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# B.Tech. (ME) (2012 Onwards) (Sem.-5) MECHANICAL MEASUREMENT AND METROLOGY Subject Code : BTME-503 M.Code : 70604

Time: 3 Hrs.

Max. Marks : 60

## **INSTRUCTIONS TO CANDIDATES :**

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## **SECTION-A**

#### Answer briefly :

- 1. Draw the various blocks of a generalized measurement system.
- 2. Explain in brief 'Zero Order Systems'.
- 3. What is wringing. Give the procedure for wringing of slip gauges.
- 4. A Wheatstone bridge requires a change of 7  $\Omega$  in the unknown arm of the bridge to produce a change in deflection of 3 mm of the galvanometer. Determine the sensitivity.
- 5. Explain why a monochromatic light is used for interferometry work and not the white light?
- 6. Explain why it is not preferred to use sine bar for measuring angles more than 45°?
- 7. State the working principle of dead weight gauge tester.
- 8. Give the working principle of a stroboscope.
- 9. Draw a schematic view of radiation pyrometer.
- 10. Draw a neat sketch of LVDT.



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## **SECTION-B**

- 11. Differentiate between primary, secondary and tertiary types of measurements. Cite suitable examples for each one.
- 12. Derive the expression for time response for a second order underdamped system when subjected to a unit step input. Sketch the response.
- 13. What is sine bar? How it is used for angle measurement?
- 14. A parallel plate capacitive transducer uses plates of area 500 mm<sup>2</sup> which are separated by a distance of 0.2 mm. Calculate the value of capacitance when the dielectric is air having a permittivity of  $8.85 \times 10^{-12}$  F/m.
- 15. Explain construction and working of liquid-in-glass thermometers.

## **SECTION-C**

16. In a test, temperature is measured 100 times with variations in apparatus and procedures. After applying the corrections, the results are :

Temperature °C	397	398	399	400	401	402	403	404	405		
Frequency of occurence	1	3	12	23	37	16	4	2	2		
Calculate :											
a) The mean		R	7	b)	Mean	deviati	on				
c) Standard deviation	C.I.	0		d)	The pr	obable	error o	ofone	reading		
e) The probable error of m	ean										

- 17. Describe the construction, working and theory of McLeod gauge for measurement of vacuum. List its advantages and disadvantages.
- 18. What are dynamometers? How are they classified? Explain the difference between absorption, transmission and driving dynamometers.

# NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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