

22450

22223

3 Hours / 70 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) Define ‘Repeatability’ and ‘Reproducibility’.
 - b) State the need of inspection.
 - c) State Progressive and Drunken Pitch errors of screw threads.
 - d) Define Backlash and Run-out in gear.
 - e) State the necessity of angular measurement.
 - f) State the term ‘Quality of Design’.
 - g) Differentiate between Inspection and Quality control. (Two points)

P.T.O.

2. Attempt any THREE of the following: 12
- a) Differentiate between Line Standard and End Standard.
 - b) Enlist the various types of assemblies. Explain the selective fit assembly with suitable example.
 - c) Angle of 102° , $8'42''$ is to be measured with the help of following standard angle gauges and square block $[1^\circ, 3^\circ, 9^\circ, 27^\circ, 41^\circ]$, $[1', 3', 9', 27']$ and $[3'', 6'', 18'', 30'']$ and square block, sketch the arrangement with minimum number of gauges.
 - d) Explain the construction and working of 'Taylor Hobson Talysurf' with neat sketch.
3. Attempt any THREE of the following: 12
- a) Explain the various sources of errors in brief.
 - b) The component of $20H_7f_8$ is to manufacture. Calculate the upper and lower limit for hole and shaft. Also state the fit between them. Given:
 - i) $i(\text{micron}) = 0.45(D)^{1/3} + 0.001D$
 - ii) Upper deviation of 'f' shaft = $-5.5D^{0.41}$
 - iii) 20 mm fall in the diameter steps of 18 mm to 30 mm
 - iv) $IT7 = 16i$
 - v) $IT8 = 25i$
 - c) Describe the 'Two Wire' method for measurement of effective diameter measurement of screw threads with neat sketch.
 - d) Describe the characteristics of precision measuring instruments in brief.

4. Attempt any THREE of the following: 12

- a) Describe the Taylors principle of gauge design with suitable sketches.
- b) Describe the construction and working of 'Gear Rolling Test Bench' with neat sketch.
- c) Explain the use of 'Angle Dekkor' for comparing angles with suitable example.
- d) Describe any four machine alignment tests conducted on Lathe machine with neat sketches.
- e) Describe how the various types of surfaces are identified with fringe patterns on the optical flat.
- f) Describe the methodology of 'Six Sigma' for problem solving.

5. Attempt any TWO of the following: 12

- a) Explain the construction and working of sigma comparator. State the advantages and disadvantages of it.
- b) Explain the construction and working of Tool Makers microscope with neat sketch. Describe procedure of checking of any two parameters of screw threads with it.
- c) Define Quality Audit. Explain the various types of quality audit.

6. Attempt any TWO of the following:

12

- a) Describe the construction and use of Co-ordinate Measuring Machine (CMM) for screw thread parameter measurement with neat sketch. State its application.
- b) Describe the Operative Characteristics (OC) curve with stating the various points on it. Explain the various points on it in brief.
- c) 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 \bar{C} compute trial control limits and plot control chart for C. What values of C'' would you suggest for the subsequent period?
