MANIPAL INSTITUTE OF TECHNOLOGY



(A constituent unit of MAHE, Manipal)

IIPAL

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: MEASUREMENTS & METROLOGY. [AAE -3154]

REVISED CREDIT SYSTEM (28/11/2018)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

1A.	What is the relationship between Range and Sensitivity? What are the disadvantage of very sensitive instruments?	(3M)
1B.	Define (a) Systematic error. (b) Transposition method. (c) End Standard.	(3M)
1C.	Discuss the importance of inspecting gears.	(4M)
2A.	Describe the use of optical flats and Monochromatic light for dimensional comparison and testing flatness of surfaces.	(5M)
2B.	A clearance fit has to be provided for a shaft and bearing assembly having a diameter of 40 mm. Tolerances on hole and shaft are 0.006 and 0.004 mm, respectively. The tolerances are disposed unilaterally. If an allowance of 0.002 mm is provided, find the limits of size for hole and shaft when (a) hole basis system and (b) shaft basis system are used.	(3M)
2C.	State the procedures to follow in use of straightedge.	(2M)
3A.	Define roundness and state the causes of out-of-roundness. Discuss the different methods used to find roundness.	(6M)
3B.	Explain the operating principle of electrical and electronic comparator.	(4M)
4A.	Explain clearly the following types of fit (a) Selective fit (b) Push Fit.	(2M)
4B.	Write down the three basic feature of comparator.	(3M)
4C.	Derive the equation for the Base Tangent Method used in gear tooth design.	(5M)
5A.	With the neat sketch explain the construction and working of McLeod gauge used for vacuum measurement.	(5M)
5B.	Discuss the types of errors in spur gear measurement.	(2M)
5C.	List different techniques used in force measurement and briefly explain any one.	(3M)