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

Total number of printed pages – 2

B. Tech

PCME 4304

Fifth Semester Examination – 2013

MACHINING SCIENCE AND TECHNOLOGY

BRANCH : MECH

QUESTION CODE : C-384

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) Explain the term "Machinability".

   (b) Differentiate flank and crater wear.

   (c) List the additives added to water to improve its properties as a cutting fluid.

   (d) What is the difference between plain shaper and universal shaper ?

   (e) What is meant by "grade" and "structure" of a grinding wheel ?

   (f) Compare group drive and individual drive.

   (g) Write the principle of ECM.

   (h) What is difference between USM and conventional grinding ?

   (i) How the size of a planner expresses.

   (j) List the product applications of LBM.

2. In an orthogonal cutting operation, the following data have been observed :

   Uncut chip thickness, $t = 0.127$ mm

   Width of cut, $b = 6.35$ mm

   Cutting speed, $v = 2$ m/s

   Rake angle, $\alpha = 10°$

   Cutting force, $F_c = 567$ N

   Thrust force, $F_t = 227$ N

   Chip thickness, $t_c = 0.228$ mm

P.T.O.

Determine shear angle, the friction angle, shear stress along the shear plane and the power for the cutting operation. Also find the chip velocity, shear strain in chip and shear strain rate. 10

3. (a) Sketch a single point cutting tool under ASA system. Define various tool angles and discuss their importance. 5

   (b) Calculate the change gears to cut a single start thread of 0.5 mm pitch on a centre lathe having a lead screw of 12 mm pitch. 5

4. (a) Draw the block diagram of a drilling machine and explain its major parts. 5

   (b) Explain the different tool and job holding methods of milling machine. 5

5. (a) Discuss various mechanisms for converting rotary motion into rectilinear motion in a mechanical drive. 5

   (b) Describe the mechanism of speed transmission from motor to spindle and speed reversal mechanism of lathe. 5

6. Explain, in detail, with neat diagram the working of electro discharge machining process. 10

7. (a) Explain different parts of a turret lathe and how it differs from engine lathe. 5

   (b) Compare the laser beam machining and plasma arc machining with respect to their principle of operation, application and advantages. 5

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

   (a) Drill tool dynamometer

   (b) Abrasive Jet machining

   (c) Copying lathe

   (d) Quick return mechanism.