

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:3161921****Date:14-07-2023****Subject Name:Machine Tool Design****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Explain hydraulic transmission system in brief.	03
	(b) Give the drive and feed motions for the following machines	04
	(1) Lathe (2) Boring (3) Drilling (4) shaping	
	(c) Explain various laws of stepped regulation with its applications.	07
Q.2	(a) Compare arithmetic and geometrical progression ratio for speed selection.	03
	(b) What are structure diagrams? Which information can be obtained from structure diagrams?	04
	(c) Explain the function of machine tool structures.	07
OR		
	(c) Draw the structure diagram and gear box arrangement for the following structural formulae.	07
	(i) 2(1) 3(2)	
	(ii) 2(3) 3(1)	
	(iii) 3(1) 2(3)	
	(iv) 3(2)2(1)	
Q.3	(a) Explain the different design criteria for design of machine tool structure.	03
	(b) On which basis you will select the Cast Iron and Steel as the material of machine tool structure.	04
	(c) Explain the design procedure of machine tool structure on the basis of strength.	07
OR		
Q.3	(a) Enlist the major requirements that the guide ways must satisfy.	03
	(b) Illustrate with sketch the symmetrical V, dovetail and cylindrical sideways.	04
	(c) Explain methods of adjusting clearances in sideways.	07
Q.4	(a) What are the design requirements of spindle units?	03
	(b) Suggest the material for following spindles	04
	1. Normal accuracy spindle 2. Precision machine tools 3. Heavy duty spindles.	

(c) Explain the design procedure of power screws. **07**

OR

Q.4 (a) Write the general design procedure of column structure. **03**

(b) What are the desirable properties for material of spindle and Bearing? Suggest material for spindle and bearing. **04**

(c) Why preloading is carried in antifriction bearing? What are the methods of preloading of ball bearing? **07**

Q.5 (a) How will you use aesthetic considerations for effective design of Machine tools? **03**

(b) Explain the importance of ergonomic consideration applied to the design of control members of machine tools. **04**

(c) What are the effects of vibration on performance of design of machine tools and how these can be minimized? **07**

OR

Q.5 (a) What are the advantages of adaptive control system? **03**

(b) What is anthropometric Data? How it is useful in design of machine tool. **04**

(c) Explain selective control system for speed changing. **07**
