

Date of submission 21/02/2011

Q:1 Two wagons are coupled by using a turn buckle with right and left hand single start threads. The mean diameter ~~of the~~ and the thread pitch are 48mm and 10mm, respectively. The co-efficient of friction between the screw and the nut is 0.14. Determine the work done in drawing the two wagons closer through a distance of 220mm against a steady load of 3kN. Also find the additional work done if the load is increased to 8kN over a distance of 300mm.

Q:2 Find the load that can be lifted by applying a force of 220N at the end of a 500mm long lever of screw jack using single start square threads. The load doesn't rotate with spindle and is carried on a swivel head having a bearing of 100mm diameter. The pitch of the threads is 10mm and the root diameter is 50mm. co-efficient of friction between nut and thread is 0.18 and between spindle and swivel head is 0.15. Find also efficiency of the jack.

Q:3 (a) What do you mean by film friction? state its laws and also discuss the laws of solid dry friction.

(b) Deduce an expression for the efficiency of an inclined plane when a body down a plane.

Q:4 (a) Define Grashof's law. state how is it helpful in classifying the four-link mechanisms into different type and discuss one four bar mechanism which is exception of the Grashof's law.

(b) Discuss various types kinematic pair and the constraint motion.

(c) Define degree of freedom of kinematic chain, graphical representation of a degree of ~~freedom~~ freedom, and also discuss redundant degree of freedom.

Q:5 Show that the linkages shown in following figure 1(a) & (b) are structures suggest some changes to make them mechanism having one degree of freedom. The number of link should not ~~be~~ be changed more than two.

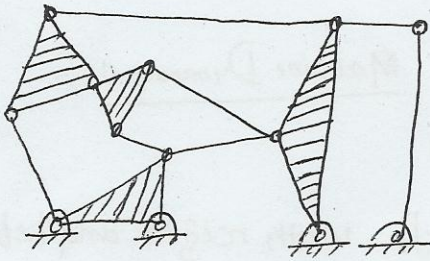


Fig. 1(a)

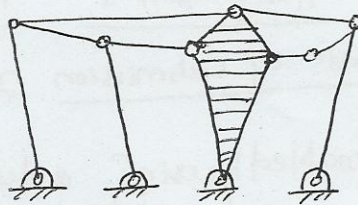


Fig. 1(b)

Q.6 Using the Grashof's law state the following figures (Fig. 2) which type of mechanism ~~are~~ indicate

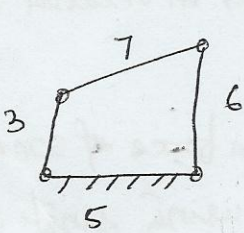


Fig. 2(a)

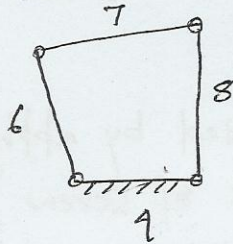


Fig. 2(b)

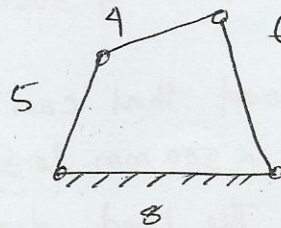


Fig. 2(c)

{ Dimensions in
standard
units of length }

Q.7 (a) How are the ~~quick return~~ Whitworth quick return mechanism and crank and ~~lever~~ slotted lever mechanism are different from each other.

(b) A linkage has 14 links and the number of loop is 5. calculate its

(i) D.O.F (ii) No. of joints (iii) Maximum no. of ternary links that can be had.