

**T.E./Insem.-610**  
**T.E.(Mechanical)**  
**METROLOGY & QUALITY CONTROL**  
**(2015 Pattern) (Semester - I)**

*Time : 1 Hour]*

*[Max. Marks :30*

*Instructions to the candidates:*

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4 & Q.5 or Q.6.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Assume suitable data, if necessary.*

- Q1)** a) Explain different types of errors in the measurement. [6]  
b) Explain the term 'Calibration. Why it is required? What is traceability. [4]

OR

- Q2)** a) Define the terms: Straightness, Flatness, Squareness, Roundness. [4]  
b) Design a general purpose Go-No Go plug gauge for checking hole of diameter 70H8.

Use: •  $i = 0.45\sqrt[3]{D} + 0.001D$   
•  $IT\ 8 = 25i$   
• Diameter steps – 50 – 80mm  
• Gauge tolerance = 10% of work tolerance  
• Wear allowance = 10% of gauge tolerance

Draw & label the sketch indicating tolerance zones & sizes. [6]

- Q3)** a) What is a comparator? Explain with a neat labelled sketch, construction, working, advantages & limitations of Johanson Mikrokatar. [6]  
b) Calculate the effective dia. for M24×3 screw plug gauge by using floating carriage micrometer for which readings were taken as below- [4]  
i) Diameter of standard cylinder = 22.001 mm.  
ii) Micrometer readings over standard cylinder with two wires of same diameter was = 12.9334 mm.  
iii) Micrometer readings over plug screw gauge & same wires was = 12.1124 mm.

Best size wire was used for above measurement. Neglect rake & compression errors.

**P.T.O.**

OR

- Q4)** a) Explain with a neat labelled sketch, construction, working & applications of  
of  
i) Parkinson gear tester [3]  
ii) Profile projector [3]  
b) Calculate the constant chord length & its distance below the tooth tip for gear of module 5mm & pressure angle  $20^\circ$ . [4]
- Q5)** a) Explain with a neat labelled sketch, construction, working, advantages, limitations & applications of co-ordinate measuring machine. [6]  
b) Explain machine - vision system with advantages & applications. [4]

OR

- Q6)** a) What is Interferometry? Explain with neat sketch, construction and working of NPL flatness interferrometer. [6]  
b) What is LASER? How it is useful in metrology? State the applications. [4]

