

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Sixth semester B.Tech degree examinations (S), September 2020

Course Code: ME312

Course Name: METROLOGY AND INSTRUMENTATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

Marks

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| 1 | a) Distinguish between relative error and random error. | (4) |
| | b) Explain how the measurements are made with universal bevel protractor. | (4) |
| | c) Write any two precautions to be followed when using a gauge block. | (2) |
| 2 | a) Explain briefly the construction and working of a height gauge. | (5) |
| | b) Explain with the help of a diagram the principle of a sine bar. | (5) |
| 3 | a) Differentiate hole basis and shaft basis systems of tolerance, which system is used most and why? | (6) |
| | b) Explain the following gauges (1) snap gauges (2) plug gauges | (4) |
| 4 | a) Write any four characteristics of Laser. | (4) |
| | b) Describe the working of optical flat with neat sketch. | (4) |
| | c) State the principle of interferometry. | (2) |

PART B

Answer any three full questions, each carries 10 marks.

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| 5 | a) Discuss the procedure involved in a profile projector to project the images. | (4) |
| | b) Explain the measurement of major and minor diameters of a screw thread. | (6) |
| 6 | a) With the help of a neat sketch describe the working of a profilometer. | (5) |
| | b) Explain the principle and working of Autocollimator. | (5) |
| 7 | a) Discuss any two alignment tests carried out in lathe machine with neat sketch. | (6) |
| | b) List the various geometrical checks made on machine tools | (4) |
| 8 | a) What are the four basic steps of machine vision system? Explain any one. | (4) |
| | b) Explain the construction and principle of CMM. | (4) |
| | c) Mention the disadvantages of CMM. | (2) |

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) With suitable example explain the elements of generalized measurement system. (6)
- b) Write short notes on accuracy and precision with examples. (4)
- 10 a) Explain first-order system with suitable examples. (4)
- b) Write short notes on signal conditioning stage. (3)
- c) State the dynamic characteristics of simplified measuring system. (3)
- 11 a) Describe with neat sketch working of LVDT. (6)
- b) Give the classifications of measuring instruments. (4)
- 12 a) With neat sketch explain the working principle of pneumatic load cell. (4)
- b) Write short notes on accelerometers. (3)
- c) What are the factors to be considered for bonded strain gauge? (3)
- 13 a) Explain with neat diagram how to measure the power by using rope brake dynamometer. (5)
- b) Explain the construction of a thermocouple. (3)
- c) What are the advantages of resistance temperature detectors (RTDs)? (2)
- 14 a) Briefly explain the calibration of temperature measuring devices. (4)
- b) Explain the working of pressure thermometer. (4)
- c) What is the principle of radiation pyrometer? (2)
