

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3161921****Date:17-12-2022****Subject Name:Machine Tool Design****Time:02:30 PM TO 05:00 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

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|------------|---|-----------|
| Q.1 | (a) Name the Devices used for intermittent motion. Explain anyone in detail. | 03 |
| | (b) Why feed box with gear cone with sliding key is not suitable for heavy duty lathe machine? | 04 |
| | (c) Discuss general requirements of machine tool design. | 07 |
| Q.2 | (a) Why it is important to adjust the clearance in slide ways? | 03 |
| | (b) Discuss various types of Bed structure and wall arrangements and their applications with neat sketch. | 04 |
| | (c) With neat sketch explain following gear box:
(1) Feed box with tumbler gear (2) Feed box with sliding gear | 07 |
| | OR | |
| | (c) Discuss various shapes of slide ways and justify their application for machine tools. | 07 |
| Q.3 | (a) Write a note on Antifriction Guideways. | 03 |
| | (b) Write a short note on materials of machine tool structure. | 04 |
| | (c) Give requirement of Protecting devices for slide ways and explain various types of protecting devices with neat sketch. | 07 |
| | OR | |
| Q.3 | (a) Explain various functions and types of guideways. | 03 |
| | (b) Explain basic design procedure for machine tool structure. | 04 |
| | (c) Explain the design procedure of Slideways for wear resistance. | 07 |
| Q.4 | (a) Discuss various methods to improve dynamic stiffness of machine tools. | 03 |
| | (b) State the functions and requirements of the spindle unit along with the materials. | 04 |
| | (c) Explain Preloading of anti friction bearing. | 07 |
| | OR | |
| Q.4 | (a) Differentiate between sliding friction and rolling friction power screw. | 03 |
| | (b) Write a short note on adaptive control system. | 04 |
| | (c) Explain the design of aerostatic slideways. | 07 |
| Q.5 | (a) Discuss the role of Aesthetics in Product design. | 03 |
| | (b) Draw general layout of knee type vertical milling machine with relative motion. | 04 |
| | (c) Explain design procedure of columns. | 07 |

OR

- Q.5** **(a)** Discuss following in brief: **03**
 1. Value Engineering 2. Consumer Quality level
- (b)** Draw general layout of Lathe with relative motion. **04**
- (c)** Explain factors affecting stiffness of machine tool structure and **07**
 methods to improve it.
