

Code No: 155CE**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year I Semester Examinations, January/February - 2023****METROLOGY AND MACHINE TOOLS****(Mechanical Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Explain terms 'shear plan' and 'shear zone'. [2]
- b) Describe the basic elements of metal cutting. [3]
- c) List the different types of boring machines. [2]
- d) Sketch and label the parts of a shaper. [3]
- e) What is lapping process? [2]
- f) How are milling machines classified? [3]
- g) Define limits. [2]
- h) With conventional diagram, explain fits. [3]
- i) How Talysurf is useful? [2]
- j) List the reasons for inspecting the gear tooth elements. [3]

PART – B**(50 Marks)**

- 2.a) Sketch a single point cutting tool and explain about various angles.
- b) How many types of chips are formed in metal cutting? Explain various factors responsible for formation of these different types of chips. [5+5]

OR

- 3.a) Give a neat diagram of an Engine Lathe. Describe and mark its main parts and controls.
- b) Describe the feed mechanism of lathe. [5+5]
- 4.a) With help of a block diagram, describe the main features of a horizontal boring machine.
- b) Calculate the machining time for drilling 4 holes of 16 mm diameter, each on a flange from the following data. Flange thickness=30 mm; cutting speed = 22 mpm, feed 0.2 mm/rev. [5+5]

OR

- 5.a) How is a slotting machine specified? Describe the main parts of a slotting machine.
- b) List the differences between shaper and planer. [5+5]

6.a) Make a neat sketch of a universal milling machine and describe its constructional features.

b) How do you classify the various types of milling cutters? Explain. [5+5]

OR

7.a) What is meant by grinding? What are natural and artificial abrasives?

b) With neat sketch, explain the working principle of honing process. List its applications. [5+5]

8.a) List the differences between tolerance and Allowance.

b) Why it is necessary to give tolerance on engineering dimension? Give an example of both a unilateral and bilateral tolerance. [5+5]

OR

9.a) Explicate the use of auto collimator in measuring flatness of surfaces.

b) Explain how angle of a work-piece is measured with the help of sine bar. [5+5]

10.a) Explain various geometrical tests made on lathe machine tool before acceptance.

b) The heights of peaks and valleys of 20 successive points on a surface are 45, 25, 23, 22, 24, 53, 15, 22, 64, 32, 63, 12, 23, 34, 55, 23, 11, 12, 17, 15 microns respectively, measured over a length 20 mm. Determine CLA and RMS values of roughness surface. [5+5]

OR

11.a) What are the elements required to be measured for determination of the accuracy of screw threads? Explain.

b) Describe the features of Co-ordinate Measuring Machine (CMM). [5+5]

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