



- Q3. Explain the principle of operation of hydrodynamic fluid coupling with relevant sketch.
- Q4. What are the principles involved in hydrostatic drive? What are their advantages and limitations?
- Q5. Discuss about Toyota ECT-i transmission.
- Q6. What is fluid coupling? Draw and explain its performance curves.

### SECTION-C

- Q7. Explain the principle of the Ward Leonard type of control for electric drive.
- Q8. A rotor is driven by a co-axial motor through a single plate clutch, both sides of the plate being effective. The external and internal diameters of the plate are respectively 220 mm and 160 mm and the total spring load pressing the plates together is 570 N. The motor armature and shaft has a mass of 800 kg with an effective radius of gyration of 200 mm. The rotor has a mass of 1300 kg with an effective radius of gyration of 180 mm. The coefficient of friction for the clutch is 0.35. The driving motor is brought up to a speed of 1250 *rpm*. When the current is switched off and the clutch suddenly engaged.-Determine
- The final speed of motor and rotor.
  - The time to reach this speed,
  - The kinetic energy lost during the period of slipping.

How long would slipping continue if it is assumed that a constant resisting torque of 60 N-m were present? If instead of a resisting torque, it is assumed that a constant driving torque of 60 N-m is maintained on the armature shaft, what would then be slipping time?

- Q9. The coefficient of the rolling resistance for a truck weighing 62000 N is 0.018 and the coefficient of air resistance of 0.0276 in the formula  $R = KW + K_a AV^2$ , where A is the frontal area of 5.57 m<sup>2</sup> and V is speed in km/hr. the transmission efficiency in top gear of 6.2:1 is 90% and that in the second gear of 15:1 is 88%. If the truck has maximum speed of 90 km/hr in top gear then calculate :
- The b.p of engine.
  - The engine speed if the driving wheels have effective diameter of 0.82 m.
  - The maximum grade that a truck can negotiate at the above engine speed in second gear.