B.E / B.Tech. PRACTICAL END SEMESTER EXAMINATIONS, NOVEMBER / DECEMBER 2023

Fifth Semester

ME3581 - METROLOGY AND DYNAMICS LABORATORY

(Regulations2021)

Time : 3 Hours | Answer any one Question | Max. Marks 100

Aim, Apparatus required, Procedure	Tabulation/ Drawing	Calculation& Results	Viva-Voce	Record	Total
20	30	30	10	10	100

1.	Find the least count (L.C) of the vernier caliper. Calibrate the vernier caliper using standard size slip gauges (At least with 10 sets of slip gauges) and find the error in the caliper.
2.	Determine the semi-cone angle of the given component using sine bar.
3.	Calibrate the given micrometer for 15 readings of periodic and progressive errors by using slip gauges and plot the graph between nominal value and error.
4.	Find the major, minor and effective diameter of given threaded job by using floating carriage micrometer.
5.	Calibrate the vernier height gauge using slip gauges over the range 25 to 50 mm in steps of 5 mm and estimate the heights of the various features of the given component.
6.	Using profile projector measure effective diameter, major diameter, minor diameter, thread angle, and pitch of given screw thread.
7.	Determine the module of the given spur gear using vernier caliper. (Take readings for at least 5 number of tooth).
8.	Measure various features in a prismatic component using Coordinate Measuring Machine (CMM).
9.	Measure the Flatness of given surface plate.
10.	Measure the surface finish of the milling processed surface using stylus-based instruments.
11.	Find the moment of inertia of flywheel and axle system.

12.	Determine the radius of gyration and mass moment of inertia of the circular disc theoretically and verify the results experimentally using the turn table apparatus. Take minimum four readings.
13.	Find out the natural frequency of transverse vibration of the spring mass system.
14.	Conduct free un-damped vibration tests on the single rotor set up and determine the natural frequency of the system. Draw the following graph: Mass moment of Inertia Vs torsional Natural frequency.
15.	Determine the critical speed of the circular shaft and also find the natural frequency of the shaft.
16.	Conduct an experiment on the cam set up and draw the following graphs i) θ Vs Displacement ii) θ Vs velocity iii) θ Vs Acceleration Assume speed of the cam is 50 rpm
17.	Conduct an experiment on the Watts Governor and determine the following i) the range and ii) the sensitivity. Also Plot the graphs.
18.	By conducting an experiment on the Porter Governor determine (i) the range and (ii) the sensitivity. Also Plot the graphs.
19.	Determine whether the Governor is stable or unstable. Take at least 5 readings By conducting an experiment on the Proell Governor determine i) the range and ii) the sensitivity.
20.	Determine the gyroscopic couple produced in the motorized gyroscope for different masses and compare the results with theoretical values.