

Question Bank (G scheme)

Name of subject: THEORY OF MACHINES

Subject code: 17412

Semester: VI

Unit Test :II

Course : ME

QUESTION BANK

Que. No. 1 Solve any three (3 x3 = 9)

Chap. 5 .Flywheel and Governor

- 1) Give the reason for providing flywheel in the engine.
- 2) Define fluctuation of energy and coefficient of fluctuation of energy.
- 3) Compare simple watt governor with porter governor giving two main points of difference.

Chap. 6. Brakes and Dynamometer

- 4) State the types of brakes used in railways. Comment on the material of the block of the brake.
- 5) How the Dynamometers are classified.

Chap. 7. Clutches and Bearings

- 6) Write the application of
 - 1) Single plate clutch
 - 2) Multi-plate clutch
- 7) Compare single plate clutch with multi-plate clutch on the basis of
 - 1) Power transmitted
 - 2) Size

Chap. 8. Balancing

- 8) Why is balancing of rotating parts necessary for high speed engine.
- 9) Explain the concept of balancing.

(Question No. 2 & Ques. No. 3) Solve any TWO (Each 4 marks)

Chap. 5 .Flywheel and Governor

- 1) What is the difference between centrifugal and inertia governor? Why are centrifugal governor preferred to the inertia governor?
- 2) Explain with sketch turning moment diagram for a four stroke I. C. engine.
- 3) Explain the working principle of centrifugal governor with sketch.

Chap. 6. Brakes and Dynamometer

- 4) State the principle of operation of an “ Eddy current dynamometer” with neat labeled sketch
- 5) Explain the working internal expanding shoe brake with neat sketch.
- 6) A band and block brake has 12 wooden blocks each subtending an angle of 15° at the Centre of the brake drum of dia. 1m. The blocks are 5 cm thick. The two ends of the bands are attached on the opposite side of the differential brake lever at distances of 8 cm and 2 cm from the fulcrum. $\mu = 0.3$. Find the minimum force required to be applied at the end of the lever 1m long assuming that the drum rotates i) CW ii) CCW when the braking torque is 5000 Nm.

Chap. 7. Clutches and Bearings

- 7) A torque of 350 Nm is to be transmitted through a cone clutch having a mean dia. of 300 mm and semi cone angle of 15° . The maximum normal pressure at the mean radius is 15 KN/m². $\mu = 0.3$. Calculate the width of contact surface. Also find the axial force to engage the clutch.
- 8) A multi-plate clutch transmits 55 KW of power at 1800 r.p.m., $\mu = 0.1$ for friction surface. Axial intensity of pressure is not to exceed 160 KN/m². The internal radius is 80 mm and it is 0.7 times the external radius. Find the number of plates needed to transmit the required torque.
- 9) A shaft has number of collars integrates with it. The external dia. of the collars is 400 mm and the shaft dia. is 250 mm. If the intensity of pressure is 0.35 N/mm² uniform and $\mu = 0.05$, Determine
 - (i) Power absorbs when shaft runs at 105 rpm
 - (ii) Number of collars required.
- 10) Draw neat labeled sketch of centrifugal clutch. State its application.

Chap. 8. Balancing

- 11) Four masses m_1, m_2, m_3, m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15m, 0.25 m and 0.3 m respectively, and the angle between successive masses are $45^\circ, 75^\circ$ and 135° . Find the position and magnitude of the balanced mass required, if its radii of rotation is 0.2 m .solve it graphically.
- 12) Three masses m_1, m_2, m_3 are 100 kg, 200 kg, 150 kg respectively. The corresponding radii of rotation are 0.3 m, 0.15m, 0.25 m respectively, and the angle between m_1 & m_2 is 45° , and m_2 & m_3 is 75° and m_3 & m_1 is 240° . Find the position and magnitude of the balanced mass required, if its radii of rotation is 0.2 m .solve it graphically.

