Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: MEDLO5012 and Course Name: MACHINING SCIENCE AND TOOL DESIGN

Time: 2.5 hour Max. Marks: 80

Time: 2-hour 30 minutes	Max Marks: 80
Q.1.	Choose the correct option for following questions. All the questions are compulsory and carry equal marks.
1	Friction at the tool-chip interface can be reduced by
Option A	Decreasing the rake angle
Option B	Increasing the depth of cut
Option C	Decreasing the cutting speed
Option D	Increasing the cutting speed
2	Continuous chips with built up edge are formed during machining of
Option A	Brittle metals
Option B	Ductile metals
Option C	Hard metals
Option D	Soft metals
3	Crater wear occurs mainly on the
Option A	Nose part, front relief face and side relief face of the cutting tool
Option B	Face of the cutting tool at a short distance from the cutting edge only
Option C	Cutting edge only
Option D	Front face only
4	Tool signature consists of _____ elements.
Option A	Two
Option B	Four
Option C	Five
Option D	Seven
5	Thrust force in an orthogonal machining is 400 N and cutting force is 600 N. If the rake angle is 15°, then friction angle is_____.
Option A	21°
Option B	41°
Option C	49°
Option D	75°
6	Pull end length of a broach is
Option A	less than broached hole length

Option B	equal to broached hole length
Option C	greater than broached hole length
Option D	70 % of broached hole length
7	The cutting force in up milling _____ per tooth movement of the cutter.
Option A	Is zero
Option B	Is maximum
Option C	Decreases from maximum to zero
Option D	Increases from zero to maximum
8	The binding material used in cemented carbide tools is
Option A	Tungsten
Option B	Chromium
Option C	Silicon
Option D	Cobalt
9	Form tools are used for
Option A	Machining of rectangular work pieces
Option B	Generation of gear teeth
Option C	Turning of cylindrical work pieces having multiple diameters , in a production run
Option D	Drilling holes of various shapes
10	Broaching allowance is
Option A	The amount of material removed by the broach
Option B	The rate at which the material is removed
Option C	Distance between two consecutive teethes of the broach
Option D	Length of the cutting teethes.
Q.2.	Solve any Two Questions out of Three 10 Marks each
A	During turning of a steel rod, the tool life decreases from 80 min to 20 min. due to increase in cutting velocity, from 60 m/min to 120 m/min., then at what cutting velocity the life of that tool under the same condition and environment will be 40 min.?
B	Derive the expression for the merchants constant from Merchant theory.
C	What are the different types of chips formed during maching and conditions of formations of such chips?
Q.3.	Solve any Two Questions out of Three 10 Marks each

A	Calculate and design round progressive broach for machining cylindrical hole of dia. $27H_7$ and an axial length of 30 mm in a work piece of carbon steel. Assume cut per tooth in the range of 0.02 to 0.03 mm and the broaching force required per 'mm' of cutting-edge length to be 120 N/mm. The broach is of H.S.S. and permissible stress not to exceed 200 N/mm^2.
B	Discuss various tool wear mechanisms.
C	What are essential properties of cutting fluid.
Q.4.	Solve any Two Questions out of Three 10 Marks each
A	Explain the method of finding Taylor's exponent by taper turning test.
B	Explain the graphical procedure for designing flat form tool.
C.	State and explain the effect of the factors influencing the cutting temperature during machining operation?