

**Ganpat University**  
**B.Tech SEM VIII Mechatronics Engineering**  
**Regular Examination May-June 2013**  
**MC803 Machine Tool Design**

Duration: 3hr

Marks: 70

**Instructions:**

1. Assume suitable data if necessary.
2. Write your answer to the point and precisely.
3. Draw neat and clean sketch.
4. Use of design data book (PSG) is permissible.

**SECTION - 1****Q.1 Attempt following questions**

- (a) Find the speed steps arranged in geometric progressions for following [06]  
 conditions:  $n_{\min} = 12$  rpm,  $n_{\max} = 510$  rpm,  $z = 8$ .
- (b) Write down steps for selecting best structural diagram for machine tool gear [06]  
 box design. Explain also concept of ray diagram.

**OR****Q.1 Attempt following questions**

- (a) Draw structure and speed diagram for following data: [10]  
 $Z = 12$ ,  $N_{\min} = 30$  and  $N_{\max} = 1500$ .
- (b) Describe steps for drawing multi-speed motor structure diagram. [02]

**Q.2 Attempt following questions**

- (a) A 2000 mm long, 1000 mm high and 500 mm wide lathe bed consists of two [07]  
 vertical walls strengthened by perpendicular or diagonal stiffeners. The  
 thickness of the walls is 50 mm, while that of the stiffeners is 25 mm.  
 Calculate the reduced bending rigidity of the beds having perpendicular and  
 diagonal stiffeners.
- (b) Explain Profile of Machine tool structure with Applications. [04]

**OR****Q.2 Attempt following questions**

- (a) Explain Static and Dynamic Stiffness of Machine Tool with sketch. [07]
- (b) Derive equation of weight ratio when bar subjected to tension in machine tool [04]  
 structure.

**Q.3 Attempt following questions**

- (a) Describe guidelines for selecting geometric progression ratio. [04]
- (b) Write a short note on break-up of speed steps in machine tool for design of [04]  
 speed box.

- (c) Explain Manufacturing problems with respect to wall thickness and walls of different thicknesses. [04]

**SECTION – II**

**Q.4 Attempt following questions**

- (a) Explain Transmission of Vibration from Vibrating Foundation [04]  
(b) Explain Vibration due to Reciprocating Unbalance [04]  
(c) Write short note: Vibration due to Intermittent cutting. [04]

**OR**

**Q.4 Attempt following questions**

- (a) Explain Vibration in case of milling machine during cutting. [04]  
(b) Explain vibration in grinding machine [04]  
(c) Explain factors of Productive time. [04]

- Q.5 (a)** A 20 mm diameter drill is to be made on soft steel at 500 rpm and 0.12 mm feed. Take specific power 0.06 kw per cubic centimeter per minute. Determine Power. [05]

- (b)** Explain Following Instruments used in Acceptance tests [06]  
1. Dial Gauge  
2. Test Mandrels  
3. Spirit Level

**OR**

- Q.5 (a)** Explain Sequence of Acceptance tests [04]

- (b)** Explain with Application [04]  
1. Autocollimeter  
2. Wavinessmeter

- (c)** Explain Present Worth Principle [03]

**Q.6 Attempt following questions**

- (a) Explain Disc Cam Control with neat Sketch [04]  
(b) Explain Travelling Control by Dropping Worm and Slipping Clutch [04]  
(c) Compare Star wheel with rotary wheel [04]

**END OF PAPER**