17532

14115

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory*.

(2) Answer each next main Question on a new page.

(3) Illustrate your answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any <u>THREE</u> of the following : **12**

(i) State role of factor of safety in design.

(ii) Write the functions and requirements of machine tool structures.

(iii) Differentiate between slideways and guideways.

(iv) What are basic design requirements of simple machine part ?

b) Attempt any <u>ONE</u> of the following : **6**

(i) Define stress concentration ? State the different methods to reduce effect of stress concentration and explain in brief.

b) Explain various profiles of structures for machine tool.

Marks

2. Attempt any FOUR of the following : **16**

a) Explain the different stresses developed in machine parts.

b) Write classification of machine tool slideways ? Draw any two shapes.

c) Write is ray diagram ? Explain the significance of ray diagram.

d) What is speed chart ? State its importance with suitable example.

e) Define. Aesthetics ? Why it is important in machine tools ?

3. Attempt any TWO of the following : **16**

a) What is machine tool structure ? Explain the factors affecting stiffness of machine tools structure and also write methods to improve it.

b) State and explain hydrodynamic and hydrostatic slideways.

c) What is effect of vibration on cutting condition and tool life ?

4. a) Attempt any THREE of the following : **12**

(i) State the applications of different types of profiles is used as machine tool structure ?

(ii) Explain selection of range of spindle speed.

(iii) State essential requirement for layout of stepped drive.

(iv) What is function of knob ? Draw any two sketches of knobs used in machine tools.

b) Attempt any ONE of the following : **6**

(i) What is spindle unit ? What are its functions ? State any two requirement of spindle unit.

(ii) What are stepped regulation of speed in machine tool ? State various laws of stepped regulations.

Marks

5. Attempt any FOUR of the following : **16**

a) Why location of displays is important in machine tools ? Explain with suitable example.

b) Explain role of vibration dampers and isolators.

c) Check the feasibility of structural formula 3(2) 2(1) for $\phi = 1.41$.

d) What are advantages of G.P. series ?

e) State general requirements of machine tool design.

f) What are antifriction guide ways ? State any four advantages of it over conventional guide ways.

6. Attempt any FOUR of the following : **16**

a) Explain with example representation of speeds on structural diagram.

b) State different types of bearings used for spindle support.

c) Write a report on ergonomic features of drilling machine in your workshop.

d) Explain stick slip phenomeno in machine tool guideways.

e) Write the applications and properties of any four types of materials used in machine tool construction.