Student Exam No. _____

GANPAT UNIVERSITY

B. Tech. Semester: VII (Mechanical & Mechatronics) Engineering

CBCS Regular Examination Nov – Dec 2016

2ME703: Production Technology

Time: 3 Hours **Total Marks: 70**

Instruction:

1. Answer to the two sections must be written in separate answer books.
2. Figures to the right indicate full marks of the questions.
3. Draw neat sketch wherever necessary.
4. Assume suitable data if require.

Section - I

Que. – 1

[A] Explain briefly with neat sketch the following: Orthogonal cutting and Oblique cutting. Also Discuss the types of chip produced during machining along with the factors responsible for it. **[6]**

[B] The following data from an orthogonal cutting test is available. **[6]**

Rake angle = 15^o Chip thickness ratio = 0.383

Uncut chip thickness = 0.5 mm Width of cut = 3 mm

Yield stress of material in shear = 280 N/mm^2

Average co-efficient of friction on tool face = 0.7

Determine normal and tangential forces on tool face.

OR

Que. – 1

[A] What is tool signature? Discuss the effect of rack angle. Relief angle, side cutting edge angle and nose radius on machining process. **[6]**

[B] In orthogonal turning of a hollow tube, the following observations have been obtained: (i) Cutting velocity = 20 m/min (ii) Back rake angle = 8^o (iii) Feed rate = 0.2 mm/rev. (iv) Cutting force = 2000 N. (v) Feed force: 300 N. (vi) Outside diameter of tube: 50 mm. (vii) Inside diameter of tube: 48 mm. (viii) Length of chip per revolution = 80 mm. Determine: (i) Coefficient of friction between chip-tool interface. (ii) Shear plane angle. (iii) Chip flow velocity. (iv) Mean shear stress of material **[6]**

Que. – 2

[A] Explain the Electro Discharge Machining (EDM) working showing important elements. What are the functions served by Dielectric fluid in EDM? **[6]**

[B] How do you define the tool life? How cutting speed effect the tool life? What are the various forms of wear found in cutting tools? Show with neat sketch. **[5]**

OR

Que. – 2

[A] Discuss the following cutting tool materials with respect to composition, merits, demerits and field applications (i) High carbon steel (ii) Cemented carbide (iii) CBN **[6]**

[B] Explain the working of an Ultrasonic Machining (USM) with important elements. State the advantages and disadvantages of USM. [5]

Que. – 3 Answer the following questions

[A] Explain Surface Finish and Surface Integrity with one example. [4]

[B] Explain the factors affecting the Torque and Axial thrust in drilling machining operations. [4]

[C] Tool life tests in turning yield the following data: (1) when cutting speed is 100 m/min, tool life is 10 min; (2) when cutting speed is 75 m/min, tool life is 30 min. (a) Determine the n and C values in the Taylor tool life equation. Based on your equation, compute (b) the tool life for a speed of 110 m/min, and (c) the speed corresponding to a tool life of 15 min. [4]

Section – II

Que. – 4

[A] With neat sketch explain the Laser Beam Machining process along with advantages, disadvantages and applications. [6]

[B] Enlist various fixtures uses in mass production system. Explain any one with neat sketch. [6]

OR

Que. – 4

[A] Enlist the types of Drilling Jigs. Explain any three with the help of suitable sketch. [6]

[B] Explain the Principle of WJM. Explain the process parameters that influence WJM. List the applications and limitations of WJM. [6]

Que. – 5

[A] Differentiate between forming and generating. Explain Roll Forming method of gear manufacturing. [6]

[B] Estimate the blanking force to cut a blank 25 mm wide and 30 mm long from a 1.5 mm thick metal strip, if the ultimate shear stress of the material is 450 N/mm^2. Also determine the work done if the percentage penetration is 25 percent of material thickness. [5]

OR

Que. – 5

[A] Why thread rolling has become the most commonly used method for thread manufacturing? Discuss the various threads rolling process briefly. [6]

[B] A hole of 60 mm diameter is to be produced in steel plate 2.5 mm thick. The ultimate shear strength of the plate material is 450 N/mm^2. If the punching force is to be reduced to half of the force using a punch without shear, estimate the amount of shear on the punch. Take percentage penetration as 40%. [5]

Que. – 6 Answer the following questions

[A] With the help of sketch discuss the important elements of press tool design. [4]

[B] Classification of method for gear manufacturing, Explain any three methods in details [4]

[C] Explain any four kind of locators use to locate blanks in fixture with the help of neat sketch. [4]

END OF PAPER