.002	1.997	2.003	2.011
R	.027	.011	.017	.009	.014	.017	.023	.021	.015	.026

Given  $A_2 = 0.577$   $D_3 = 0$  and  $D_4 = 2.114$

Draw the appropriate control chart and put your conclusions.