Enrollment No......................................

Faculty of Engineering
End Sem (Even) Examination May-2019
ME3CO07 Manufacturing Processes and Machines

Programme: B.Tech.   Branch/Specialisation: ME

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i.   The angle between side cutting edge and end cutting edge is called as   **1**
          (a) Approach angle   (b) Nose angle
          (c) Side relief angle   (d) End relief angle

     ii. Which cutting condition affects the cutting temperature   **1**
          predominantly?
          (a) Depth of cut   (b) Cutting speed
          (c) Feed   (d) None of these

     iii. In Apron, power is transmitted from spindle to_____   **1**
          (a) Lead screw   (b) Feed rod
          (c) Both (a) and (b)   (d) None of these

     iv. Which of the following is not the method of taper turning?   **1**
          (a) Compound rest method   (b) Tailstock offset method
          (c) Attachment method   (d) None of these

     v.   In a shaper_____ movement of the drive is converted into _____   **1**
          movement.
          (a) Rotary, reciprocating   (b) Reciprocating, rotary
          (c) Rotary, rotary   (d) None of these

     vi. Depth of cut in shaper may be given by _____   **1**
          (a) Tool head slide
          (b) Lifting the table
          (c) Both tool head slide or drifting the table
          (d) None of these

vii. _____ drills are the most common cutting tool used with the drilling machines **1**
(a) Compound (b) Twist (c) Auger (d) None of these

viii. The broaching operation in which the work moves past the stationary tool is called **1**
(a) Pull broaching (b) Push broaching
(c) Surface broaching (d) Continuous broaching

ix. Non-Traditional machining can also be called as? **1**
(a) Contact Machining (b) Non-contact machining
(c) Partial contact machining (d) Half contact machining

x. Which the following is true for Electrical Discharge machining (EDM)? **1**
I. The metal removal takes place due to erosion
II. Any electrical conductor can be machined by this method.
III. Some light oil like transformer oil or kerosene oil is used as dielectric.
(a) Only I (b) I & II (c) I, II and III (d) II and III

Q.2 i. What must be the main properties of the cutting tool material? Any four. **2**

ii. With the help of neat sketch describe the geometry of the single point cutting tool. **3**

iii. While doing orthogonal machining with a cutting tool having a 10º rake angle, the chip thickness is measured to be 0.40 mm, the uncut thickness being 0.16 mm. Find out the shear plane angle and also the magnitude of shear strain. **5**

OR iv. For an orthogonal cutting operation, using the data given below, calculate **5**
(a) Shear angle (b) Work done in shear
(c) Shear strain.
Cutting velocity (V_c) = 85 m/min
Cutting Force (F_t)=25 kg
Feed force (F_f) = 10 kg
Rake angle (α)=18º
Depth of cut (t_1) = 0.25 mm
Chip thickness (t_2) =0.5 mm

Q.3 i. Find the angle at which the compound rest should be set to turn the taper on the workpiece having a length of 200 mm, larger diameter 45 mm and smaller diameter 30 mm. **2**

ii. Describe the process of cutting external threads on a lathe. **3**

iii. Write any five difference between the turret and capstan lathe. **5**

OR iv. Explain briefly the parts of lathe with diagram. **5**

Q.4 i. What is the difference between compound and differential indexing? Explain the relative merits. **4**

ii. Classify milling machine. Draw a neat sketch of universal type milling machine. **6**

OR iii. Define cutting speed, feed and depth of cut in relation to shaper work. **6**

Q.5 i. Discuss the centre-less grinding with its advantage and limitations **4**

ii. What are the advantages, limitations and applications of broaching? **6**

OR iii. Explain the working of radial drilling machine with diagram of machine. **6**

Q.6 Attempt any two:
i. Explain one method of forming gears in detail. **5**
ii. Explain principle and working of USM with diagram. **5**
iii. Explain principle and working of ECM with diagram. **5**

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Marking Scheme
ME3CO07 Manufacturing Processes and Machines

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Q.1 i.   The angle between side cutting edge and end cutting edge is called as **1**
           (b) Nose angle

     ii.   Which cutting condition affects the cutting temperature **1**
           predominantly?
           (b) Cutting speed

     iii. In Apron, power is transmitted from spindle to_____ **1**
           (c) Both (a) and (b)

     iv.   Which of the following is not the method of taper turning? **1**
           (d) None of these

     v.   In a shaper_____ movement of the drive is converted into _____ **1**
           movement.
           (a) Rotary, reciprocating

     vi.   Depth of cut in shaper may be given by _____ **1**
           (c) Both tool head slide or drifting the table

     vii. _____ drills are the most common cutting tool used with the drilling **1**
           machines
           (b) Twist

     viii. The broaching operation in which the work moves past the stationary **1**
           tool is called
           (d) Continuous broaching

     ix.   Non-Traditional machining can also be called as? **1**
           (b) Non-contact machining

     x.   Which the following is true for Electrical Discharge machining **1**
           (EDM)?
           (c) I, II and III

Q.2 i.   Properties of the cutting tool material **2**
           Any four 0.5 mark for each   (0.5 mark * 4)

     ii.   Geometry of the single point cutting tool. **3**
           Diagram   1.5 marks
           Description   1.5 marks

     iii. Find out the shear plane angle and also the magnitude of shear strain **5**
           Chip thickness ratio = 0.4   1 mark
           Shear angle = 22.938°   1.5 marks
           Shear Strain = 2.59   2.5 marks

OR   iv.   For an orthogonal cutting operation calculate **5**
           Shear angle = 29.35°   1 mark
           Work done in shear = 1393 kg m/min   2 marks
           Shear Strain = 1.978   2 marks

Q.3 i.   Find the angle **2**
           Formula   1 mark
           Answer   1 mark

     ii.   Process of cutting external threads on a lathe. **3**
           Diagram   1 mark
           Explanation   2 marks

     iii. Any five difference between the turret and capstan lathe. **5**
           1 mark for each difference   (1 mark * 5)

OR   iv.   Parts of lathe with diagram. **5**
           Diagram   2.5 marks
           Parts Explanation   2.5 marks

Q.4 i.   Compound and differential indexing **4**
           Difference   2 marks
           Relative merits   2 marks

     ii.   Classify milling machine   3 marks **6**
           Sketch of universal type milling machine.   3 marks

OR   iii. Relation to shaper work **6**
           Cutting speed   2 marks
           Feed   2 marks
           Depth of cut in.   2 marks

Q.5 i.   Centre-less grinding   2 marks **4**
           Its advantage and limitations   2 marks

     ii.   Broaching **6**
           Advantages   2 marks
           Limitations   2 marks
           Applications   2 marks

OR   iii. Working of radial drilling machine **6**
           Diagram of machine.   3 marks
           Explanation   3 marks

Q.6   Attempt any two:
   i.   One method of forming gears   **5**
   ii.   Principle and working of USM   3 marks   **5**
          Diagram.   2 marks
   iii.   Principle and working of ECM   3 marks   **5**
          Diagram.   2 marks

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