Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1720903 **Date: 20-06-2014**

Subject Name: Machine Tool Design

Time: 02:30 pm - 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. **Use of PSG Design Data Book is permitted in examination.**

Q.1	**(a)**	Derive an expression for optimum (l^2/h) ratio for a solid rect-angular cross section (b x h) steel lathe bed having length l.	**07**
	(b)	Explain the direction control valve with the help of neat sketch.	**07**
Q.2	**(a)**	Explain the Selective and pre-selective mechanisms in brief.	**07**
	(b)	Explain the following laws of stepped regulation : Arithmetic progression and geometric progression. What are the advantages offered by geometric progression in machine tools drives ?	**07**
		OR	
	(b)	Design (draw only structure diagram and speed chart only) a radial drilling machine gearbox from the following data: N_{min} = 80 r.p.m. Speed of gearbox input shaft = 720 r.p.m. N_{max} =900 r.p.m. No of steps = 8	**07**
Q.3	**(a)**	State the functions of spindle unit. Explain the spindle materials and its selection.	**07**
	(b)	Explain the design of slide ways based on wear consideration.	**07**
		OR	
Q.3	**(a)**	Explain the different methods used for adjusting clearances in slide ways.	**07**
	(b)	Explain the spindle design based on bending stiffness with neat sketch.	**07**
Q.4	**(a)**	Explain the protective and safety devices used machine tools.	**07**
	(b)	Explain the basic design procedure for machine tools structure design.	**07**
		OR	
Q.4	**(a)**	Explain the basic design aspects used for machine tools structure design.	**07**
	(b)	Explain the dynamic stability of machine tools.	**07**
Q.5	**(a)**	Explain the aesthetic considerations used in machine tool design.	**07**
	(b)	Explain the recent developments in machine tool elements design.	**07**
		OR	
Q.5	**(a)**	Explain the ergonomic considerations used in machine tool design in detail.	**07**
	(b)	Explain about the modular structures used in machine tools.	**07**

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