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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST 1

Winter Semester: 2021 - 22

Course Code: MEC 2015

Course Name: Metrology & Mechanical Measurement

Program & Sem: B-Tech 4th IV sem

Date: 26th April 2022

Time: 11:30 AM to 12:30 PM

Max Marks: 30 Marks

Weightage: 15%

Instructions:

(i) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries THREE marks. (4Qx 3M= 12M)

Q.NO.1 Define Metrology & Measurement. Give some examples (C.O.No.1) [Knowledge level]

Q.NO.2 List 3 differences between Accuracy & Precision (C.O.No.1) [Knowledge level]

Q.NO.3 List the different Methods of Measuring Length, Breadth & Thickness
(C.O.No.1) [Knowledge level]

Q.NO.4 Define Repeatability, Readability & Reproducibility. (C.O.No.1) [Knowledge level]

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries FIVE marks. (2Qx5M=10M)

Q.NO.5 .Standards are the basic requirements for comparisons and relatable to mass production. List the classification of these standards in measurement world and give relatable applications.

(C.O.No.2) [Comprehension level]

Q.NO.6 . Error is responsible for the difference between a measured value and the "true" value .List the types of Errors with suitable reasons and methods to avoid the same.

(C.O.No.2) [Comprehension level]

Part C [Problem Solving Questions]

Answer the Questions. Question carries EIGHT marks. (1Qx8M=8M)

Q.NO.7 A calibrated meter end bar has an actual length of 1000.0003 mm. It is to be used in the calibration of two bars A and B, each having a basic length of 500 mm. When compared with the meter bar LA + LB was found to be shorter by 0.0002 mm. In comparing A with B it was found that A was 0.0004 mm longer than B. Find the actual length of A and B (C.O.No.3) [Application level]



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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST 2

Winter Semester: 2021 - 22

Course Code: MEC 2015

Course Name: Metrology & Mechanical Measurement

Program & Sem: B-Tech 4th sem

Date: 1st June 2022

Time: 11:30 AM to 12:30 PM

Max Marks: 30 Marks

Weightage: 15%

Instructions:

- (i) *Read the all questions carefully and answer accordingly.*
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Part A [Memory Recall Questions]

Answer all the Questions. Each question carries THREE marks.

(4Qx 3M=12M)

Q.NO.1 Define Limit, Fit & Tolerance. Give some examples

(C.O.No.2) [Knowledge level]

Q.NO.2 List 3 differences between Sine bar & Sine center.

(C.O.No.2) [Knowledge level]

Q.NO.3 List the different types of Fit. Give example for each

(C.O.No.2) [Knowledge level]

Q.NO.4 Define Range, Deviation, Basic Size.

(C.O.No.2) [Knowledge level]

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries FIVE marks.

(2Qx5M=10M)

Q.NO.5. Precise measurement of angles is one of the important requirements in workshops and tool rooms. We need to measure angles of interchangeable parts, gears, jigs, fixtures, etc. Explain Autocollimator with neat sketch

(C.O.No.2) [Comprehension level]

Q.NO.6. Comparators are precised measuring instruments which uses the concept of comparing the measurand with a standard quantity. Explain a mechanical comparator with neat sketch.

(C.O.No.2) [Comprehension level]

Part C [Problem Solving Questions]

Answer the Question. The question carries EIGHT marks.

(1Qx8M=8M)

Q.NO.7

a) Build an Angle Gauge of **102° 8' 42"**

b) List the slips to be wrung together to produce an overall dimension of 92.357 mm using two protection slips of 2.500 mm size. Show the slip gauges combination. (C.O.No.3) [Application level]



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: MEC 2015

Course Name: Metrology & Mechanical Measurements

Program & Sem: B-Tech & IV sem

Date: 29th June 2022

Time: 9:30 AM to 12:30 PM

Max Marks: 100

Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.

(ii) x

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries SIX marks.

(5Qx 6M= 30M)

Q.NO.1 With a neat Sketch explain different types of Fits.

(C.O.No.1) [K level]

Q.NO.2 Brief about Sine Bar and Sine Centre with Neat Sketch.

(C.O.No.2) [K level]

Q.NO.3 Build an angle of 57° 34' 9"

(C.O.No.3) [K level]

Q.NO.4 Write Note on Gear Tooth Terminology with neat diagram.

(C.O.No.3) [K level]

Q.NO.5 Write short notes on 1) GD&T 2) Surface roughness 3) Dynamometers

(C.O.No.3) [K level]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

Q.NO.6 Interferometry' is a measurement method using the phenomenon of interference of waves (usually light, radio or sound waves). The measurements may include those of certain characteristics of the waves themselves and the materials that the waves interact with. Explain in detail about process details Interferometry

(C.O.No.2) [C level]

Q.NO.7 In Metrology, The comparator is a Precision Instrument, which is used to compare the dimensions of the given component with the actual working standard. List the classifications & explain any two.

(C.O.No.3) [C level]

Q.NO.8 The screw thread micrometer is designed to measure the pitch diameter of screw threads up to 0.01mm of accuracy. Draw a neat sketch of Screw thread terminology with nomenclatures

(C.O.No.2) [C level]

Q.NO.9 Build the following Slip Gauges using M-87 set. (i) 49.3825 mm (ii) 87.3215mm.

(C.O.No.2) [C level]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FIFTEEN marks.

(2Qx15M=30M)

Q.NO.10 Three 100 mm end bars are measured on a level comparator by first wringing them together and comparing with a calibrated 360 mm bar which has a known error of +45 micrometers. The three end bars together measure 78 micrometers less than the 300 mm bar. Bar A is 25 micrometers longer than bar B and 33 micrometers longer than bar C. Find the actual length of each bar.

(C.O.No. 1) [A level]

Q.NO.11 A medium force fit on a 85 mm shaft requires a hole tolerance and shaft tolerance each equal to 0.325 mm and an maximum interference of 0.0575 mm. Determine the proper hole and shaft dimension with the basis hole standard. **(C.O.No. 2) [A level]**