Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PCME 4304

Fifth Semester Regular Examination – 2014

MACHINING SCIENCE AND TECHNOLOGY

BRANCH : MECH

QUESTION CODE : H 177

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

   (a) Differentiate the orthogonal cutting and oblique cutting.

   (b) What is flank wear ; with help of sketch show it on a cutting tool ?

   (c) Distinguish between ideal roughness and natural roughness.

   (d) What are the four major parts of a carriage ?

   (e) Name the factors affect the cutting speed of drill.

   (f) Compare group drive and individual drive.

   (g) How the size of a turret lathe is is specified ?

   (h) Name the common electrolytes used in ECM.

   (i) List the product applications of LBM.

   (j) What are the limitations of LBM ?

2. Following data were collected from an orthogonal machine test on steel :

   Cutting speed = 18 m/min

   Rake angle = 20^0

   Clearance angle = 10^0

   Width of cut = 3.2 min

   Underformed chip thickness = 0.10 mm

   Deformed chip thickness = 0.25 mm

P.T.O.

Cutting force in cutting velocity direction = 800 N

Normal force in a direction normal to cutting velocity = 500 N

Draw the Merchant's circle diagram and evaluate : shear angle, shear strain, friction co-efficient against chip flow, friction force on the rake face. 10

3. (a) Explain the need of cutting fluid and how it affects the machining. 5

   (b) Derive the expression of optimum cutting speed for minimum cost of machining. 5

4. (a) Estimate the grinding force during surface grinding of a 25 mm wide mild steel block with a depth of cut of 0.05 mm. The diameter of wheel is 200 mm and the wheel rotates at 3000 rpm. The number of grits/mm^2 is measured and found to be 3. The feed velocity of the table is 100 mm/min. 5

   (b) Sketch and describe the differential indexing method. 5

5. (a) Explain in detail the pull and push type broaches with their relative advantages and disadvantages. 5

   (b) Explain the principle of quick return mechanism with diagram. 5

6. Explain in detail with neat diagram the working of wire EDM and state its advantages, disadvantages and applications. 10

7. (a) Describe the method of AJM with help of a schematic diagram. 5

   (b) Explain with diagram the working of gear hobbing machine. 5

8. Write short notes on any **two** : 5×2

   (a) Plasma arc Machining

   (b) Lathe tool dynamometer

   (c) Speed reversal mechanism.