Reg. No.



VI SEMESTER B.TECH (MECHANICAL & IP ENGG.) END SEMESTER EXAMINATIONS, JUNE 2017

SUBJECT: PE-IV, MACHINE TOOL TECHNOLOGY [MME 4008] REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

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	 Instructions to Candidates: Answer ALL the questions. Missing data may be suitably assumed. Draw neat sketches wherever is required. 	
1 A .	Explain with neat sketch the working motions and parameters defining working motions in (i) Lathe (ii) Drilling Machine.	05
1B.	What are the essential requirements for proper functioning of a gear transmission with sliding clusters?	05
2A.	Derive the relationship between speed step ratio, the number of speed steps and speed range ratio. Also show the relationship graphically.	03
2B.	With the help of a neat sketch show how would you cut metric thread of 1.5 mm pitch with a whit worth lead screw of 2 TPI by employing change gears with translating gear.	02
2C.	Design a nine speed gear box having N $_{min}$ = 100 rpm and N $_{max}$ = 630 rpm. Assume Motor speed = 1400 rpm. The design should include structural diagram, speed chat with gear ratio and number of teeth on the gears.	05
3A.	Explain the shaft size minimization criterion in the decision making for the best structural diagram of a gear box.	05
3B.	 A stepped cone pulley with back gearing arrangement is used to obtain the eight spindle speeds. The diameters of the steps of the stepped cone pulley are in the ratio of 1.12. (i) Draw the layout of the drive system (ii) Draw the speed diagram and calculate the speeds of the spindle with a maximum speed of 200rpm. (iii) Back gear ratio. 	05
4A.	Prove that for machine tool structure, there exists an optimum ratio L^2 / D (where L = length and D = depth of the structure) depending upon: (i) operation constrains and (ii) the material of the structure.	05
4B.	Draw with the neat sketches the commonly used shapes of slide ways in machine tools.	05
5A.	What are the sources of vibration in machine tools? Explain.	05

- **5B.** Explain the steps involved in the design of machine tool spindle for strength. **03**
- 5C. When sliding bearings are preferred over anti-friction bearings? What is the difference between hydrostatic and hydrodynamic bearings?02
