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PRESIDENCY UNIVERSITY BENGALURU

 **SET-A**

SCHOOL OF ENGINEERING

**END TERM EXAMINATION – MAY/JUNE 2024**

**Semester :** Semester VI - 2021

**Course Code :** MEC3086

**Course Name :** - Design of Machine Elements-II

**Program :** B. Tech.

**Date :** June 14, 2024

**Time :** 1:00 PM - 4:00 PM

# Max Marks : 100

**Weightage :** 50%

# Instructions:

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**PART A**

**ANSWER ANY FIVE QUESTIONS 5QX2M=10**

1. Explain creep phenomenon in belt drives with a suitable diagram

(CO1) [Knowledge]

1. Enlist any 2 advantages and disadvantages of Chain Drives used for power transmission in bicycles

(CO1) [Knowledge]

1. Define free length of a helical spring with neat sketch
2. Define NIP in a leaf spring design.

(CO2) [Knowledge] (CO2) [Knowledge]

1. Calculate the number of teeth in gear if the module is 4 mm and diameter is 100 mm.

(CO3) [Knowledge]

1. Define Clutch. Identify the advantages and disadvantages of a positive clutch
2. What is dry lubrication and full film lubrication?

(CO4) [Knowledge] (CO5) [Knowledge]

**PART B**

**ANSWER ANY FIVE QUESTIONS 5QX10M=50**

1. Daanish is Graduate Enginner Trainee at Mercedes Benz and is struck with a problem with the length of the closed belt in one of the belt design Assignments. As a colleague help him to obtain the correct relation of belt length and also explain the results for the same.

(CO1) [Comprehension]

1. As a suspension design expert suggest what is nipping in the leaf spring? Explain with a neat diagram.

(CO2) [Comprehension]

1. **Elecon** stands as Asia's largest industrial gearbox manufacturer, since last 60 years. Enlist the design procedure for Helical Gears followed by the company.

(CO3) [Comprehension]

1. Asia Motor Works (AMW) is a Heavy Commercial Manufacturing Company having a manufacturing plant at Gandhidham, Bhuj. The company wants to re-look into the clutch design procedures. As an Engineer suggest the criteria used for clutch design to AMW and explain any one with a procedure

(CO4) [Comprehension]

1. A simple block brake design is to be carried out and the different conditions for the criterions are to be calculated for locking and energizing the brakes. Identify any 3 criterions for design and explain the same.

(CO4) [Comprehension]

1. What is Equivalent bearing load in roller bearings? Explain in detail with a neat sketch.

(CO5) [Comprehension]

1. A good lubrication between moving surfaces is desired and can be achieved by many suitable means with the required properties. Enlist any 3 lubrication mechanism with a neat sketch and explain the same.

(CO5) [Comprehension]

**PART C**

**ANSWER ANY TWO QUESTIONS 2QX20M=40**

1. Assume a leaf spring used for any automobile suspension that consists of 2 extra full-length leaves and 10 graduated-length leaves, including the master leaf. The center-to-center distance between the two eyes of the spring is 1 m. The maximum force that can act on the spring is 90 kN. For each leaf, the ratio of width to thickness is 10:1. The modulus of elasticity of the leaf material is 207,000 N/mm2. The leaves are pre-stressed in such a way that when the force is maximum, the stresses induced in all leaves are the same and equal to 800 MPa. Identify and calculate any 2 parameters from the above data,

(CO1) [Application]

1. A single plate clutch is used to connect or disconnect a machine to the source of 30 kW power running at 1200 rpm. The outer diameter of the friction lining used in clutch is 1.5 times the inner diameter. The friction lining material is woven asbestos and opposing plate material is steel. The shaft is made up of C40 steel having yield point strength 324 MPa and take fos= 2.5.Determine some of the main design parameters considering uniform wear criteria.

(CO4) [Application]

1. Design a pair of steel straight-toothed spur gears to transmit 35 kW between parallel non-intersecting shafts at 1800 rpm of the pinion. The velocity ratio required is 6:1. The pitch line velocity of gears is not to exceed 29 m/s. Assume the suitable parameters and identify the parameters

(CO3) [Application]