

State the applications of following bearings with suitable reasons:

i) Deep Groove Ball bearing : Application: Electric Motor Reason: Capacity to take heavily axial load with high rotational speed ii) Taper roller bearing : Application: axle housing of automobile Reason: ability to take high radial load as well as thrust load iii) Thrust collar bearing: Application: Clutch of automobile Reason: ability to combine radial & axial load with min. speed iv) Needle roller bearing: Application: Differential of automobile Reason: takes less radial space. it has high radial load carrying capacity.

Explain the selection procedure of bearings from manufacturer's catalogue.

1) Calculate radial and axial forces and determine dia. of shaft. 2) Select proper type of bearing. 3) Start with extra light series for given diagram go by trial of error method. 4) Find value of basic static capacity (C_0) of selected bearing from catalogue. 5) Calculate ratios F_a/VF_r and F_a/C_0 . 6) Calculate values of radial and thrust factors.(X & Y) from catalogue. 7) For given application find value of load factor K_a from catalogue. 8) Calculate equivalent dynamic load using relation. $P_e = (XVF_r + YFA) K_a$. 9) Decide expected life of bearing considering application.

Differentiate between sliding contact and rolling contact bearings.



3	noise	Less noise	High noise
4	Life	Less life	Long life
5	Cost	Less cost	More costly
6	Coeff. of friction	High	less

State one application each of (i) Deep groove ball bearing (ii) Taper roller bearing (iii) Thrust roller bearing (iv) Needle roller bearing

Application of bearings : i) Deep Groove Ball bearing : Electric Motor ii) Taper roller bearing : axle housing of automobile iii) Thrust collar bearing: Clutch of automobile iv) Needle roller bearing: Differential of automobile

State any four disadvantages of rolling bearings as compared to journal bearings

Disadvantages of rolling bearing as compared to Journal Bearing: 1) Initial cost is very high 2) Noisy in normal operation. 3) Shock capacity is less. 4) Finite life due to failure by fatigue. 5) Dirt & metal chips can enter the bearing & may lead it to failure. 6) Occupies greater diametral space compared to journal bearing.

State any four advantages of ball bearings over plain journal bearings.

1) The ball bearings have a far smaller contact area and thus have a lower frictional drag coefficient. 2) Due to less frictional drag means better response and less power consumption. 3) The turbo can spool up much faster, which reduces turbo-lag and offers a major performance advantage over journal bearing turbochargers at lower to mid turbocharger speeds. 4) The reduced contact area of the ball bearings means that it requires far less lubrication, allowing for lower oil pressure feeds. 5) The ball bearing more reliable. 6) Less expensive.

A taper roller bearing has a dynamic load capacity of 26 kN. The desired life for 90% of the bearing is 8000 hr. and speed is 300 rpm. Calculate equivalent radial load that the bearing can carry

Given:

$$C=26 \text{ KN} , L_{10h} = 8000 \text{ h} , n=300 \text{ rpm}$$

Bearing life (L_{10})

$$L_{10} = \frac{60 n (L_{10h})}{10^6} , L_{10} = \frac{60 \times 300 \times 8000}{10^6} = 144 \text{ million rev.}$$

Equivalent radial load

$$C = P (L_{10})^{0.3} , P = 26000 / (144)^{0.3} = 5854.16 \text{ N}$$

$$F_r = P = 5854.16 \text{ N}$$

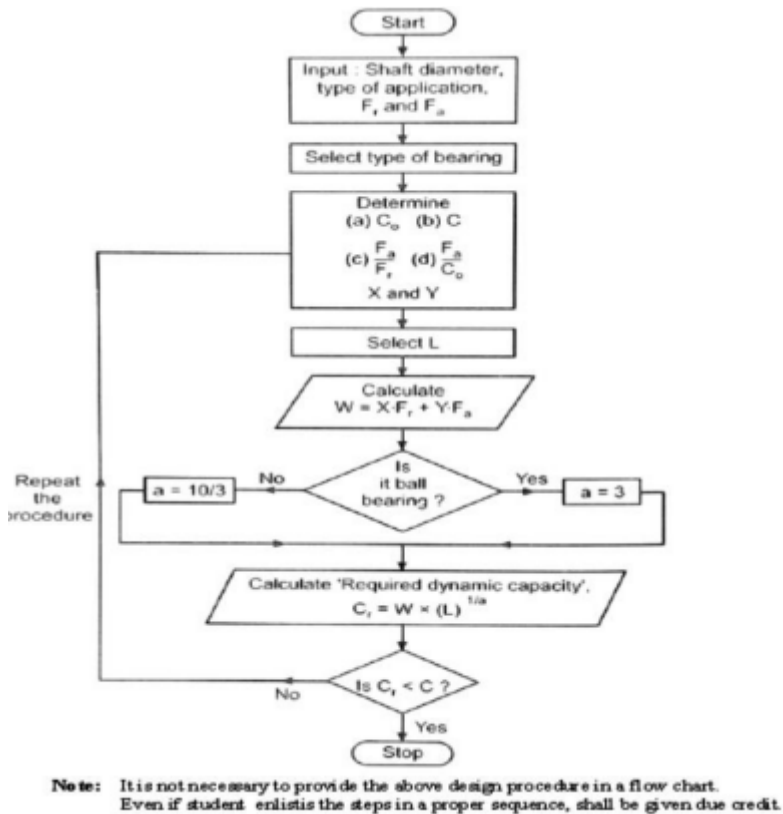
Differentiate between sliding contact and rolling contact type

bearings.

SR.NO	Parameter	Sliding contact bearing	Rolling contact bearing
1	Size	large	Small
2	starting torque	High	low
3	noise	Less noise	High noise
4	Life	Less life	Long life
5	Cost	Less cost	More costly
6	Coeff. of friction	High	less

(i) State the steps involved in selection of a proper ball bearing from a manufacturer's catalogue.

Steps Involved in selection of a proper ball bearing from
Manufacture's Cataloge



What are rolling contact bearings? State their advantages over sliding contact bearings.

Rolling contact bearing- contact between the surfaces is rolling ,it is antifriction bearing Advantages (any six) (1)low starting and running friction except at very high speed (2) ability to withstand momentary shock loads (3) accuracy of shaft alignment (4) low cost of maintenance (5) reliability of service (6) easy to mount and erect (7) cleanliness (8) small overall dimension

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