METROLOGY AND DIGITAL MANUFACTURING, AAE 3158, 04TH FEB 2021

Type: DES

Q1. With a neat table mention the geometric characteristic symbols, mentioning the type of tolerance, symbols and characteristic. Explain the terms interchangeable manufacture and interchangeable assembly. (4)

Q2. Define GDT and identify three advantages of GDT over coordinate tolerancing. (3)

Q3. Differentiate between complimentary and deflection methods of measurement. (3)

Q4. The operation of instruments requires energy. What is the source of energy for dial indicators? pneumatic comparators, and electrical comparators? Write a note on the various contact points used in a dial indicator. (3)

Q5. Explain why special attention should be given to GO gauges compared to NOT GO gauges during the design of gauges. Describe why a GO gauge should be of full form. (3)

Q6. What is a cut-off wavelength? List the recommended cut-off wavelengths for some of the typical manufacturing operations. (2)

Q7. A clearance fit has to be provided for a shaft and bearing assembly having a diameter of 60 mm. Tolerances on hole and shaft are 0.008 and 0.0055 mm, respectively. The tolerances are disposed unilaterally. If an allowance of 0.0035 mm is provided, find the limits of size for hole and shaft when (a) hole basis system and (b) shaft basis system is used. (5)

Q8. Explain the working, and factors that influence amplification of a Johansson Microkator. (4)

Q09. With a neat sketch explain the four different types of reference circles used for measurement of uncertainty in roundness. (4)

Q10. Explain the significance of Industrial IoT on machine learning and digital manufacturing. (3)

Q11. Discuss the effect of phase relationship between the stylus and the skid on measurement accuracy. (3)

Q12. With a flow chart enumerate the steps involved in PLM integration with shop floor execution. (4)

Q13. With a line diagram show how merging virtual design and automation shortens time to launch. (3)

Q14. With an example, show the propagation of uncertainty with addition and subtraction. (3)

Q15. Describe the constructional features of a CMM. (3)