Total No. of Questions : 12]

P4904

SEAT No. :

[Total No. of Pages : 2

[4959]-1037

B.E. (Mechanical)

(D) : MACHINE TOOL DESIGN

(2012 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:-

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Assume suitable data, if necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable electronic calculators is allowed.***

SECTION - I

Q1) Explain with any one practical example why geometric progreassion is used in machine tool drive speed regulation. **[10]**

OR

Q2) Explain the design procedure of speed gear box for spindle drive by considering all safety factors. **[10]**

Q3) a) A bed subjected to torsional loading is constructed as a closed box type structure, while a bed subjected to bending is constructed as I-section Why? **[2]**

b) Explain static and dynamic stiffness in machine tool structures. **[8]**

OR

Q4) With the schematic, explain the stress analysis of Lathe Bed. **[10]**

Q5) a) Discuss the functions and types of guide-ways. **[5]**

b) What is stick-slip motion in slide-ways. Explain. **[5]**

OR

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Q6) Explain the design criteria and calculations of any one slide-ways. **[10]**

SECTION - II

Q7) a) Discuss the different factors for the design of sliding friction power screws. **[6]**

b) Describe with neat sketch spindle unit of a milling machine. **[6]**

OR

Q8) a) Explain the methods of preloading of antifriction bearings. **[6]**

b) Explain why the distribution of load over the threads is uniform in a ball lead screw in comparison with sliding friction lead screw. **[6]**

Q9) With the help of block diagram, explain the experimental method for determination of dynamic characteristic of equivalent elastic system. **[12]**

OR

Q10)Explain the effect of forced vibration due to perturbance of the cutting process on machine tools. **[12]**

Q11)a) Explain retrofitting with reference to Lathe machine. **[8]**

b) Discuss the design considerations for step-less drive. **[8]**

OR

Q12)a) With the help of applications, explain recent trends in machine tools. **[8]**

b) Explain the ergonomics considerations applied to the design of control members and location of displays. **[8]**