S.B. Roll. No……

THEORY OF MACHINES
5th Exam/Mech./5317/Jun'2022
(For 2018 Batch Onwards)

Duration: 3Hrs. **M.Marks:75**

SECTION-A

Q1. Fill in the blanks. **15x1=15**

a. In lower pair, two links have _____contact.
b. In a simple mechanism number of links are_____
c. Number of cycles completed in one second is called_____
d. Reciprocating masses can be balanced_____
e. Dynamic friction is less than _____friction.
f. The axis of first and last gear is co-axial in _____gear train.
g. For low speeds _____governor is suitable.
h. An idler has _____ effect on velocity ratio.
i. Flywheels are mostly made of_____
j. In a kinematic chain, when one its links is _____it is called a mechanism.
k. When a governor is infinitely sensitive it is called _____.
l. Crowning of pulley is done to_____
m. _____governor is spring loaded governor.
n. Vibrations can be minimized by using_____
o. Pantograph is a device used to reproduce a given displacement to a _____ or _____scale.

SECTION-B

Q2. Attempt any six questions. **6x5=30**

i. What is angle of repose? Derive an expression between angle of repose and limiting angle of friction.
ii. What are the advantages of V-belt drive over flat belt drive.
iii. Differentiate between machine and mechanism.
iv. Explain the difference between flywheel and governor.
v. Explain various types of free vibrations with the help of neat sketches.
vi. Explain coefficient of fluctuation and speed and coefficient of fluctuation of energy.
vii. Explain the terms circular pitch, diametral pitch and addendum.
viii. What is Flywheel? What are its applications?
ix. In a Watt governor, the length of each arm is 300 mm & they are pivoted on the axis of rotation. Determine the height of the governor and the radius of rotation of the balls when the governor speed is 60 r.p.m.

SECTION-C

Q3. Attempt any two questions. **2x15=30**

a. Explain the causes of vibrations in machines, their harmful effect and remedies.
b. A cantilever shaft of 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The young's modulus of the shaft material is 200 GPa. Determine the longitudinal and transverse vibrations of the shaft.
c. Four masses m_1, m_2, m_3 and m_4 having masses 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation as 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45^o, 75^o and 135^o. Find mass and position of the balancing mass rotating at a radius of 0.2 m.