Code No: 5116D **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations, February - 2014
THEORY OF METAL CUTTING
(Production Engineering)

Time: 3 Hours **Max. Marks: 60**

Instructions:
i) Part A is compulsory Question for 20 marks.
ii) Part B consists of five questions with "either" "or" pattern. The student has to answer any one. However students have to answer five questions from Part B (numbered from 2 to 6)

PART - A
(Answer all sub questions)

5 × 4 marks = 20

1.a) Explain the factors effecting the machinability.
b) What are the indexible inserts? How are they specified?
c) Explain the specifications of grinding of grinding wheel.
d) Explain any two types of wear mechanisms.
e) Discuss the properties of cutting fluids.

PART - B

5 × 8 marks = 40

Answer either "a" or "b" from each question

2.a) i) Explain a basic machining operation with the help of a neat sketch.
ii) Discuss the various types of chips produced during metal cutting.

OR

b) i) Discuss the various forces encountered in metal cutting.
ii) In an Orthogonal cutting operation, the following data have been observed:

Uncut chip thickness	= 0.127 mm.
Width of cut	= 6.35 mm.
Cutting Speed	= 2 m/s
Rake angle	= 10^0
Cutting force	= 567 N
Thrust force	= 227 N
Chip thickness	= 0.228 mm

Determine shear angle and shear stress along the shear plane.

3.a) i) Sketch a single-Point cutting tool and show on various tool elements and tool angles.
ii) Describe the tool represented by 10, 10, 6, 6, 8, 8, 1 mm in ASA system.

OR

b) i) Explain the formation of built up edge and their effects?
ii) How the tool shank of a single point cutting tool is designed?

4.a) i) How will you determine the drilling torque and hence the drilling power?
ii) Find the drilling power for 50 mm diameter drill having a feed of 0.50 mm/rev and cutting speed is 0.75 m/s. The material factor for brass is 0.55. Determine also the drilling thrust.

OR

b) i) Make a neat sketch of center type cylindrical grinder and explain its operation.
ii) Calculate the power required per mm^3 of metal removed per second for a surface grinding operation using the following data.

Wheel speed = 20 m/s
Work speed =0.18 m/s
Tangential force = 84 N
Depth of cut = 0.018 mm
Width of cut = 14 mm.

5.a) i) Describe any tool life equation.
ii) The useful tool life of a HSS tool machining mild steel at 18 m/min is 3 hr. Calculate the tool life when the tool operates at 24 m/min.

OR

b) i) Why tool wear is important in metal cutting? Discuss various types of tool wears.
ii) Explain the nature of frictional force in metal cutting.

6.a) Explain any two methods of measuring temperature at different points on tool.

OR

b) i) State the functions of a cutting fluid. Describe the effect of cutting fluid on cutting speed and tool life.
ii) What are the essential properties of cutting tool materials?

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