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MANIPAL INSTITUTE OF TECHNOLOGY
*A Constituent Institute of Manipal University, Manipal*

**II SEM M. Tech. (MANUFACTURING ENGG & TECHNOLOGY) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY 2017**

**SUBJECT: DESIGN OF MANUFACTURING TOOLS (MME 5221)**
**REVISED CREDIT SYSTEM**

Time: 3 Hours Max. Marks: 50

**Instructions to Candidates:**
- Answer **ALL** questions.
- The use of **CERTIFIED DATA SHEET** is permitted.
- Missing data, if any, may be assumed appropriately.

1. a) What is a chip breaker? Discuss the different types of chip breakers. **[04]**
   b) Design a circular form tool for machining 5 mm wide groove and 2 X 45° chamfer on workpiece shown in **Fig. Q. 1b.** The work material is steel with hardness 250 BHN. The centre of the tool is 4 mm above the centre of the work. Outside diameter of the form tool is 50 mm. **[06]**

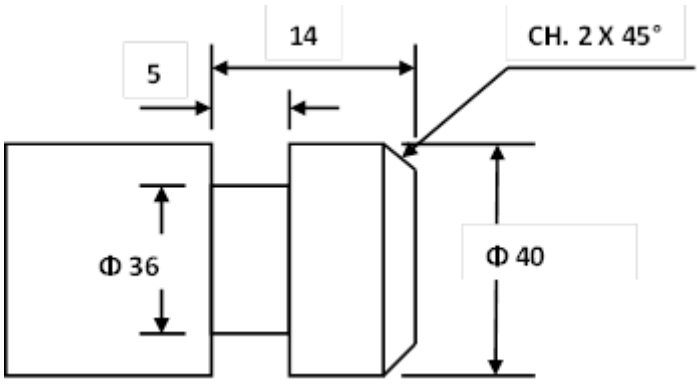


**Fig. Q. 1b**

2. Design a single point turning tool made of High Speed Steel (HSS) for machining carbon steel with maximum yield strength 380 MPa and hardness 325 BHN. Let the maximum depth of cut is 2 mm, coefficient of friction between tool and work is 0.45 and the tool overhang is 35 mm while

machining. Draw three views of the designed tool with relevant dimensions marked on the same. **[10]**

3. a) Compare the geometry, salient features and applications of the following milling cutters: **[04]**

    i) Straight toothed fluted cutter

    ii) Form relieved cutter

    b) Design a die and punch and select a suitable press for piercing a Φ20 mm hole in 4 mm thick steel sheet having 250 MPa shear strength. **[06]**

4. a) Design a broaching tool for machining a keyway of size 10C11 (width) X 4H12 (depth) in a steel ($\sigma t$ = 700 MPa) hub of Φ30 X 80 mm long. **[07]**

    b) Recommend the appropriate shank end for the broaching tool designed as per the problem definition in **Q. 4.a** and show the working drawing of the broaching tool with dimensions. **[03]**

5. a) Design a High Speed Steel (HSS) side and face cutter for milling 8 mm wide and 4 mm deep slot in a steel workpiece having tensile strength of 650 MPa. The slot should be finish milled in a single operation. **[07]**

    b) Draw the designed milling cutter as per problem definition in **Q. 5.a**, showing important dimensions. **[03]**