Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University, Manipal – 576 104

II SEM M. Tech. (Mfg Engg & Tech) DEGREE END SEMESTER EXAMINATIONS MAY 2016

SUBJECT: DESIGN OF MANUFACTURING TOOLS (MME 532)
(REVISED CREDIT SYSTEM)

Time: 3 Hours MAX.MARKS: 50

Instructions to Candidates:
- Answer **ANY FIVE FULL** questions.
- Use of a certified data booklet is permitted.
- Missing data, if any, may be suitably assumed.
- Assumptions if any, must be stated clearly wherever applicable

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

i) Slitting saw

ii) Slotting cutter

b)) Design a circular form tool for machining 4mm wide groove and 2 X 45° chamfer on component shown in **Fig. Q. 1b**. The center of the tool is 6mm above the center of the work. Outside diameter of the form tool is 50 mm. **[06]**

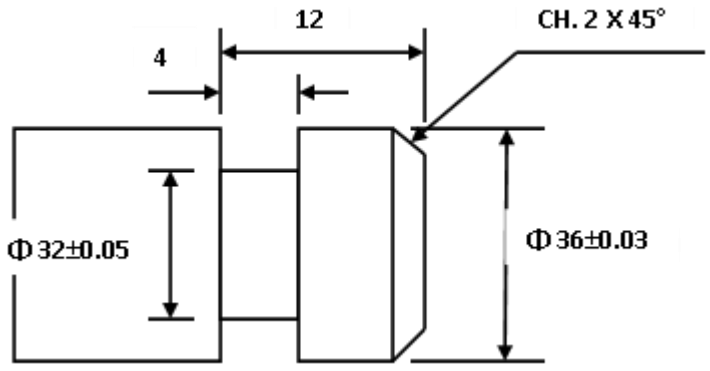

Fig. Q. 1b

2 a) Discuss with a sketch the design features of a back plate fixture used in lathes for holding the components for machining. **[04]**

b) Design a single point rough turning tool for following specifications: **[06]**

Tool material: High Speed Steel (HSS)

Work material: free machining steel

Motor power: 4 kW

Transmission efficiency = 80%

Maximum depth of cut = 3 mm

Max. feed rate = 0.4 mm/rev

Draw three views of the designed tool with appropriate geometry parameters indicated.

3 a) Design a twist drill for drilling Φ20 X 60 mm deep hole in a steel work material having tensile strength of 850 MPa. Take the flute cutter diameter as 80 mm and maximum permissible feed as 0.3 mm/rev. **[07]**

b) Recommend an appropriate Morse Taper shank for the drill design of **Q. 3 a,** and draw the designed twist drill showing important dimensions. **[03]**

4 a) What is the importance of computing center of pressure in a sheet metal component with multiple slots of different shapes, while designing die for the same. Illustrate with an example. **[03]**

b) Design a die and punch system for piercing a slot of 40 x 30 mm size in a 4 mm thick steel sheet having 350 MPa shear strength. **[07]**

5 a) Design a High Speed Steel (HSS) side and face cutter for milling 10 mm wide and 6 mm deep slot in a steel workpiece having tensile strength of 800 MPa. The slot should be finish milled in a single operation. Also draw the designed milling cutter showing important dimensions. **[07]**

b) What is chip breaker? Discuss its significance in machining with examples. **[03]**

6 a) Design a set of machine taps for threading 40 deep blind holes to M16X2.0 (6H Grade), if the work material is Cast Iron. **[07]**

b) Recommend an appropriate Morse Taper shank to the designed tap for **Q. 6 a,** and draw the tap indicating the dimensions. **[03]**