Student Exam No._____

# GANPAT UNIVERSITY

## B. Tech. Semester: 6th Mechatronics Engineering

## Regular Examination May – June 2014

## Metrology & Instrumentation 2MC602

**Time:** 3 Hours **Total Marks: 70**

**Instruction:**

1. **Figures right to the questions indicates full marks of each question.**
2. **Use pencil only to draw figures with proper notation.**
3. **Write answer for section-1 and section-2 in separate answer sheets**

### Section-1

| | | | |
|---|---|---|---|
| Que-1 | (A) | State the principle of a micrometer. Sketch a outside micrometer and name its various parts. | 6 |
| | (B) | Explain construction and working of vernier height gauge with neat sketch. | 6 |
| | | **OR** | |
| Que-1 | (A) | Design general type GO and NO-GO gauges for components having 35 H8/f9 fit. The basic size falls in the diameter range of 30-50mm. the fundamental deviation for 'f' shaft= $(-5.5\ D^{0.4})$ microns. The multipliers for 8 and 9 grades are 25 and 40.Take wear allowance as 10% of gauge tolerance. Sketch the gauges with values. | 6 |
| | (B) | State how surface finish is designated on drawings. | 3 |
| | (C) | State the factors affecting the surface texture. | 3 |
| Que-2 | (A) | Draw the sketch and describe the construction and working of Pneumatic comparator. | 6 |
| | (B) | Compare between Electrical comparator and Mechanical comparator. | 5 |
| | | **OR** | |
| Que-2 | (A) | Explain the construction, working and applications of tool maker's microscope with the help of a neat sketch. | 7 |
| | (B) | Derive the expression for the effective diameter of a screw thread using 2 wire method. | 4 |
| Que-3 | (A) | Distinguish between the followings:<br>(i) Hole basis and shaft basis (ii) Upper and Lower deviations | 4 |
| | (B) | How sine bar is used for angle measurement? Explain with suitable example. | 4 |
| | (C) | Define the following<br>(1) Dynamic metrology (2) Legal metrology | 4 |

## Section-2

Que-4 (A) Write short note (Any two) 8
(1) Venturimeter (2) Rotameter (3) Nutating disc meter

(B) What are the difference between Rate meter & Quantity meter . 3

**OR**

Que-4 (A) Write advantages & disadvantages of Radiation pyrometer. 3

(B) Describe with aneat sketch the working of Optical pyrometer. 4

(C) Explain Bimetallic thermometer . 4

Que-5 (A) Describe following 7
(1) Belt transmission dynamometer (2) Gravity balance method for torque measurement

(B) Give the classification of dynamometer & explain Rope brake dynamometer with neat sketch. 5

**OR**

Que-5 (A) Explain briefly following 8
(1) Bourdon tube pressure gauge (2) Diaphragm gauge

(B) Explain construction & working of " Dead weight tester" with neat sketch. 4

Que-6 (A) Explain Mechanical torsion meter for measurement of torque. 4

(B) Write a short note on Centrifugal Tachometer. 4

(C) Explain with neat sketch how the force is measured with help of Proving ring. 4

END OF PAPER