17532

11920

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 answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

Marks

1. (A) Attempt any THREE : **12**

(a) What are the Basic Design Requirements ?

(b) Explain stress concentration factor.

(c) Explain hydrostatic slide ways.

(d) What are the requirements for layout of a stepped drive ?

(B) Attempt any ONE : **6**

(a) Explain selection of range of spindle speed.

(b) Explain stick slip motion in guides.

2. Attempt any FOUR : **16**

(a) State General design procedure. (any four)

(b) What are the factors affecting stiffness of machine tool structure ?

(c) State the different types of bearings used for spindle units.

(d) State the advantages of G.P. Series. (any four)

(e) Explain the Role of vibration dampers and Isolators.

3. Attempt any TWO : **16**

(a) Explain decision making for best ray diagram of a Gear box.

(b) Explain the function of guide ways, state the requirements for selecting materials for guide ways.

(c) State the general requirements of machine tool design.

4. (A) Attempt any THREE : **12**

(a) Explain aerostatic slide ways.

(b) Why feasibility of structural formula is required ? How is it checked ?

(c) Explain the method of reducing vibrations.

(d) What is the function of push button, knobs levers and cranks ?

(B) Attempt any ONE : **6**

(a) Explain types of surface profile produced by machine tools.

(b) Explain factors of safety and service factor.

5. Attempt any FOUR : **16**

(a) State the different types of materials required for machine tool structures. State its applications.

(b) What are the functions of machine tool structures ?

(c) Calculate spindle speed for following :

Given $\phi = 1.2$, $N_1 = 36$ rpm, no. of steps six.

Also, draw suitable structure diagram for six speed and ray diagram for the same.

(d) List out different sources of vibrations in machine tools.

(e) Define Aesthetics. Why is it important ?

(f) Explain ergonomic considerations applied to location of displays and control members.

6. Attempt any FOUR : **16**

(a) What are the requirements of machine tool structures ? (any four)

(b) What is the function of the spindle units ? What are its requirements ?

(c) What are the different constraints for stepped regulation of speed ?

(d) Which profile of machine tool structure is more preferred for use ? Why ?

(e) State various aesthetic characteristics in machine tool design.
