III B. Tech I Semester Supplementary Examinations, May - 2019
DESIGN OF MACHINE MEMBERS– II
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
        2. Answer **ALL** the question in **Part-A**
        3. Answer any **FOUR** Questions from **Part-B**
        4. Data Book Allowed

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PART –A

1. a) What is meant by the term boundary lubrication? [2M]
   b) How the reciprocating masses produce inertia force in a connecting rod? [2M]
   c) What type of stresses induced in the curved beams? [2M]
   d) What is creep? How does it affect the design of belt drive? [3M]
   e) What is Herringbone gear? State its applications? [3M]
   f) Why is I section preferred for bell crank lever? [2M]

PART -B

2. a) Differentiate between hydrostatic and hydro dynamic bearing? What is the importance of McKee's investigation? [7M]
   b) A shaft of 150 mm diameter is supported in a foot step bearing which is counter bored at the end with a hole diameter of 50 mm. the speed of the shaft is 100 rpm and the allowable bearing pressure is 0.8 N/mm^2. Determine the load which can be supported, power lost in friction and heat generated in bearing. Assume $\mu = 0.015$. [7M]

3. a) At what angle, the twisting moment is maximum in the crank shaft? Explain. [7M]
   b) Design a cylinder of an 1100 CC six-cylinder car engine with the following data: power 40 kW at 4400 rpm and mean effective pressure is 1 N/mm^2. [7M]

4. a) Derive the bending moment equation of the beam with a sketch and write its assumptions. [7M]
   b) A rectangular bar 50 mm wide by 75 mm deep is bent into a circular form with the plane of the arc parallel to its depth, the radius of curvature being 100 mm. If the bar is now subjected to a bending moment of 37.5 N-m tending to decrease its curvature, draw the stress distribution diagram of the section. [7M]

5. a) Why square threads are preferred over V- threads for power transmission? [7M]
   b) A flat belt running on a pulley of diameter 1m transmits 7.5 kW at 200 rpm μ =0.25, diameter of smaller pulley =225mm and Centre distance =1.5 m. Find the necessary width of the belt if the pull should not exceed 20 N/mm. Neglect C.F. tension. [7M]

6. a) Explain why helical gears are capable of transmitting greater power than spur gear. [7M]
   b) A pair of spur gear with 20° full depth involute teeth has pinion with 20 teeth and gear 60 teeth. The speed of the pinion is 1800 rpm and it transmits 30 kW. The permissible static bending stress for the material of both gears is 140 MPa. The error in microns is given by e = 32+2.5 (m+0.25√d). Design the gear and find the required surface hardness. [7M]

7. a) Explain the procedure of designing hand foot lever and where it is used? [7M]
   b) Describe the different types of wire ropes? And explain the procedure for its construction. [7M]