

Enroll No

Day & Date: Thursday 18/09/2025

Time: 2:30 To 3:30

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures in rounded () brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
 - 3) CO is the index number of the Course Outcome statement.
 - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate, and create respectively.
 - 5) Assume suitable data if necessary.
 - 6) Use of non-programmable calculators is allowed

		Marks	BT Level	COs
Q.1 A	The layout of an intermediate shaft of a gear box supporting two spur gears B and C is shown in Fig. 1. The shaft is mounted on two bearings A and D. The pitch circle diameters of gear B and C are 900 and 600 mm respectively. The material of the shaft is steel FeE 580 (Sut = 770 MPa and Syt = 580 MPa) Factors K_b and K_t of ASME code are 1.5 and 2.0 respectively. Determine shaft diameter using ASME code. Assume that gears are connected to the shaft by means of keys.	10	BL3	3

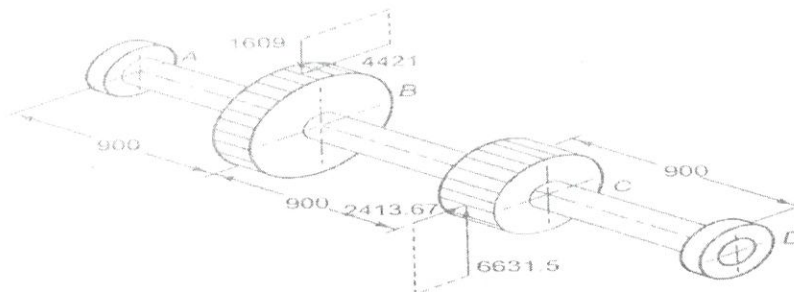


Fig. 1

B	Describe the purpose of a shaft key and categorize its different types.	3	BL2	3
OR				
	Explain the force analysis of square and flat key.			

Q.2 A	Discuss the factors influencing the selection of appropriate gear type for a given application.	4	BL2	4
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OR

Discuss the different types of gear trains.

B	The pitch circles of a train of spur gears are shown in Fig. 2. Gear A receives 5 kW of power at 700 rpm through its shaft and rotates in the clockwise direction. Gear B is the idler gear while the gear C is the driven gear. The number of teeth on gears A, B and C are 30, 60, and 40 respectively, while the module is 3 mm. Calculate i) the torque on	8	BL3	4
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each gear shaft; and ii) the components of gear tooth forces. Assume 20° involute system for the gears.

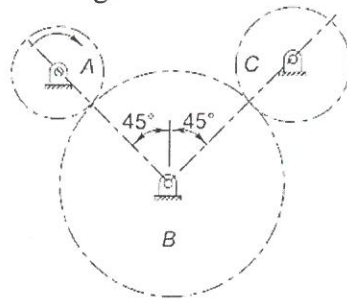


Fig. 2

