BACHELOR OF VOCATION
Automotive Manufacturing
Automotive Mechatronics
Subject: Measurements and Metrology
Subject Code: BBME-106
Semester: Second
October 2020
Theory (External): 35 Marks
Time: 03 Hours

INSTRUCTIONS TO THE STUDENTS

1. Read the questions carefully and write the answers in the answer sheets.

2. Wherever necessary, the diagram drawn should be neat and properly labelled.

3. This questions paper comprises of 8 questions out of which student need to attempt any 4 questions.

4. All questions carry equal marks.

5. The time allotted will be 3 hours for examinations including time of downloading of question paper to emailing of answer books to the concerned Dean/IC.

ESSAY TYPE QUESTIONS

1. List the objectives of metrology. What are the possible sources of errors in measurements? Briefly explain them.

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

3. In a sine bar, when should the set-up be made for the complement of an angle? Discuss the essential requirements for maintaining accuracy in the construction of a sine bar.

4. (a) What do you mean by accumulation of tolerances? Explain how it can be   overcome.
   (b) Define profile tolerance. How the profile of a spur gear is traced using a profile-measuring instrument?

5. What is the justification for studying surface metrology as a specialized subject? Explain the following methods of quantifying surface roughness: (a) R_z value, (b) RMS value, and (c) Ra value.

6. Define temperature. How is it different from heat? State and explain the different laws of thermocouples.

7. Tolerances for a hole and shaft assembly having a nominal size of 50 mm are as follows:
   Hole = $50^{+0.02}_{+0.00}$ +0.00 mm and shaft = $50^{-0.05}_{-0.08}$ mm.
   Determine the following: (a) Maximum and minimum clearances (b) Tolerances on shaft and hole (c) Allowance (d) MML of hole and shaft (e) Type of fit

8. Discuss the working of a Bourdon gauge with a neat sketch.

****END OF PAPER****