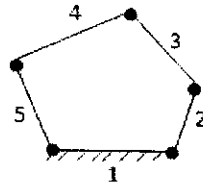


Answer Q.No.1 and any six (6) from the rest.

1. MCQ type questions.

Marks: 1 x 10 = 10

- (i) When a body is subjected to transverse vibrations, the stress induced in a body will be
 (a) shear stress (b) tensile stress (c) compressive stress
- (ii) The algebraic difference between the maximum limit and the basic size is called
 (a) actual deviation (b) upper deviation (c) lower deviation (d) fundamental deviation
- (iii) The lead screw of a lathe with nut forms a
 (a) sliding pair (b) rolling pair (c) screw pair (d) turning pair
- (iv) When brakes are applied on a moving vehicle; the kinetic energy is converted to
 (a) Mechanical energy (b) Heat energy (c) Electrical energy (d) Potential energy
- (v) Higher pairs are those which have
 (a) Point or line contact between the two elements when in motion
 (b) surface contact between the two elements when in motion
 (c) elements of pairs not held together mechanically
 (d) two elements that permit relative motion
 (e) none of the above
- (vi) The degree of freedom of the following mechanism is (a) 1 (b) 2 (c) 3 (d) 4



(vii) The module of a gear is given by

- (a) d/t (b) $2d/t$ (c) $d/2t$ (d) $d/3t$

Where d = diameter of pitch circle,

T = number of teeth

(viii) When the belt is stationary, it is subjected to some tension, known as initial tension. The value of this tension is equal to the

- (a) tension in the tight side of the belt
 (b) tension in the slack side of the belt
 (c) sum of the tensions in the tight side and slack side of the belt

P.T.O.

- (d) average tension of the tight side and slack side of the belt
- (ix) Which energy is absorbed by the brakes of an elevator during braking process?
 (a) Potential energy (b) Kinetic energy (c) Both (a) and (b) (d) None of the above
- (x) The size of a cam depends upon
 (a) base circle (b) pitch circle (c) prime circle (d) pitch curve
2. (a) Define fit. Explain different types of fits with neat sketch.
 (b) Explain the terms 'Selective assembly and Interchangeability'. Marks:10+5=15
3. Derive the expression of natural frequency for free longitudinal vibration by equilibrium method. Marks:15
4. Derive the expression for length of a 'crossed belt drive' Marks:15
5. Explain graphically 'Hole basis system' and 'Shaft basis system'? Which one is preferred and why? Marks:10+5=15
6. Define the following terms as applied to a cam follower system with a neat sketch :-
 (a) Base circle, (b) Pitch circle, (c) pitch curve (d) Pressure angle, and (e) Stroke of the follower Marks: 3 x 5=15
7. The layout of the leather belt drive transmitting 20 kW power is shown in Fig.1. The centre distance between the pulleys is twice the diameter of the big pulley. The belt should operate at a velocity of 25 m/s approximately.
 Calculate -
 (a) The length of the belt
 (b) The diameter of the pulleys Marks:15

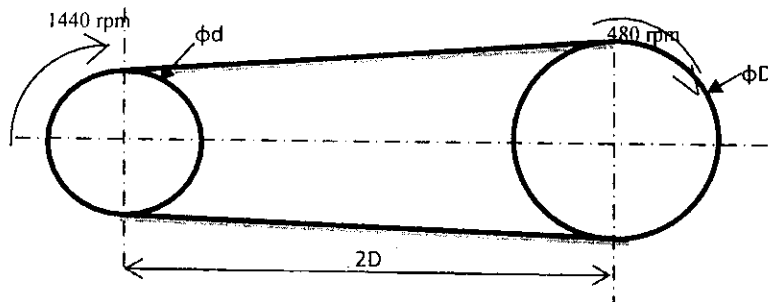


Fig.1

8. Derive the expression for torque capacity of a friction disk clutch using uniform pressure theory. Marks:15
9. Write a short note on any **three(3)** of the followings Marks:5 x 3=15
 (a) Lower pair and Higher pair (b) Factor of Safety (c) Quick-return mechanism (d) Kutzbach criterion