Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM EXAMINATION - AUGUST 2024

Semester : B.TECH.	**Date : 07-08-2024,**
Course Code : MEC2015	**Time : 09.30am to 12.30pm**
Course Name : Metrology and Mechanical Measurements	**Max Marks : 100**
Program : B.TECH.	**Weightage : 50%**

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific, non-programmable calculator and MMM Data sheet are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A			
	ANSWER ANY 4 QUESTIONS	**4Q X 5M=20M**	
1	Differentiate Nominal size and Actual size.	(CO 1)	[Knowledge]
2	Explain the types of Deviation in Fits.	(CO 2)	[Knowledge]
3	What role does a Coordinate Measuring Machine (CMM) play in metrology?	(CO 4)	[Knowledge]
4	Define Interchangeability.	(CO 5)	[Knowledge]
5	What is fundamental measuring process?	(CO 3)	[Knowledge]
6	Define Working standards in Metrology.	(CO 2)	[Knowledge]

PART B			
	ANSWER ANY 5 QUESTIONS	**5Q X 10M=50M**	
7	Compare and contrast traditional dimensioning methods with GD&T, highlighting the advantages of using GD&T in engineering drawings.	(CO 4)	[Comprehension]
8	Explain the different types of pitch errors that can occur in screw threads, their causes, and how they manifest in the thread profile. Also, discuss the impact of these errors on the functionality and mating of the threaded components.	(CO 3)	[Comprehension]
9	Given a 75 mm shaft rotating in a bearing, with tolerances of 0.075 mm for both the shaft and the bearing, and a required allowance of 0.10 mm,	(CO 4)	[Comprehension]

	determine the dimensions of the shaft and the bore of the bearing using the basis hole system.		
10	Define Geometric Dimensioning and Tolerancing (GD&T) and draw any 10 GD&T symbols & their characteristics.	(CO 5)	[Comprehension]
11	What is the significance of Datum in Geometric Dimensioning and Tolerancing (GD&T), and how does it establish a reference framework for dimensional measurements? Also, describe the different types of Datum.	(CO 2)	[Comprehension]
12	For a medium force fit on a 75 mm shaft, where both the hole tolerance and shaft tolerance are 0.225 mm, and the maximum interference is 0.0375 mm, calculate the appropriate dimensions for the hole and shaft using the basis hole system.	(CO 2)	[Comprehension]
13	Explain with a neat diagram the concepts of Maximum Material Condition (MMC) and Least Material Condition (LMC) for both holes and shafts.	(CO 3)	[Comprehension]

PART C			
	ANSWER ANY 2 QUESTIONS		**2Q X 15M=30M**
14	A QC engineer wants to check the flatness of a newly purchased CMM, identify an optical instrument that measures angles without contact and elucidate the same.	(CO 5)	[Application]
15	An engineer needs to verify the fit of a shaft using a gauge. Identify the appropriate type of gauge and provide a detailed diagram with labels.	(CO 2)	[Application]
16	A mechanical engineering company is designing a precision assembly that involves a fitting between a hole and a shaft. The hole, with a nominal size of 85 mm, will be finished using broaching and honing, while the shaft, requiring an F-type fit, will be produced on a capstan lathe.	(CO 4)	[Application]