

R07

Code: R7310303

III B. Tech I Semester (R07) Supplementary Examinations, May 2012

DYNAMICS OF MACHINERY

(Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 The rotor of the turbine of the ship makes 1500 rpm clockwise when viewed from stern. The rotor has a mass of 800 kg and its radius of gyration is 300 mm. Find the maximum gyro-couple transmitted the hull when the pitches with maximum angular velocity of 1 rad/s. What is the effect of this couple?
- 2 Two tie rods are connected by a turnbuckle having right and left hand metric threads of V-type. The pitch of the threads is 5 mm on a mean diameter of 30 mm and a thread angle of 60° . Assuming coefficient of friction of 0.12, find the torque required to produce a pull of 40 kN.
- 3 The external and internal radii of a friction plate of a single clutch are 120 mm and 60 mm respectively. The total axial thrust with which the friction surfaces are held together is 1500 N. For uniform wear, find the maximum, minimum and average pressure on the contact surfaces.
- 4 The cast iron flywheel is fitted to a punch press to run at 90 rpm and must supply 12 kN.m of energy during $1/5^{\text{th}}$ revolution and allow 15% change of speed. The ring speed is limited to 350 m/minute. Find the mean diameter and weight of the flywheel and the motor power. Assume overall efficiency as 80.5.
- 5 The arms of the Porter governor are of equal lengths and both are pivoted on the same vertical line. Derive an expression to find the height of the Porter governor, neglecting friction.
- 6 The piston of a 60° twin V-engine has strokes of 120 mm. The connecting rod driving a common crank has a length of 200 mm. The mass of the reciprocating parts per cylinder is one kg and the speed of the crank shaft is 2500 rpm. Determine the magnitude of the primary and secondary forces.
- 7 Discuss the unbalanced forces and couples acting in a four cylinder in-line engines and the method of balancing them.
- 8 Discuss the effect of damping on vibratory system. What is meant by under-damping, over damping and critical damping?
