Code No. : 16515

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg. : CBCS) VI-Semester Main Examinations, January-2021
Metrology & Instrumentation

Time: 2 hours

Max. Marks: 60

Note: Answer any NINE questions from Part-A and any THREE from Part-B

Part-A (9× 2 = 18 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What is bilateral tolerance system?	2	2	1	1
2.	What is the difference between the Ring and Snap Gauges	2	2	1	1
3.	Differentiate between primary and secondary texture?	2	1	2	1
4.	Name the instruments required for alignment tests.	2	3	2	2
5.	Distinguish between accuracy and Precision	2	1	3	1
6.	What are the laws of thermoelectricity	2	3	3	2
7.	Define gauge factor of a strain gauge	2	1	4	2
8.	What is the need for rosette?	2	3	4	1
9.	List out the advantages of pirani gauges	2	2	5	5
10.	What are the advantages of piezoelectric type accelerometer?	2	2	5	1
11.	State the characteristics of line standard	2	3	1	1
12.	What is Auto collimator?	2	1	2	1
	Part-B (3 × 14 = 42 Marks)				
13. a)	Write detailed notes on progressive and positional limit gauges?	7	3	1	2
b)	Explain the construction and uses of i) Spirit Level ii) Sine bar	7	2	1	4
14. a)	Describe the procedure for measuring surface texture using Taylor Hobson Talysurf method.	7	3	2	3
b)	Derive an Expression for measuring the Gear tooth thickness using Chordal Tooth thickness method	7	5	2	4
15. a)	Draw a block diagram representation of a generalized measuring system identify the various elements and point out the function performed by each element.	8	2	3	2
b)	Discuss the importance of calibration with suitable example	6	3	3	2
16. a)	With neat sketch, explain the working principle of Proving ring	10	2	4	1
b)	Describe the Torsion measurement using strain gauge with neat diagram	4	4	4	1

17. a)	Draw the schematic for an accelerometer and discuss how acceleration is measured.	6	2	5	2
b)	Explain briefly the working principle and operation of Bourdon tube Pressure Gauge with its applications.	8	2	5	4
18. a)	Describe surface roughness evaluation by profilometer	6	2	2	2
b)	A 50 mm diameter shaft and bearing are to be assembled with a clearance fit. The tolerance and allowance are as under Allowance = 0.035 mm Tolerance on hole = 0.025 mm. Tolerance of shaft = 0.017 mm. Find the limits of size for the hole and shaft if (i) Hole basis system is used (ii) Shaft basis system is used	8	4	1	2
19.	Answer any *two* of the following:				
a)	What are the various types of instrumental errors? Explain them	7	3	3	1
b)	Explain one method of temperature compensation using an adjacent arm compensating gauge	7	3	4	1
c)	Explain the construction, working and theory of Bulk modulus gauges	7	2	5	2

M: Marks;   L: Bloom's Taxonomy Level;   CO: Course Outcome;   PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	52.5
2	Knowledge on application and analysis (Level-3 & 4)	41.9
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	5.6

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