ME Mech Machine Design / Sem II / Choice Based / Second Half 2018

22/11/2018

Paper / Subject Code: 35003 / Machine Tool Design .

Duration: 3 hours **Total Marks** 80

- **Attempt any FOUR questions out of SIX questions.**
- **Assume suitable data wherever required.**
- **Illustrate answers with sketches wherever required.**

Q1 **Answer any four questions** **20**

1. General requirements of machine tool design
2. List out machine tool structures and their functions
3. Design features of a spindle
4. Briefly discuss machine tool testing
5. Classify speed and feed boxes

Q2 **(i)** What are ray diagram? How an optimum ray diagram obtained? **10**

(ii) Design procedure of rolling friction power screws based on wear resistance, strength, stiffness, buckling stability **10**

Q3 **(i)** List out and explain Various laws of Stepped regulation of speed boxes **10**

(ii) Derive the effect of machine tool compliance on machining accuracy. **10**

Q4 **(i)** How to carryout procedure of Level installation of machine tools with instruments **10**

(ii) Design a lead screw and nut for a lathe to sustain an axial load of 16KN. The thrust is carried on a collar of 110mm outer diameter and 80mm inner diameter and is to rotate at 100rpm. The coefficient of friction at the collars and threads could be taken as 0.15 and 0.14 respectively Validate the design of lead screw Determination of torque **10**

Q5 Design a two stage 6 Speed gear box a Machine tool from the following Minimum Speed 100rpm, Maximum Speed 1400rpm, Motor H.P 10hp, Motor Speed 1440rpm **20**

Draw 1. Structural Diagram, 2. Optimal Ray diagram 3.Deviation Diagram. 4. Gearing Diagram.

Q6 **Answerany two questions** **20**

1. Design requirements of guideways and design procedure of guideways
2. Basic design procedure of structures of machine tool
3. Explain machine tool testing of accuracy tests, idle run tests and acceptance tests

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