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Student Exam No._____

Date:- 29/11/2014. GANPAT UNIVERSITY

**B. Tech. Semester: VII Mechanical/ MechatronicsEngineering**

**Regular Examination November – December2014**

**2ME703 - PRODUCTION TECHNOLOGY**

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

**Instruction:** 1 Attempt all questions.
2 Assume suitable data if necessary.
3 Figures to the right indicate full marks.

**Section - I**

| | | | |
|---|---|---|---|
| **Que. – 1** | **(a)** | Explain briefly with neat sketch the following: Orthogonal cutting and Oblique cutting | **4** |
| | **(b)** | Enlist and explain any six cutting tool materials briefly. What are the importance of positive and negative rake angles? | **4** |
| | **(c)** | Explain briefly the following types of chips: Continuous chip, Discontinuous chip and Build up chip | **4** |
| | | **OR** | |
| **Que. – 1** | **(a)** | What is Build up edge? Why a Build up edge on a tool is undesirable? | **4** |
| | **(b)** | Discuss the various types of tool wear and failures. | **4** |
| | **(c)** | List and explain various types of single point cutting tools. | **4** |
| **Que. – 2** | **(a)** | A Carbide tool with a mild steel work-piece was found to give life of 2 hours while cutting at 48 m/min. If Taylor's exponent n=0.27, determine (i) The tool life if the same tool is used at a speed of 20 percent higher than the previous one.<br>(ii) The value of cutting speed if the tool is required to have tool life of 3 hours. | **5** |
| | **(b)** | What is chip thickness ratio? With usual notion, derive the expression showing relationship between shear plane, chip thickness ratio and rack angle. | **6** |
| | | **OR** | |
| **Que. – 2** | **(a)** | In an orthogonal cutting operations the following data has been observed:<br>Chip length obtained = 96 mm<br>Uncut chip length = 240 mm<br>Rake angle used = 20°<br>Depth of cut = 0.6 mm<br>Horizontal and vertical components of cutting force = 2400 N and 240 N respectively.<br>Determine the value of shear plane angle, chip thickness, frictional angle, and resultant cutting force. | **5** |
| | **(b)** | Using tool life equation, derive the expression for optimum cutting speed for minimum total cost. | **6** |
| **Que. – 3** | **Attempt All.** | | **12** |
| | **(a)** | Discuss briefly 'Friction in metal cutting'. | |

P.T.O.

(b) During orthogonal machining with a cutting tool having a 12° rake angle, the chip thickness is measured to be 0.44 mm, the uncut chip thickness being 0.18 mm. Determine Shear plane angle and shear strain.

(c) Discuss briefly the following:
Side cutting angle, Side relief angle, Back rake angle, nose radius

(d) What is machinability index? What is the function of chip breakers?

## Section – II

**Que. – 4** (a) Enumerate various types of clamps. Explain in detail with neat sketch any three clamping devices. 4

(b) Classification of method for gear manufacturing. Explain any three methods in details. 4

(c) Describe briefly with a neat diagram the working principle of Laser Beam Machining (LBM)? What are its advantages, limitations and applications? 4

**OR**

**Que. – 4** (a) What do you understand by 'Degree of freedom'? List the main components or elements of jigs and fixtures. 4

(b) Explain the factor affecting the Torque and Axial thrust in drilling machining operation. 4

(c) What is Chemical Machining? State its advantages and limitations. 4

**Que. – 5** (a) Differentiate the following: a) ECG and ECM b) AJM and PAM 6

(b) Explain the working principle of Electro-Chemical machining process. 3

(c) Why LBM cannot be used for machining Al and Ag? 2

**OR**

**Que. – 5** (a) Give the comparison of gear hobbing and gear shaping. Explain with neat sketch the thread rolling method of making threads. 6

(b) Explain briefly the following methods of gear finishing. 5

1. Gear shaving
2. Gear burnishing
3. Gear grinding
4. Gear lapping
5. Gear honing

**Que. – 6** **Attempt All** 12

(a) Explain Six-pin method (3-2-1 method).

(b) How are jigs and fixtures classified? Write the principles of Jigs and Fixtures design.

(c) Describe briefly with a neat diagram the working principle of Ultra Sonic Machining (USM)? Give also its advantages, limitations and applications.

(d) Sketch the schematic diagram and explain the process principle of Electron Beam machining.

END OF PAPER