DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)   **Date:-**

Assignment No: - 1   **Course Outcome: 401.1**

Topic Name: - Fundamentals and types of Mechanism

---

1. Explain kinematic link and types of Kinematic link.

2. Define a) Machine b) Structure c) Mechanism d) Inversion e) Kinematic chain

3. Difference between Machine & Structure.

4. Explain type of constraint motion with proper examples?

5. State classification of kinematic pair according to type of relative motion and type of contact between them?

6. Explain four bar chain mechanism with the help of locomotive wheel?

7. Explain single slider crank chain mechanism with the help of with worth quick return mechanism?

8. Explain Elliptical Trammel.

9. Explain with sketch working of crank and slotted lever with quick return mechanism?

10. Describe with neat sketch working of Oldham's coupling.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe

DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)   **Date :-**

Assignment No: - 2   **Course Outcome: 401.2**

Topic Name: - Velocity and Acceleration of Mechanism

---

1. Explain Klein's construction for velocity diagram of single slider crank mechanism.

2. Explain Klein's construction for Acceleration diagram of single slider crank mechanism.

3. Define a) Angular velocity b) Absolute Velocity c) Relative velocity d) Linear acceleration e) f) Angular acceleration Relative acceleration.

4. State the relation between linear velocity and angular velocity?

5. In the engine mechanism, crank OB = 50 mm, length of connecting rod = 225 mm. The centre of gravity of the rod is at 'G' which is 75 mm from 'B'. The speed is 200 rpm, and the crank OB is rotated at 45° from 'OA'. Find out the velocity of point 'G' and angular velocity of AB by relative velocity method.

6. In reciprocating engine the crank is 250 mm long and connecting rod is 1000 mm long. The crank rotates at 150 rpm. Find velocity and acceleration of piston. And angular velocity and angular acceleration of connecting rod when the crank makes an angle of 30° to IDC. Use analytical method.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe

DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)   **Date :-**

Assignment No :- 3   **Course Outcome: 401.3**

Topic Name :- Cam & Follower

---

1. Give detail classification of follower.

2. Classify the types of Cam.

3. Explain Cam Terminology with neat sketch.

4. List different types of follower motions?

5. Draw the profile of a cam to raise the valve with S.H.M. through 40mm in 1/4th of revolution, keep if fully raised through 1/10th revolution and lower it with uniform acceleration and retardation in 1/6th revolution. The valve remains closed during the rest of the revolution. The diameter of roller is 20mm and minimum radius of cam 30mm. The axis of the valve rod passes through the axis of cam shaft.

6. Construct the profile of the cam suit the following specification. Cam shaft diameter =40mm. Least radius of the cam = 25mm, angle of lift = 120°, angle of fall = 150°, lift of the follower = 40mm, number of pauses are equal with interval between motion. During the lift the motion is S.H.M. During the fall the motion is uniform acceleration and retardation. . The axis of the valve rod passes through the axis of cam shaft. The speed of cam is uniform.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe

DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)   **Date :-**

Assignment No :- 4   **Course Outcome: 401.4**

Topic Name :- Belt Chain & Gear Drive

---

1. Compare flat belt and V belt.

2. Define a) Crowning of pulley b) Angle of Lap c) Gear train.

3. Compare cross belt and open belt drive.

4. Explain the phenomena of slip in a belt?

5. Explain the phenomena of Creep in a belt?

6. State the effect of centrifugal tension on power transmission.

7. A pulley is driven by the flat belt running at the speed of 600m/min and transmits 4kW. The coefficient of friction between belt and pulley is 0.3 and the angle of lap is 160°. Find maximum tension in belt.

8. Find the power transmitted by the belt running over a pulley of 600mm diameter at 200 rpm. The coefficient of friction between the belt and a pulley is 0.25, angle of lap is 160° and maximum tension in belt is 2500N.

9. State four merits and Demerits of chain drive over belt drive.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe

DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)   **Date :-**

Assignment No :- 5   **Course Outcome: 401.5**

Topic Name :- Brakes & Clutches

---

1. State Classification of Brakes.

2. Explain with sketch working of an internally expanding shoe brake.

3. Define Self-locking and Self Energizing brake.

4. Explain Disc brake with neat and labeled sketch.

5. Explain with neat sketch a) Single plate clutch b) Multi plate clutch c) Centrifugal clutch.

6. A multi plate size clutch has five plates having four pair of active friction surfaces if the intensity of pressure is not to be exceed 0.127 N/mm². Find the power transmitted at 500rpm. The outer and inner radii of friction surface are 125mm and 75mm respectively. Assume uniform wear and co-efficient of friction = 0.3

7. Explain Single Plate Clutch with neat Diagram.

8. Explain Centrifugal Clutch with neat Diagram.

9. Explain Cone Clutch with neat Diagram.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe

DEPARTMENT OF AUTOMOBILE ENGINEERING

VISION

"To develop technically skilled engineers with value-based education in automotive industry to face upcoming chances".

MISSION
- *Understanding the need for regional automotive industries.*
- *Provide hands on skills for life long professional development.*
- *To create responsible students with sense of ethics & discipline.*

Subject Name: Theory of Machine (22438)　　　　　　　　**Date :-**

Assignment No :-6　　　　　　　　　　　　　　　　**Course Outcome: 401.6**

Topic Name :- Flywheel Governors & Balancing

---

1) State function of flywheel in I.C. Engine?
2) Draw and explain turning moment diagram of a four stroke cycle internal combustion engine.
3) Define fluctuation of speed and fluctuation of energy.
4) Define the term coefficient of fluctuation of speed in case of flywheel.
5) Define the term coefficient of fluctuation of energy and also state its significance.
6) State the function of governor.
7) Define a) Sensitivity of governor b) Isochronism c) Hunting of governor
8) Explain with sketch, the working of centrifugal governor.
9) Three masses m1, m2 and m3 are of 100N, 200N and 150N respectively. The corresponding radii are 0.3 m, 0.15 m and 0.25 m respectively. Angles between masses m1 and m2 is 45o and between m2 and m3 is 75o and between m3 and m1 is 240o. Determine graphically the position and magnitude of the balance mass required if the radius of rotation is 0.2 m.

Date of Submission:-

Assign By: - Mr. Abhijit Kamthe