17530

11920

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

Marks

1. a) **Attempt any <u>THREE</u> of the following:** **12**

(i) Define Metrology and State its objectives.

(ii) Explain the concept of multi-gauging. State its applications

(iii) An angle of 128° 24' 12" is to be set using standard set of 13 pieces angle gauges and square block. Sketch the arrangement.
(1°, 3°, 9°, 27°, 41°) (1', 3', 9', 27') (3", 6", 18", 30")

(iv) Explain Drunken and Progressive error in screw thread pitch.

Marks

b) **Attempt any ONE of the following:** **06**

(i) Explain the construction and working of the pneumatic comparator with neat sketch. State its advantages and disadvantages.

(ii) Explain the construction and working of the Parkinson's Gear Tester with neat sketch. State its advantages.

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

a) Explain the necessity of inspection in manufacturing processes.

b) State characteristics of good comparator.

c) Explain the concept of selective fit with suitable real-time example.

d) Explain why sine bar is not suitable for angle greater than 45°.

e) Describe the Three Wire Method of effective diameter measurement of screw threads.

f) Explain the constant chord method for measurement of gear tooth thickness with neat sketch.

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

a) Define Wavelength standard. State its advantages over the material standards.

b) Differentiate between the Hole basis and Shaft basis system.

c) Explain the Angle Dekkor with neat sketch. State its applications.

d) Explain the measurement various parameters of screw threads using the Tool makers Microscope in brief.

e) State the significance of surface finish control in the various applications.

f) Define SQC. State the various benefits of it.

Marks

4. a) **Attempt any <u>THREE</u> of the following:** **12**

a) Explain the construction and working of LVDT with neat sketch.

b) Explain the construction and working of Taylor's Hobson Talysurf with neat sketch.

c) Justify the statement, "Higher quality of design means higher costs, quite often it also means higher values".

d) Differentiate between the Variable and Attribute measurement with examples.

b) **Attempt any <u>ONE</u> of the following:** **06**

(i) State any four alignment test conducted on lathe machine and explain one by one with suitable sketches.

(ii) Explain the Six Sigma, a methodology of system improvement in detail.

5. **Attempt any <u>FOUR</u> of the following:** **16**

a) Differentiate between Quality Control and Inspection.

b) State the various types of quality audit. Explain any one in detail.

c) State the various sampling methods. Explain any one.

d) State the characteristics and applications of Normal Distribution curve.

e) State the various tools of SQC. Explain any one.

f) Explain the procedure of profile checking with profile checking machine.

Marks

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

a) The following table gives the numbers of missing rivets noted at aircraft final inspection:

Air Plane No.	No. of missing reverts	Air Plane No.	No. of missing reverts	Air Plane No.	No. of missing reverts
1	8	10	12	19	11
2	16	11	23	20	9
3	14	12	16	21	10
4	19	13	9	22	22
5	11	14	25	23	7
6	15	15	15	24	28
7	8	16	9	25	9
8	11	17	9		
9	21	18	14		

Find C compute trial control limits and plot control chart for C. What values of C' would you suggest for the subsequent period?

b. In manufacturing process, the numbers of defectives found in the inspection of 15 lots of 400 items each are given below.

Lot No.	No. of defectives	Lot No.	No. of defectives
1	2	9	18
2	5	10	8
3	0	11	6
4	14	12	0
5	J	13	3
6	0	14	0
7	1	15	6
8	0		

(i) Determine the trail control limits for *np* chart and state whether the process is in control.

(ii) Calculate the new value of mean fraction defective if some obvious points outside control limits are eliminated. Also, calculate the corresponding upper and lower control limits and examine whether the process is still in control or not.

c) Differentiate between Single, Double and Multiple Sampling plan.

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