

Code: 9A14502

B.Tech III Year I Semester (R09) Supplementary Examinations December 2015

**MACHINE TOOLS & METROLOGY**

(Mechatronics)

Time: 3 hours

Max. Marks: 70

(Minimum of two questions from each part should be chosen for answering FIVE questions)

All questions carry equal marks

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**PART – A**

(Machine Tools)

- 1 (a) Explain why studying the type of chips produced is important in understanding cutting operations.  
(b) The cutting force increases with depth of cut and decreasing rake angle. Why?  
(c) What are the effects of performing a cutting operation with a dull tool?
- 2 (a) Describe the types of machining operations that can be performed on a lathe.  
(b) Explain the functions of different angles on a single point lathe cutting tool.  
(c) What is the work feed mechanism used in shaping? Explain in detail.
- 3 (a) Why is end milling such a versatile process? Explain with examples.  
(b) Explain how drill life is determined. Explain the reasoning behind the design guidelines for drilling.
- 4 (a) Explain why there are so many different types and sizing of grinding wheels.  
(b) What factors could contribute for chatter in grinding operation? Explain.  
(c) What is honing? What are its similarities to grinding? Discuss.

**PART – B**

(Metrology)

- 5 (a) Explain the construction and uses of vernier bevel protractor.  
(b) Explain how sine bar is used to measure;  
(i) Angle of component of small size. (ii) Angle of component of large size.
- 6 (a) Describe a method to measure to effective pitch diameter of a screw plug gauge. Also explain how the errors in pitch and angle affect the virtual effective diameter.  
(b) Describe a method for inspecting the involute profile of a spur gear tooth.
- 7 (a) What are interferometers? Explain any two types of interferometers.  
(b) List out the applications of laser interferometers in angular measurements.
- 8 (a) What are the different types of automatic inspection systems?  
(b) Describe the constructional features of co-ordinate measuring machine.

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