

DESIGN OF MACHINE ELEMENTS-II  
( Mechanical Engineering )

Time: 3 Hours

Max. Marks: 70

Answer any **FIVE** Questions  
All Questions carry **equal** marks

1. (a) Distinguish between “Hydrodynamic” and “Hydrostatic Bearings” with figures.  
(b) How are rolling contact bearings manufactured?

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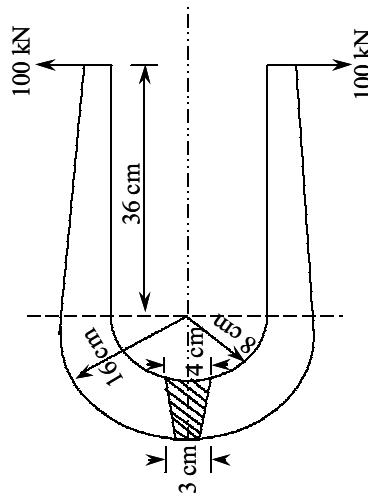
2. Design and sketch a cast iron piston for a single acting four stroke I.C. engine with a 0.14 m cylinder bore, 0.19 m stroke and 0.375 m connecting rod length. The maximum gas pressure is  $3.5 \text{ N/mm}^2$  and the engine speed is 600 r.p.m., it develops a brake mean effective pressure of  $0.7 \text{ N/mm}^2$  and uses  $4.65 \text{ kJ/kWh}$  per second, check the piston for heat flow.

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3. (a) What is the function of connecting rod?  
(b) What are the usual ratios of the connecting rod length and the stroke of piston? How are they decided upon?

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4. Determine the maximum stress, if the direction of the load is reversed.



Figure

5. (a) Discuss the different types of belts and their materials used for power transmission.  
(b) Discuss the various important parameters necessary for the selection of a particular drive for power transmission.

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6. A pair of helical gears is to transmit 15 kW. The teeth are  $20^\circ$  stub in diametral plane and have a helix angle of  $45^\circ$ . The pinion runs at 10000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given  $\sigma_{es} = 618 \text{ MPa}$ .

**S.2** 

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7. (a) Discuss the materials and practical applications for the various types of springs.
- (b) A helical spring is made from a wire of 6 mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity 84 kN/mm<sup>2</sup>, find the axial load which the spring can carry and the deflection per active turn.
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8. (a) List the type of threads used in power screws. Give practical example for each type of threads.
- (b) State advantages and disadvantages of using different types of threads in power screws.