Printed Pages: 2 **Sub Code: EME403**

Paper Id: | 1 | 4 | 0 | 4 | 0 | 3 | **Roll No.** | | | | | | | | | | |

B.TECH
(SEM VI) THEORY EXAMINATION 2017-18
MEASUREMENT & METROLOGY

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Define the term transducer.
b. What do you mean by characteristics of measuring instrument?
c. What is signal to noise ratio?
d. What is the difference between accuracy and uncertainty?
e. Explain what is meant by systematic error and random error.
f. Define the term legal metrology and dynamic metrology.
g. What is Taylor's principle of gauge design?
h. What so you mean by thermocouple and thermopile?
i. What are the essential parts of comparator?
j. What do you mean by actuators?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. What is the function of a transducer? What is the difference between active and passive transducers? What is the advantage if the output of a transducer is an electrical signal? Explain briefly with diagrams important transducer actuating mechanisms.
b. Describe PIRANI gauge and its working principle. What is the range of absolute pressure which can be measured with this instrument?
c. What is a seismic instrument? Explain how it can be used to measure amplitude and acceleration of a vibrating body with a neat diagram.
d. Explain principle and types of sine bar with the help of neat sketch. Explain any one of them in detail.
e. What is meant by a "hole basis" system of limits and fits? Explain the difference between allowance and tolerance. How many kinds of fits are you familiar with? Also describe the construction and working principle of a profile prject Auto-collimator.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe briefly the main function of measuring instrument. Also describe various types of instrument.
(b) Write short notes on:
  i. Dead Time
  ii. Dead Zone
  iii. Precision
  iv. Drift
  v. Dynamic Characteristic

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Write down the principle and working of stroboscope with the help of neat diagram.

(b) Write down various elastic sensing members. Explain principal and types of Bourdon Tube. Explain any one of them in detail.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the load cells? Explain principle and types of load cells and explain any one of them in detail.

(b) Explain the working of Rota meter, Hot Wire Anemometer and Laser Doppler Velocimetry with the help of neat diagram.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What do you mean by Co-ordinate Measuring Machine? Write down its construction and working. Also explain various types of CMM.

(b) What is the vernier principle? Name the different types of vernier calipers and draw their neat sketches

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Write short notes on the concept of interchangeability. Give the relative characteristics of line and end standards.

(b) Describe the optical system of a laser interferometer. Discuss some advantages of laser in interferometer.