17532

11819

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** of the following : **12**

a) State the basic design requirements of machine tool design.

b) Define factor of safety. State the importance of factor of safety in design.

c) Write the general requirements of machine tool design.

d) Explain in brief design procedure of machine tool design.

B) Attempt **any one** of the following : **6**

a) What is stress concentration ? State the different methods to reduce the stress concentration effect. Explain in brief with neat sketches.

b) i) State the role of factor of safety in machine design procedure.

ii) State various factors effecting on stiffness of machine tool structure.

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

a) State the different materials used for machine tool structures. Also state their properties.

b) State the applications of different types of profiles used as machine tool structure.

c) State the different functions of machine tool structure.

d) Explain in brief, selection of material in machine tool structure design.

e) State various methods in improve the stiffness of machine tool structure.

Marks

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

a) State and explain hydrodynamic and hydrostatic slide ways.

b) i) What are the different types of bearing used in spindle support ? Describe in brief.

ii) Classify and explain the guide ways with (block diagram) flow chart.

c) i) Define speed chart State the necessity of speed chart.

ii) State the functions of guide ways.

4. Attempt **any four** of the following : **16**

a) Define ray diagram. Explain the significance of ray diagram.

b) State different constraints for steeped regulation of speed.

c) Explain decision making for the best ray diagram of gear box.

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

e) Define machine tool structure. State the requirements of machine tool structure in machine tool design.

5. A) Attempt **any two** of the following : **12**

a) State the various sources of vibrations in machine tool.

b) State different standard values of ϕ i.e. common ratio. Also state factors on which selection of ϕ depends.

c) Explain in brief various methods of reducing vibrations in machine tool.

B) Attempt **any one** of the following : **6**

a) Calculate spindle speed of following :

Given $\phi = 1.3$, N1 = 47 rpm, No. of steps six. Also draw suitable structural and ray diagram for six speed.

b) What is Spindle unit ? What are the functions of it ? Also state any two requirement of Spindle unit.

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

a) State ergonomic considerations applied to types of display and location of display.

b) State the functions of knobs, levers, crank and hand wheel.

c) Define asthetics. State the importance of asthetics in machine tools.

d) State the function of push button. Draw any two sketches of knobs used in machine tool control.

e) State and explain effects of vibration on machine tool performance and accuracy.

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

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