

Q.1&6 to be solved on blank A4 sheet, while rest to be attempted on answer-sheet

Q1. In the Figure 1, a bearing is shown in an isometric view. The bearing is to be made by welding a base plate, a vertical plate and a cylindrical bearing support and then taking the assembly to the site for use. Draw a sketch of the bearing assembly clearly showing the welding symbols. Dimensioning is not required. Since the bearing has to have good surface finish, indicate the same with Ra value of 1.6. Similarly indicate that the axis of the bearing be parallel to the base within 25 micron.

Q.2 What are the advantages of such bearings (Figure 1) over the rolling element bearings? What are the disadvantages?

What are 4 major components of a typical rolling element bearing? Cite one practical application in which all the four components are non-stationary during operation. (8)

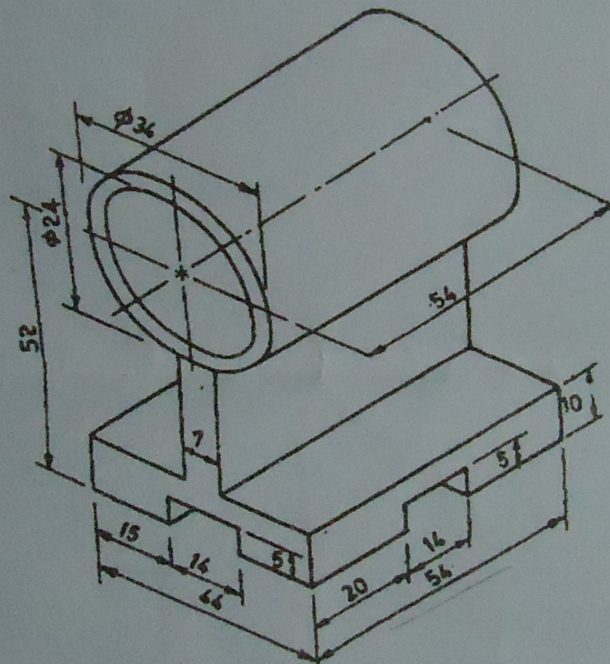
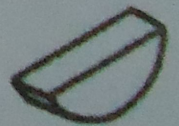


Figure 1

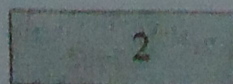
Q3. What is the name and advantage of the key shown in the figure aside? What is its disadvantage? (3)



Q. 4. A) Name the bolt more commonly used in machine tool tables for clamping the work piece.
B) What is the purpose of square part of the shank of the bolt shown aside? (4)



Q. 5. Two plates are to be welded end to end as shown in Figure below. The plates after welding are shown on extreme right with an arrow on which weld symbol is to be placed. Place an appropriate weld symbol on this arrow. What mistake you may be committing with this arrow position? (5)



Q 6. A schematic diagram of a speed reducer gearbox is shown in Figure 1. The gearbox is a rectangular box with a lid screwed on the top to allow access for inspection/maintenance and disassembly. Not all details appear in the figure.

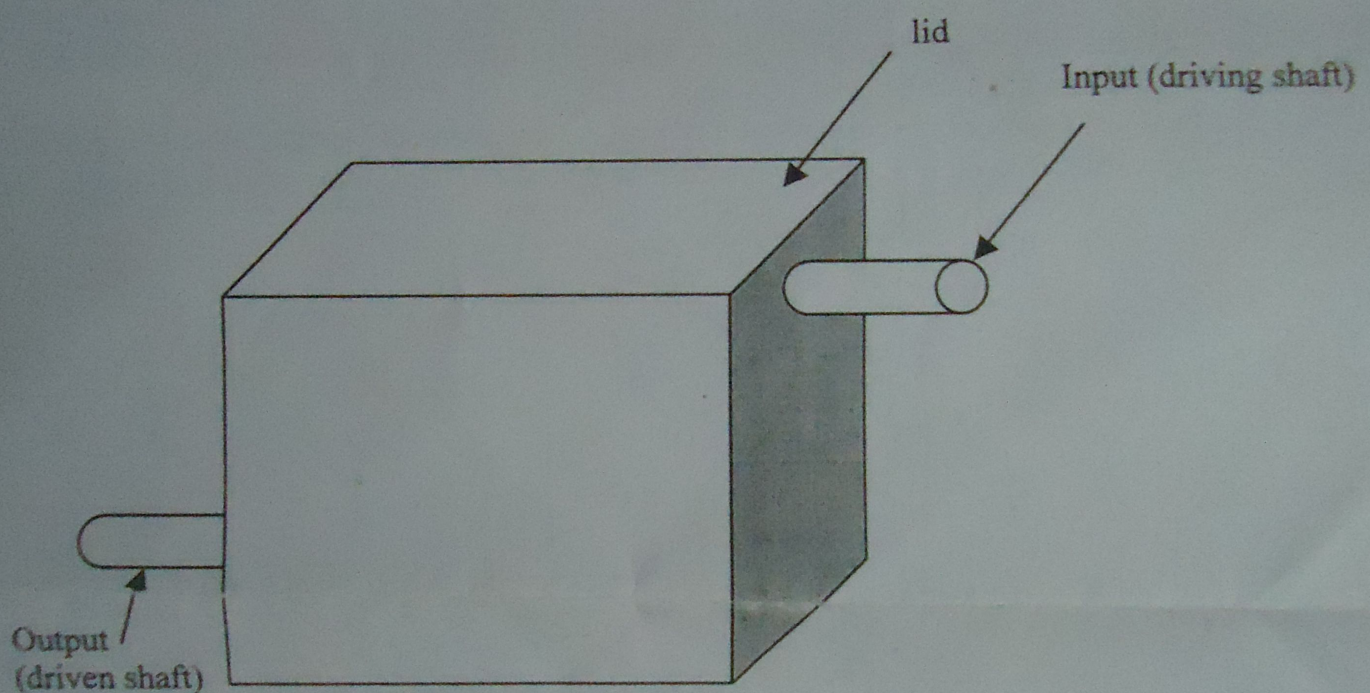


Figure 1. Schematic of Gear box

The gearbox has a driving shaft that has a helical gear mounted on it. A driven shaft carries another gear in mesh with that on driving shaft. The gears have 12 and 38 number of teeth. The two shafts (driving and driven) are parallel and lay one below the other in a vertical plane in the gearbox. Assume appropriate pitch circle diameters based on number of teeth.

Draw the neat, proportionate front and side views of the gearbox clearly indicating the gearing, shafting, bearing supports and their associated arrangements, etc. Assume suitable dimensions and other necessary data. It may be emphasized that an electrical motor drives the input shaft while the output shaft is connected to a machine through couplings (not shown and not part of the gearbox). Arrangement of clamping the lid on the box should be clearly shown. Bill of Material (BOM) may be shown with type of gear and bearing used. Indicate the components on assembly drawing with number given in BOM. Use appropriate conventions of representation of bearings and gears. (14)