BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: IV/ADD**
BRANCH: PRODUCTION **SESSION : SP/2019**

SUBJECT : PE4003 METROLOGY

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) Why should engineers study metrology? [2]
(b) How sensitivity, drift and reproducibility of a measuring instrument affect its performance? [3]

Q2 (a) What is parallax error in measurement? How can it be rectified? [2]
(b) Differentiate between line standard and end standard with example. [3]

Q3 (a) State the basic principle of a comparator. [2]
(b) What are the various means of magnification in mechanical comparators? [3]

Q4 Explain the working of a sigma comparator with neat sketch. [5]

Q5 (a) Define 'tolerance' and 'allowance' in designing of any component or assembly. [2]
(b) What is meant by 'interchangeability' and 'selective assembly'? Site examples. [3]

Q6 For each of the following hole and shaft assembly, find shaft tolerance and hole tolerance. State whether the type of fit is clearance or interference or transition. [5]

(a) Hole: $50^{+0.25}_{-0.00}$ Shaft: $50^{+0.05}_{+0.005}$

(b) Hole: $30^{+0.05}_{+0.00}$ Shaft: $30^{-0.02}_{-0.05}$

(c) Hole: $25^{+0.04}_{+0.00}$ Shaft: $25^{+0.06}_{+0.04}$

All dimensions are in mm.

:::: 05/03/2019 ::::::E