Register Number:……..

B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Fifth Semester

MECHANICAL ENGINEERING

U18MEI5202: Engineering Metrology and Quality Control

COURSE OUTCOMES

CO1: Apply knowledge of linear and angular measurements and effective communication for engineering practice

CO2: Apply knowledge of form measurements with effective communication for engineering application

CO3: Explain the working principles of advanced instruments/equipment's used in metrology

CO4: Construct various control charts for the variables and attributes

CO5: Apply knowledge of various sampling methods, concepts and reliability

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	What are the objectives of metrology?	CO1	[K_1]
2.	Define Taylor principle for gauge design.	CO1	[K_2]
3.	How roundness measured in the least squares circle method?	CO2	[K_2]
4.	Define "material ratio" with reference to surface finish measurement.	CO2	[K_1]
5.	Mention the applications of tool maker's microscope.	CO3	[K_2]
6.	List any three field of applications of machine vision system.	CO3	[K_1]
7.	Define the term statistical quality control.	CO4	[K_1]
8.	What is a control chart? Mention its types.	CO4	[K_2]
9.	Differentiate producers risk and consumers risk.	CO5	[K_1]
10.	List out the industrial uses of acceptance sampling.	CO5	[K_2]

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

11.	Explain the principle of a sine bar for the measurement of external tapered components. Mention its uses and limitations.	16	CO1	[K_3]

12.	The following figure represents the various specifications of a spur gear. Represent the tooth thickness and explain the measurement of tooth thickness using gear tooth Vernier caliper with an appropriate sketch.	16	CO2	[K_4]

Nomenclature of a spur gear

13.	Illustrate with a neat sketch the working principle of Laser interferometer in detail with its applications.	16	CO3	[K_3]
14.	List the various configurations of coordinate measuring machine. Explain the constructional features of any one configuration of CMM.	16	CO3	[K_3]
15.	Explain in detail with a neat flow chart, the step by step procedure involved in assessing a process for its capability.	16	CO4	[K_4]
16.	A tyre supplier ships tyres in lots of size 400 to the buyer. A single sampling plan for inspecting these tyres calls for a sample size of n = 15 and an acceptance number of c = 0 is being used for the lot inspection. The supplier and the buyer's quality control inspector decide that AQL = 0.01 and LTPD = 0.10. Compute the producer's risk and consumer's risk for the sampling plan. Also construct an OC curve.	16	CO5	[K_4]

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