Hall Ticket No | | | | | | | | | | | Question Paper Code: AME010

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech V Semester End Examinations (Supplementary) - January, 2019

Regulation: IARE – R16

MACHINE TOOLS AND METROLOGY

Time: 3 Hours **(ME)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) What are the major properties required for cutting tool materials? **[7M]**
   (b) Draw Merchants circle diagram and derive an expression to show relationships among the different forces acting on the cutting tool and explain different parameters involved in metal cutting. **[7M]**

2. (a) Explain various theories of metal cutting. **[7M]**
   (b) Write various functions of cutting fluids used in metal cutting. **[7M]**

UNIT – II

3. (a) Describe with the help of neat sketch, the working principle of collet chuck. **[7M]**
   (b) What are the common operations performed on a planner? Describe briefly any two. **[7M]**

4. (a) Draw a neat sketch describing taper turning attachment method and explain its working principle. **[7M]**
   (b) Draw the block diagram of a slotting machine and explain briefly about various parts present on it. **[7M]**

UNIT – III

5. (a) Describe the construction of Column and Knee type milling machine with a neat sketch. **[7M]**
   (b) Define up milling and down milling machining methods. Discuss any four milling operations with neat sketches. **[7M]**

6. (a) What is the application of twist drill. Describe twist drill nomenclature using appropriate sketch. **[7M]**
   (b) Explain the construction and working principle of a boring machine with a neat sketch. **[7M]**

UNIT – IV

7. (a) Describe interchangeable assembly with suitable example. State its advantages. **[7M]**

   (b) The hole and shaft assembly of 30mm nominal size have tolerance specified as $30^{+0.02}_{-0.00}$mm for hole and $30^{-0.04}_{0.07}$mm for shaft. Determine. **[7M]**

   (i) Maximum and minimum (Clearance or Interference) attainable

   (ii) Allowance

   (iii) Hole and shaft tolerances

   (iv) Fundamental deviation.

   (v) Maximum material limit for shaft and hole

   (vi) Type of fit.

   Sketch these values on a conventional diagram.

8. (a) Explain the use of Sine bar for measuring angles and tapers with suitable diagrams. **[7M]**

   (b) List out the precautions to be taken care for slip gauges usage. **[7M]**

UNIT – V

9. (a) Describe with a neat sketch principle and working of Tool maker's microscope? State the applications of this instrument. **[7M]**

   (b) With the help of a neat sketch describe the method of measuring the pitch of screw thread by using pitch measuring machine. **[7M]**

10. (a) Explain the comparison method used for measuring Surface finish. **[7M]**

    (b) Explain briefly the various forms of thread gauges with neat sketch. **[7M]**

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