

**GANPAT UNIVERSITY**  
**B.TECH SEM. VII (MECHAICAL/MECHATRONICS)**  
**REGULAR EXAMINATION NOV-DEC - 2013**  
**2ME703 - PRODUCTION TECHNOLOGY**

Time: 3 Hours

Total Marks: 70

**Instructions:**

- 1). All questions are **compulsory**.
- 2). Figures to the **right** indicate full marks.
- 3). Answers to the two sections must be written in **separate** answer books.
- 4). Assume all necessary data.

**Section - I**

- Q.1 (A)** Explain following term related to single point cutting tool geometry. (4)  
 i) Shank ii) Base iii) Heel iv) Face v) Neck vi) Cutting Edge vii) Nose  
 viii) Flank
- (B)** In orthogonal machining the tool has rake angle  $8^\circ$ , chip thickness before cut is to = 0.5 mm, and chip thickness after cut is  $t_c = 1.2$  mm. The cutting and thrust forces are measured at  $F_c = 4$  N and  $F_t = 3$  N while at a cutting speed of 60 m/min. Determine the machining shear strain, shear stress, and cutting horsepower. (4)
- (C)** Enlist the different types of milling cutter and explain the side and end milling cutter important. (4)

**OR**

- Q.1 (A)** Explain American Standard System (ASA) and Orthogonal Rack System (ORS)? (4)
- (B)** Tool life tests on a lathe have resulted in the following data: (1) at a cutting speed of 375 ft/min, the tool life was 5.5 min; (2) at a cutting speed of 275 ft/min, the tool life was 53 min. (a) Determine the parameters  $n$  and  $C$  in the Taylor tool life equation. (b) Based on the  $n$  and  $C$  values, what is the likely tool material used in this operation? (c) Using your equation, compute the tool life that corresponds to a cutting speed of 300 ft/min. (d) Compute the cutting speed that corresponds to a tool life  $T = 10$  min. (4)
- (C)** Explain the factor affecting the Torque and Axial thrust in drilling machining operation. (4)
- Q.2 (A)** With help of neat sketch describe the mechanism of material removal in EDM. (4)
- (B)** Discuss the influence process parameters and applications of USM (3)
- (C)** Explain the principle of LBM with neat sketch and List out the advantage and limitation of LBM process. (4)

**OR**

- Q.2 (A) Explain the principle of AJM. Mention some of the specific applications. (4)
- (B) Explain the principle of ECM with sketch. Briefly discuss about the effect of high temperature and pressure of electrolyte on the ECM process (3)
- (C) Discuss the process parameters of EBM and their influence on machining quality. (12)

Q.3 Explain the following (Any Three)

- (A) Explain Surface Finish and Surface Integrity with one example.
- (B) Cemented Carbide and Ceramic cutting tool material which one is better explain
- (C) Explain Hobbing method for gear manufacturing. Also state its advantages and limitation.
- (D) In an orthogonal cutting operation, the rake angle =  $-5^\circ$ , chip thickness before the cut = 0.2 mm and width of cut = 4.0 mm. The chip ratio is 0.75 Determine (a) the chip thickness after the cut, (b) shear angle, (c) friction angle, (d) coefficient of friction, and (e) shear strain.

Section - II

- Q.4 (A) Explain the General Applications Of Screw Threads. (4)
- (B) Explain the process parameters that influence WJM. List the applications and limitations of WJM (4)
- (C) Explain the components of USM in detail. (4)

OR

- Q.4 (A) Which are the properties required in cutting tool material? Explain the HSS Cutting tool material. (4)
- (B) Explain the process of electrical discharge machining, its process parameters and applications. (4)
- (C) Classification of method for gear manufacturing. Explain any one method. (4)
- Q.5 (A) Define the term used in press working. 1) die 2) die block 3) punch 4) lower shoe 5) backup plate 6) stripper (4)
- (B) Describe the design principle of lathe fixture. (4)
- (C) Find the total pressure. Dimensions of tools to produce a washer 6cm outside diameter with a 2.6cm diameter hole, from material 5 mm thick have shear strength of  $360\text{N/mm}^2$ . (3)

OR

- Q.5 (A) What is meant by bending dies? Explain bending method with neat sketch. (4)
- (B) Explain the principle of metal shearing in press working. (3)
- (C) A washer with a 12.7 mm internal hole and an outside diameter of 25.4mm is to be made from 1.5mm thick strip of 5 percent carbon steel. Considering the elastic recovery of the material find: (a) the clearance (b) blanking die opening size (c) the blanking punch size (d) the piercing punch size (e) the piercing die opening size. (4)

Q.6 Attempt All. (12)

- (A) Describe with neat sketch any three types of clamping device with their features and application
- (B) What is meant by 'fool proofing' as applied to jig and fixture? How it can be achieved.
- (C) Sketch and explain different drill bushes useful in drill jigs.