

22570

23242

3 Hours / 70 Marks

Seat No.

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- Instructions :** (1) All Questions are *compulsory*.  
(2) Illustrate your answers with neat sketches wherever necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Define factor of safety.
- (b) State the type of machine tool structure.
- (c) State the function of Guideway.
- (d) State the materials used for Guideway.
- (e) State the requirement of machine tool spindle.
- (f) Define Ray Diagram.
- (g) Define Aesthetics of machine tool.

**2. Attempt any THREE of the following :**

**12**

- (a) State the basic design requirement of machine tool design.
- (b) List different types of vibration occurred in machine tool. State its effect on machine tool performance.
- (c) Discuss the factor affecting stiffness of machine tool structure.
- (d) Describe different profile of machine tool structure used in machine tool.



- 3. Attempt any THREE of the following :** **12**
- (a) State the importance of stress concentration factor.
  - (b) State shape of structure used in machine tools and draw it's neat sketch.
  - (c) Classify Guideway.
  - (d) Explain open type guideway and closed type of guideway.
- 4. Attempt any THREE of the following :** **12**
- (a) State the different type of Bearing used for spindle units.
  - (b) Discuss method of reducing vibration.
  - (c) Explain ergonomic consideration applied to type of display.
  - (d) Explain G.P. series and state its advantage.
  - (e) Explain Man-Machine relation.
- 5. Attempt any TWO of the following :** **12**
- (a) State engineering design process applied to machine tools with suitable example.
  - (b) List and compare various material of Machine tool structure.
  - (c) Draw a structural diagram and ray diagram for six speed gear box. Assume Geometric Ratio = 1.41 and minimum speed of Gear box = 270 R.P.M.
- 6. Attempt any TWO of the following :** **12**
- (a) Explain function of spindle unit. State it's material.
  - (b) Compare speed chart and ray diagram and state the importance of the ray diagram.
  - (c) Draw the structural diagram of machine tool speed box for  $n_{\min} = 16$  rpm,  $n_{\max} = 770$  rpm and  $\phi = 1.26$ , state the suitable layout and explain reason for suitability.
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