Karu-upq kl-11 84 Sem V / mech / 27-05-11 / Theory of machines II

Con. 3404–11. **RK–2034**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume any **suitable** data wherever **required**.

1. Answer any **four** with neat sketches if any— **20**
   (a) Classification of clutches
   (b) Froude hydraulic dynamometer
   (c) Wilson Hartnell Governor
   (d) Ship Stabilization with gyroscopic effect
   (e) Rigid link Mechanism Vs Flexural Mechanism
   (f) Pressure angle in cams.

2. (a) Derive an expression for ratio of tension on the tight side to that of slack side for a band and block brake. **10**
   (b) The wheel base of a car is 'b' m and the centre of mass is 'x' m in front of rear axle and 'h' m above the ground. Acceleration due to gravity is 'g' m/sec^2. Find the maximum decleration that can be given to car moving up the inclined plane at an angle 'α' to the horizontal. The coefficient of friction **10**

5. (a) A bicycle and rider of mass 120 kg are travelling at a speed of 15 km/hr on a level road. The rider applies brake to the rear wheel which is 0·9 m in diameter. How for the bicycle will travel before it comes to rest ? The pressure applied on the brake is 100 N and $\mu = 0{\cdot}05$. Assume that no other resistance is acting on bicycle. **10**

(b) A conical friction clutch is used to transmit 90 kW power at 1800 RPM. The semi cone angle is 20° and $\mu = 0{\cdot}2$. If the mean diameter of bearing surface is 375 mm and intensity of normal pressure is not to exceed 0·25 N/mm^2, find the dimensions of conical bearing surface and axial load required. **10**

6. (a) Explain with neat sketches :— **10**

(i) Reversed gear train

(ii) Compound gear train.

(b) Derive an expression for gyroscopic couple and gyroscopic acceleration. **10**

7. (a) An internal wheel, 'B' with 80 teeth is keyed to shaft 'F'. Another fixed internal wheel 'C' with 82 teeth is concentric with wheel 'B'. A compound wheel 'DE' gear with the two internal wheels. Wheel 'D' has 28 teeth and gears with 'C' while 'E' gears with 'B'. The compound wheel revolves freely on a pin which projects from a disc keyed to shaft. 'A' co-axial with shaft 'F'. If the wheels all have the same pitch and shaft A makes 800 rpm, what is speed of shaft 'F' ? **14**

If the input torque to shaft 'A' is 60 N-m, what is total load torque on shaft 'F' and holding torque on wheel C ?

(b) Explain how a governor differs from a flywheel ? **3**

(c) Explain how cams are classified ? **3**
