P P SAVANI UNIVERSITY

Fourth Semester of B. Tech. Examination

May 2022

SEME2070 Mechanical Measurement & Metrology

25.05.2022, Wednesday **Time: 09:00 a.m. To 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1	Differentiate the followings: (Minimum two points) I. Range and Span II. Precision and Accuracy	**[05]**
Q - 2 (a)	With the help of an illustration, explain the following terms: roughness, waviness, lay, and flaws.	**[05]**
Q - 2 (b)	Sketch Gear Tooth Vernier Caliper.	**[05]**
	OR	
Q - 2 (a)	Enlist and discuss the any five factors influence to produce rough surface during machining operations.	**[05]**
Q - 2 (b)	Explain the construction and working of LVDT stating applications.	**[05]**
Q - 3 (a)	Explain the concept of Squareness Measurement	**[05]**
Q - 3 (b)	Explain Hydraulic Load cell.	**[05]**
	OR	
Q - 3 (a)	Explain the working of a proving ring with a neat sketch.	**[05]**
Q - 3 (b)	Define Straightness. Describe the method of straightness measurement by using slip guage.	**[05]**
Q - 4	Attempt any one.	**[05]**
(i)	Explain Sigma Comparators with neat sketch.	
(ii)	Write a note on the Parkinson gear tester.	

SECTION – II

Q - 1	Attempt any one.	**[05]**
(i)	In a vernier calliper, the main scale reads in millimetres with a least count of 0.5 mm. Twenty divisions on the vernier correspond to 19 divisions on the main scale. Determine the least count of the calliper.	
(ii)	A selection of slip gauges is required to build a height of 48.155 mm. Propose the best combination of gauges using the 112-gauge set.	
Q - 2 (a)	Sketch Hydraulic Load cell and explain.	**[05]**
Q - 2 (b)	Explain the concept of Parallelism Measurement.	**[05]**
	OR	
Q - 2 (a)	Sketch Pneumatic Load cell and explain.	**[05]**
Q - 2 (b)	Explain how sine bar is used to measure: I. Angle of component of small size II. Angle of component of large size	**[05]**
Q - 3 (a)	Explain the Bonded and Unbonded strain gauge.	**[05]**
Q - 3 (b)	How do you employ a combination set to measure the following? (a) Height (b) Angle of a surface	**[05]**

(c) Centre of a bar stock How do you employ a combination set to measure the following?
(a) Height
(b) Angle of a surface
(c) Centre of a bar stock

OR

Q - 3 (a) What are the major benefits of an electronic digital calliper? **[05]**

Q - 3 (b) How do you measure the depth of a hole or recess using a depth gauge? What are the limitations of this instrument? **[05]**

Q - 4 Describe the principal of Thermocouple. Explain with neat sketch the construction and working of thermoelectric pyrometer. **[05]**

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