Q. P. Code: 27664

(3 Hours) **[Total Marks : 80]**

N.B. **(1)** Question no. **1** is **compulsory.**
(2) Attempt any **three** questions out of remaining **five** questions.
(3) Illustrate your answer with **necessary** sketch wherever **necessary**.
(4) Figures to the **right** indicate full **marks**.

1. **Attempt any FOUR of the following :** **(20)**

(a) Write short note on Honing Machine.

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

(c) Explain what is a tool dynamometer with a neat sketch.

(d) State the factors for selection of grinding wheel.

(e) Explain the steps for designing the broach tools.

2. **(a)** Explain the different gear finishing methods. **(10)**

(b) Draw and explain the different terms of a twist drill. **(6)**

(c) Write in brief about tool signature. **(4)**

3. **(a)** State the different sources of heat in metal cutting. **(10)**

(b) Explain the mechanism of chip formation. **(6)**

(c) Compare Shaper and Planer machines. **(4)**

4. **(a)** What are the functions of cutting fluid? Explain different types of cutting fluid. **(10)**

(b) In an orthogonal cutting with a tool rake angle 10°, the following observations were made: **(6)**
Chip thickness ratio = 0.4
Horizontal component of the cutting force = 1200 N
Vertical component of the cutting force = 1600 N
From Merchant's theory, calculate:
(i) Shear plane angle (ii) Shear force along the rake face (iii) Normal force on the rake face (iv) Coefficient of friction (μ) at the chip tool interface (v) Friction angle.

(c) Explain the rack planning process. **(4)**

5. **(a)** With the help of neat sketch describe vertical machining centers. **(10)**

(b) Write short note on : Cutting tool materials. **(6)**

(c) Write short notes on: Coordinate measuring machine. **(4)**

6. Write short notes on any **FOUR** : **20**

(a) Machinability.

(b) Surface Finish in machining.

(c) Geometry of milling cutter.

(d) Carbide inserts.

(e) GM codes in CNC machines.

***