MANIPAL INSTITUTE OF TECHNOLOGY



(A constituent unit of MAHE, Manipal)

JIPAL

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2019

SUBJECT: MEASUREMENTS AND METROLOGY [AAE 3154]

REVISED CREDIT SYSTEM (25/11/2019)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data, **IF ANY** may be suitable assumed and clearly mentioned.

| 1A. | Briefly explain the need for inspection activity. | (02) |
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| 1B. | Define: Calibration, confirmation, error. | (03) |
| 1C. | With a neat sketch, explain the working of an interferometer. | (05) |
| 2A. | Explain the precautions to be taken during measuring roundness of surfaces. | (05) |
| 2B. | Mention the principle of operation of hydraulic and pneumatic load cells. | (02) |
| 2C. | Differentiate between vapor pressure thermometer and liquid filled thermometer. | (03) |
| 3A. | With a neat sketch, explain the working of Johansson's Microkator. | (05) |
| 3B. | Explain the working of Zeiss ultra-optometer. Mention the relation for total magnification. | (05) |
| 4A. | Derive a relation to determine total arc length using Base-Tangent method. | (02) |
| 4B. | Explain the construction and working of an optical pyrometer. | (04) |
| 4C. | 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. | (04) |
| 5A. | With a neat sketch, explain the construction, working and application of Eddy current dynamometer. | (05) |
| 5B. | With a neat sketch, explain the working of a Simplex bourdon pressure tube. | (05) |