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PP-II : SE - Mech - Sem IV - CBSGS

02/06/2015

QP Code : 3477

Max. Marks: 80
Time: 3 Hrs.

N.B.:-
(1) Question **No.1** is compulsory
(2) Attempt **any three** questions out of remaining **five** questions
(3) Figures to right indicate full marks
(4) Assume suitable data if necessary

Q.1. Attempt any **five** of following: - **(20)**

(a) Explain types of chips produced during machining process.

(b) What are the features of a Horizontal CNC machine?

(c) Write a note on Gear hobbing and its types.

(d) Explain different features of Surface finish.

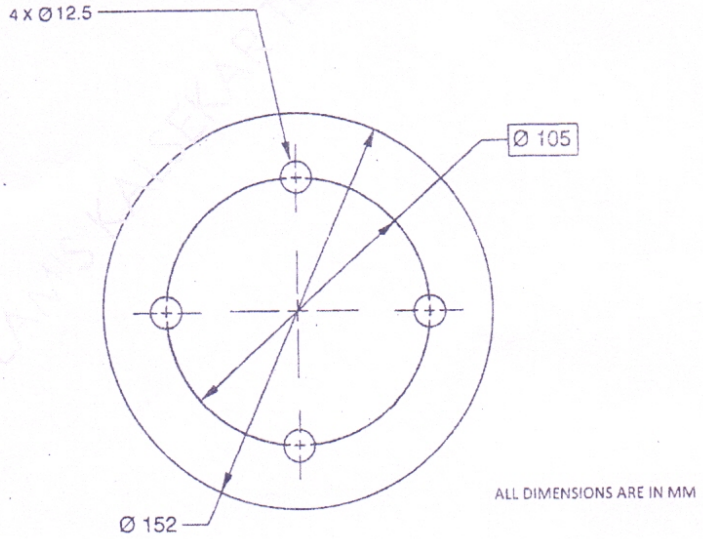
(e) Write a note on oil based cutting fluids.

(f) Write a short note on carbide inserts.

Q.2 (a) Explain the design procedure for a broach tool with help of diagram. **(10)**

(b) Write a note on different types of cutting tool materials with their applications. **(10)**

Q.3 (a) Write a CNC program for drilling operation for making 4 X ø12.5 holes in the plate as shown below, its thickness is given as 10 mm and explain all the steps in detail. (10)



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(b) Calculate and design a drill tool for machining a hole of diameter 15 mm and length 20 mm in a work piece of carbon steel. Specific cutting force = 3500 N/mm^2, Draw the drill bit and indicate designed values. (10)

Q. 4 (a) In an orthogonal cutting, the following observations were made:
Rake Angle: 10°, Cutting Speed: 50m/min, Chip Thickness: 0.4 mm, Uncut chip thickness: 0.148 mm, Depth of Cut: 2 mm, Cutting Force: 1500 N, Thrust force: 1000 N. Calculate (i) Chip reduction coefficient, (ii) Shear Angle, (iii) Shear Force, (iv) Force Normal to the shear plane, (v) Frictional Force (vi) Normal to frictional force (vii) Shear Stress (viii) Shear Strain (ix) Coefficient of Friction (x) Resultant Force **(10)**

(b) How is a gear manufactured? And also explain the limitations of the different processes. **(10)**

Q.5 (a) Derive an expression for optimum cutting speed and tool life for both minimum production cost and maximum production rate during machining process. (10)

(b) Derive the modified Merchants theory along with diagram and assumptions. **(10)**

Q.6 Write short notes on **(20)**

(a) Honing Machine.
(b) Types of Shaping machines.
(c) Forces represented in Merchant's Circle Diagram
(d) Tool geometry in the ASA system.