Govt. College of Engineering, Amravati

Department of Mechanical Engineering

MEU602 Machine Design II

CT-1 Exam Question Paper

Date: 22nd January 2018 **Time: 10.30 AM – 11.30 AM** **Max. Marks: 15**

Note:

- **Q.1 is compulsory.**
- Answer any **one question** out of **Q.2 and Q.3**.

Q.1 A shaft is supported on two bearings placed 1 m apart. A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing which drives a pulley directly below it with the help of a belt having maximum tension of 2.25 kN. Another pulley of 400 mm diameter is placed 200 mm to the left of the right hand bearing and is driven by an electric motor with the help of a belt which is placed horizontally to the right. The angle of contact for both the pulleys is 180° and $\mu = 0.24$. Determine the diameter of the solid shaft considering working stress of 63 MPa in tension and 42 MPa in shear for the material of the shaft. Assume torques on both the pulleys to be same. **9**

Q.2 A solid circular shaft supported in ball bearings carries a straight tooth spur gear at its mid span and transmits 7.5 kW at 300 rpm. The pitch circle diameter of the gear is 150 mm and the distance between the centreline of the bearing and gear is 100 mm each. If the shaft is made of steel and allowable shear stress is 45 MPa, determine the diameter of the shaft. Take pressure angle for gear as 20°. **6**

Q.3 A solid circular shaft is subjected to a bending moment of 3000 Nm and torque of 10000 Nm. The shaft is made up of steel having ultimate tensile stress 700 MPa and ultimate shear stress 500 MPa. Assuming a factor of safety of 6, determine the diameter of the shaft. **6**

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