BACHELOR OF PRODUCTION ENGG. 3rd YEAR EXAMINATION, 2017(Old)
(2nd Semester)
SUBJECT – MACHINE TOOL SYSTEMS

Time: Three hours   Full Marks: 100

No of Questions		Marks
	Answer any *five* questions	
1	(a) Differentiate between "Machine" and "Mechanism". Define "Machine Tool" with reference to metal cutting.	6
	(b) Describe principal objectives of metal cutting machine tools.	4
	(c) Define "Generatrix" and "Directrix". Describe "Turning" and "Shaping" operations with respect to generatrix and directrix.	6
	(d) Classify machine tools in three broad categories giving some examples in each.	4
2	(a) Classify and explain surfaces produced by machine tools.	4
	(b) Identify types of machine tool's basic motions.	4
	(c) Explain following conversion mechanisms: (i) R - T - R, (ii) R^2 - R, (iii) R - T and (iv) R^2 + T.	8
	(d) Describe about worm-worm wheel mechanism and how it can be utilized in reversible operation?	4
3	(a) Classify kinematic structures of machine tools which produce all formative motions.	6
	(b) Explain with neat sketch the kinematic structure, *k*-23 for double feed taper turning machine.	6
	(c) What is differential mechanism in machine tools? Explain in brief the "Sun-planet Mechanism" utilized in machine tools for speed changing.	2+6
4	(a) Explain the basic scheme of kinematic structure of Fellow's Gear shaping machine. How radial feed mechanism of the gear shaping process operates.	10
	(b) Explain kinematic structure of "Hobbing machine". Answer should include basic scheme, a neat sketch and also different kinematic balance equations.	10
5	(a) State reasons which necessitate the variation of spindle speed in machine tools.	4
	(b) Explain the speed loss analysis and find out the desirable condition for designing the ratio of two neighboring rpm steps.	6
	(c) Explain the significance of test line in saw diagram. Why G. P. series is considered in machine tool drive design?	10

BACHELOR OF PRODUCTION ENGG. 3ʳᵈ YEAR PART-I EXAMINATION, 2017(Old)
(2nd Semester)
SUBJECT – MACHINE TOOL SYSTEMS

Time: Three hours   Full Marks: 100

No of Questions		Marks
6	A 2X2 gear drive is required to be designed for transmitting 10 HP with speeds ranging from 400 rpm with $\phi = 1.26$. Assume for machine tool $\dfrac{b}{m} = 10$; and for high alloyed steel C=10.	
	Determine the following:	
	(i) Construct the best ray diagram;	
	(ii) Gear sizes at all stages;	
	(iii) Modules and width of the gears, and	
	(iv) Shaft diameters at all stages.	4+8+5+3
7	(a) Explain in brief the structural format for feed in case of milling machine.	7
	(b) Describe advantages and limitations of up and down milling.	6
	(c) Explain with neat sketch the structural format for feed in case of drilling machine.	7
8.	Write short notes on any *two* of the following:	
	(i) Pitch error correction differential unit;	
	(ii) Constraints for ray diagram of gearbox;	
	(iii) Basic rules for designing sliding cluster of gears, and	
	(iv) Clutch as speed reducer for backgear Drives,.	2x10