SE-III | Production Process-I | MECH

09-12-14

Mechanical/Automobile

K.G.C.E. EXAM KARJAT, RAIGAD

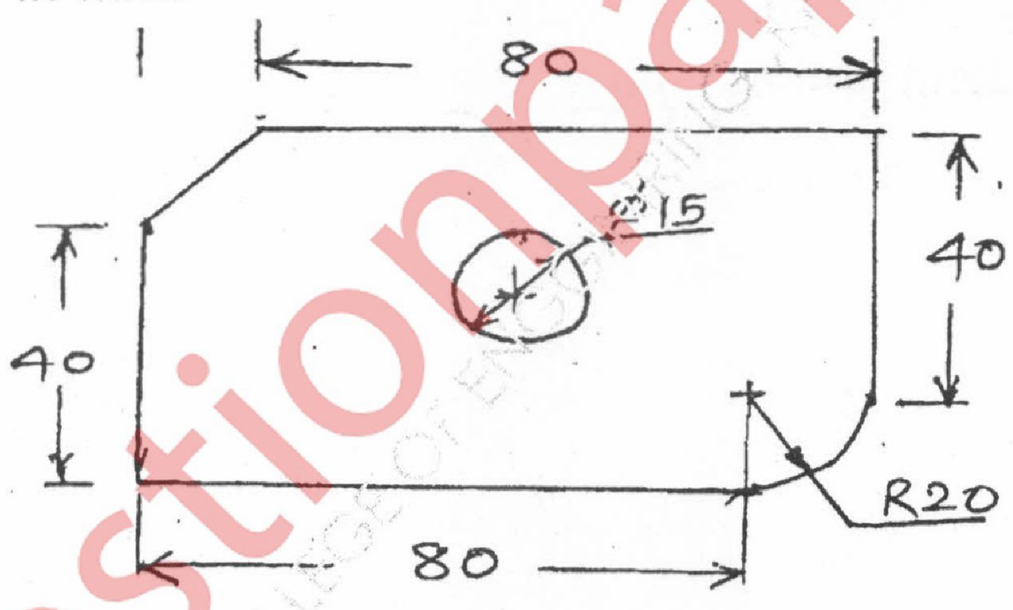
QP Code : 12500

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

N.B. : (1) Questions No. **1** is **compulsory.**
(2) Attempt any **three** questions out of remainirig **five** questions.
(3) Assume **suitable** data if **necessary.**
(4) Illustrate your answer with **neat sketches** wherever **necessary.**

1. Attempt any **four** :– **20**
   (a) Show that in metal cutting operation, $Vv = V.\gamma_c$.
   (b) Describe Ratial drilling machine with neat sketch.
   (c) Explain orthogonal rake system.
   (d) Describe internal grinding machine with neat sketch.
   (e) Discuss cutting fluids.

2. (a) Write a part programme using G-code and M code for machining external contour and drilling hole, at the centre as shown in figgur. All dimensions are in mm. **10**



   (b) Derive the relationship $2\phi + \beta \ \gamma = \frac{\pi}{2}$ in merchant's theory, clearly stating the assumptions. **10**

3. (a) Explain the various steps involved in designing circular pull type broach. Draw approprate sketches. **10**
   (b) Derive expression for tool life for minimum cost criteria in metal cutting. **10**

4. (a) Describe carbides and ceramics as cutting tools. **10**
   (b) Draw two dimensional tool dynamometer and explain it features. **5**
   (c) List gear manufacturing methods explain any one in detail with neat sketch. **5**

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5. (a) Explain with an example, graphical method of designing form tool. 10
   (b) A workpiece of 38 mm diameter is being turned on a lathe with a tool having rake angle of 33° and a feed of 0·15 mm/rev. The length of chip over one revolution of workpiece is 72 mm. The cutting speed is 12·5 m/min the tangential force is 410 N and feed force is 170 N 10
   Calculate :–
   (i) Coefficient of friction on a rake face
   (ii) Thickness of chip
   (iii) Velocity of shear
   (iv) Velocity of chip along the tool face.

6. Write short notes on (any **four**) :– 20
   (a) Lapping and honing
   (b) Dressing and truing of grinding wheel
   (c) Co-ordinate measuring machine
   (d) Nomenclature of drilling tool
   (e) Geometry of Milling cutter.

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