

BE - Mech - Sem VII C BSGS



[3 Hours]

[Total Marks : 80]

- N.B. 1) Question No. 1 is compulsory
2) Solve Any Three from remaining Five questions.
3) Use of standard data book is permitted
4) Assume suitable data if necessary, giving justification

1 NOV 2018

- Q1 Answer any Four from the following
- a) Prove theoretically, in gear design tangential force transmitted is directly Proportional to beam strength? 5
- b) Enumerate the factors that influence most the formation and maintenance of the thick oil film in hydrodynamic bearings 5
- c) State the characteristics of the chain drive and discuss the polygon effect. 5
- d) How much reduction in loading of a roller bearing will cause the expected life to be fifty percent more? 5
- e) Justify the significance of Pressure angle in gear tooth design. 5
- Q2 A rotary disc cam and central translator follower has following motion:- 20
Forward stroke = 25 mm in 100° rotation of cam with SHM, dwell to complete the cycle.
Return stroke = 25 mm with SHM in 90° of cam rotation remaining dwell to complete.
Mass of follower is 1 Kg and cam shaft rotates at 850 rpm and maximum pressure angle is 25° during forward stroke. The external force is 200 N during forward stroke and 50 N during return stroke.
Determine
1. Base circle radius
 2. Design the cam
 3. Design the spring
 4. Calculate maximum cam shaft torque.
- Q3 A V- Belt drive is to transmit 15 KW to a compressor. The motor speed is 1200 rpm and compressor pulley runs at 550 rpm. The coefficient of friction between the belt and pulley is 0.25. The compressor operates for 12 hrs/ day. Design the drive for above application. Design should include following 20
1. Section of V-Belt material
 2. Exact centre distance
 3. Belt size
 4. Number of belts
 5. Life of belt.

- Q4 Design a helical gear pair for the first stage of gear box having following 20 specifications.
Power = 20 kW
Input speed = 1440 rpm
Output speed = 90 rpm
(Design should include, module selection, checking for dynamic Load and contact stresses and construction type and constructional details of gear)
- Q5 A worm and worm wheel pair is to be design for a following specifications,
Power = 15KW, Worm speed = 960RPM, Velocity ratio = 28.
- i) Find the number of start and number of teeth on the gear. 4
 - ii) Select suitable material and find the axial module of the worm based on wear criteria. 6
 - iii) Check design for bending and dynamic load 5
 - iv) Check the design for thermal conditions. 5
- Q6 a) Select suitable Deep groove ball bearing for following specification: 10
Shaft diameter = 40mm, Radial load = 850N, Axial load = 700N, Speed = 760rpm,
Expected life = 5000hrs, Reliability = 92%
- Q6 b) Design a chain based on bearing failure and check for tensile failure for the following 10 specification.
- Rated power : 22 KW
 - Input speed : 1200 rpm
 - Output speed : 250 rpm
- Nature of load and duty: mild shock and 8 - 10 hrs
(Design should include, Number of teeth on sprockets, centre distance, pitch, number of link and chain length)