USN | | | | | | | | | | | | **15ME35B**

Third Semester B.E. Degree Examination, June/July 2017
Machine Tools and Operations

Time: 3 hrs.   Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1   a. Explain with a neat sketch, the main parts of a lathe machine.   **(08 Marks)**
    b. Sketch and explain radial drilling machine and list the classification of drilling machine.
                                                                                       (08 Marks)

OR

2   a. Draw a neat sketch to show major parts of a horizontal milling machine.   **(08 Marks)**
    b. Sketch a planning machine indicating major parts. Name any one of the mechanism for quick return movement in a planer.   **(08 Marks)**

Module-2

3   a. What are the different motion provided on a lathe?   **(06 Marks)**
    b. List and explain different machining parameters and related quantities on a lathe. **(05 Marks)**
    c. What are the tools used on lathes?   **(05 Marks)**

OR

4   a. Explain the process of up-milling and down milling. What are advantages of each process?
                                                                                       (06 Marks)
    b. List and explain different machining parameters and related quantities on a broaching machine.   **(05 Marks)**
    c. Draw a neat sketch and explain centerless grinding machine.   **(05 Marks)**

Module-3

5   a. Explain the geometry of a single point cutting tool with a neat sketch.   **(06 Marks)**
    b. List and explain the essential properties of cutting tool materials.   **(05 Marks)**
    c. Explain the effect of machining parameters on surface finish.   **(05 Marks)**

OR

6   a. A workpiece of diameter 38 mm and length 400 mm was turned on a lathe using suitable cutting tool. Determine the machining time to reduce the workpiece to 36.5 mm diameter in one pass with cutting speed of 30 mpm and feed 0.7 mm/rev.   **(08 Marks)**
    b. A shaping machine is used to machine a rectangular piece of 18 cm long and 35 cm width which cutting speed being 26 m/min. Feed is 0.8 mm/cycle cutting stroke is adjusted to 20 cm. Time for cutting to return stroke is 3 : 2. Find the time required for machining the whole surface.   **(08 Marks)**

Module-4

7   a. Briefly explain the different types of chips produced during metal cutting with neat sketches.   **(06 Marks)**
    b. Draw merchants circle diagram using usual notations and state the assumptions. **(05 Marks)**
    c. The following data refer to an orthogonal cutting process. Chip thickness 0.62 mm, feed 0.2 mm, rake angle 15°. Calculate chip reduction co-efficient and shear angle.   **(05 Marks)**

OR

8   a.   What are the components of cutting force in turning a cylindrical job?   **(06 Marks)**
    b.   Derive an expression for power needed in a turning operation.   **(05 Marks)**
    c.   List the drilling factors affect the drilling torque and thrust force.   **(05 Marks)**

Module-5

9   a.   Define tool life. List out the wear mechanisms. Explain any one.   **(06 Marks)**
    b.   A tool life of 80 minute is obtained at a speed of 30 mpm and 8 minute at 60 mpm. Determine the tool life equation and cutting speed for 4 minute tool life.   **(05 Marks)**
    c.   What is machinability? List out the machinability criteria.   **(05 Marks)**

OR

10   a.   What do you understand by economics of machining? How do you evaluate machining cost?   **(08 Marks)**
    b.   Explain how do you evaluate the actual time of machining.   **(08 Marks)**

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