4TH SEM./AUTO/DIP.MECH./MECH(MAIN)/ MECH(PROD) /MECH(SAND)/ MECH(IND.INT) MECHANICAL / 2023(S)

TH-1 Theory of Machine

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. What is degree of freedom?

   b. Define inversion.

   c. What is limiting friction?

   d. What is the function of clutch?

   e. Define coefficient of fluctuation of speed?

   f. What are the advantages of gear drive?
   g. What is the difference between governor and flywheel?
   h. State different types of vibration.

   i. What is the need of balancing in machine?

   j. Define resonance.

2. Answer **Any Six** Questions 6 x 5

   a. Explain different type of cam follower mechanism.

   b. Explain sensitiveness, stability and isochronisms of a governor.

   c. Derive the expression for torque transmitted in case of flat collar bearing assuming uniform pressure theory.

   d. Explain the causes of vibration and Remedies.
   e. Find the power lost in friction assuming I) UPT and ii) UWT when a vertical shaft of 100mm diameter rotating at 150 rpm rest on a flat foot step bearing , coefficient of friction is ,0.05. Shaft carries a load 15 KN.

   f. Differentiate between static And dynamic balancing
   g Derive the expression for height for a centrifugal governor.

3 Explain the construction and working of a centrifugal governor with the neat sketch. 10

4 What is four bar chain mechanism? Explain its inversion. 10

5 A shaft rotating at 200 rpm drives another shaft at 300 rpm and transmits 6 KW through a belt. The belt is 100 mm wide and 10 mm thick. The distance between shafts is 4 m. The smaller pulley is 0.5 in diameter. Calculate the stress in the belt for both open and closed belt drive condition. 10

6 Drive the expression for length of belt for an open belt drive. 10

7 Explain the working of prony brake dynamometer with neat sketch. 10