

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018**

**Course Code: ME303**

**Course Name: MACHINE TOOLS AND DIGITAL MANUFACTURING (IE, ME)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any three full questions, each carries 10 marks.*

Marks

- 1 a) With the help of a neat diagram explain the nomenclature of a single point cutting tool. (5)
- b) Discuss about the basic mechanism of chip formation. (5)
- 2 a) With a neat diagram discuss merchant force circle. (5)
- b) The following equation for tool life has been obtained for a certain tool material. (5)

$$VT^{0.13} \cdot f^{0.6} \cdot d^{0.3} = C$$

A 60 min tool life was obtained using the following cutting conditions

$$V = 40\text{m/min}, f = 0.25\text{mm}, d = 2.0\text{mm}$$

Calculate the effect of each parameter on tool life if speed, feed and depth of cut are increased individually by 25%.

- 3 a) List out the necessary prerequisites before performing turning operations on a lathe. (4)
- b) Illustrate different methods for taper turning with neat diagrams. (6)
- 4 a) What are the advantages of radial drilling machine over other conventional drilling machines? (4)
- b) Explain with neat sketch the following drilling machine operations a) (6)  
 Tapping b) Trepanning c) Counter-sinking

**PART B**

*Answer any three full questions, each carries 10 marks.*

- 5 a) Discuss the importance of Clapper box in a shaping machine. (4)
- b) Write the fundamental difference between a planer & a Shaper. (6)
- 6 a) Describe different work holding devices used in a shaper. (4)
- b) Describe different types of planer machines. (6)
- 7 a) Explain any three milling operations performed on a Horizontal milling machine & Vertical milling machine. (6)

- b) Explain with neat sketch straddle milling & form milling. (4)
- 8 a) Explain the working of Simple indexing mechanism. (7)
- b) Classify different types of milling machines. (3)

**PART C**

*Answer any four full questions, each carries 10 marks.*

- 9 a) A grinding wheel is specified as 250 x 30 x 35 WA40L4V18. Explain. (6)
- b) Differentiate between centerless grinding & cylindrical grinding. (4)
- 10 a) Compare truing & dressing of a grinding wheel. (4)
- b) Distinguish between turret & Capstan lathe. (6)
- 11 a) Explain the working of a semi-automatic lathe. (5)
- b) Discuss the advantages & disadvantages of lapping. (5)
- 12 a) 'Manufacturing is now a science'. Discuss. (7)
- b) Write about the R& D status of Digital manufacturing. (3)
- 13 a) Illustrate with a neat diagram the concept of digital manufacturing. (6)
- b) List the features of Digital manufacturing. (4)
- 14 a) Explain the architecture of a DM system. (7)
- b) Explain GRAI modelling method. (3)

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