Scheme - I

Sample Question Paper

Program Name : **Diploma in Automobile Engineering / Mechanical Engineering**

Program Code : **AE / ME**

Semester : **Fourth**

22438

Course Title : **Theory of Machines**

Marks : **70** **Time: 3 Hrs.**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following. **10 Marks**

a) List four inversions of Four bar Chain Mechanism
b) State two examples of Kinematic Pair.
c) State the necessity of Acceleration diagram of a Mechanism.
d) State four applications of Cam and Followers.
e) Define - lift of Cam.
f) List any four applications of clutches.
g) State the necessity of Balancing mechanical systems.

Q.2) Attempt any THREE of the following. **12 Marks**

a) Draw any one sketch of a Lower pair and a higher Pair. Explain its principle of working.
b) Differentiate between Simple and Compound Gear Train.
c) Explain the construction of spherical faced follower with suitable sketch.
d) Explain the construction of Epicyclical gear train using suitable sketch.

Q.3) Attempt any THREE of the following. **12 Marks**

a) Draw neat sketch of the mechanism of pendulum pump and explain its working.
b) Draw the neat sketch of 'Scotch yoke Mechanism'.
c) Explain the principle of working of Internal Expanding Brake using neat sketch.
d) Distinguish between Radial and Cylindrical Cam. Also draw the sketches of both the cams.

e) Explain the method of balancing of different masses revolving in the same plane.

Q.4) Attempt any TWO of the following. 12 Marks

a) Draw the construction of 'Whitworth Quick Return Mechanism'.

b) In a Single slider crank mechanism, crank OB=50mm, the length of connecting rod AB=125 mm. The point 'G' is at 60 mm form point 'B'. Crank OB is rotated at 45° from OA. The Crank rotates at 200 rpm, find out the velocity of point 'G' and angular acceleration of AB.

c) A cam is to be designed for knife edge follower with following data. Cam lift 40 mm during 90° of cam rotation with SHM, Dwell for 30°, during return stroke 60° of cam rotation by SHM and remaining is for dwell. Draw profile of cam

Q.5) Attempt any TWO of the following. 12 Marks

a) Explain the construction of Epicyclical gear train with neat sketch.

b) In a slider crank mechanism, lengths of crank and connecting rod are 30mm and 120mm respectively. The crank rotates at 180 rpm clockwise. When the crank rotates to 45° from Inner Dead Centre, find the velocity and acceleration of Slider using Klein's construction. Also find angular velocity and acceleration of connecting rod.

c) Draw neat labeled sketch of Hartnell Governor and explain its working.

Q.6) Attempt any TWO of the following. 12 Marks

a) A leather belt which is 125 mm wide and 6 mm thick, is used for transmitting power from a pulley. The diameter of the pulley is 750 mm and its angular speed is 500 rpm. The angle of lap is 150° and coefficient of friction is 0.3. If the mass of 1 m^3 of leather is 1 kg and stress in the belt is not to exceed 2.75 MPa then find the maximum power that can be transmitted by the belt.

b) Draw neat labeled sketch of Diaphragm Clutch and explain its working.

c) Draw Turning Moment diagram for single cylinder 4-stroke petrol engine. Define coefficient of speed. State the need of flywheel.

Scheme - I

Sample Test Paper - I

Program Name : **Diploma in Automobile Engineering / Mechanical Engineering**

Program Code : **AE / ME**

Semester : **Fourth**

22438

Course Title : **Theory of Machines**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. Define Kinematics and kinetics.
b. List any two types of Constrained Motion with suitable examples.
c. Define - Space Diagram
d. Define the term Relative velocity.
e. List various types of follower motions in cam follower arrangement.
f. State any four applications of cams.

Q.2 Attempt any TWO. **12 Marks**

a. Draw neat sketch of 'Elliptical Trammel' and explain its working.
b. In a Single slider crank mechanism crank OB=50mm, the length of connecting rod AB=125 mm. The point 'G' is at 60 mm form point 'B', crank OB is rotated through 45° from OA. The Crank rotates at 200 rpm, find out the velocity of point 'G' and angular acceleration of AB. Also find the angular velocity and linear velocity of the slider.
c. The cam is to give following motions to knife edge follower -1. Outstroke during 60°. 2. Dwell =30°. 3. Return stroke =60°. 4. Dwell for remaining 210°. Draw the Cam Profile of the given cam if the stroke of follower is 40mm and minimum radii of cam is 50mm, the follower moves with uniform velocity during both outward and inward stroke

Scheme - I

Sample Test Paper - II

Program Name : **Diploma in Automobile Engineering / Mechanical Engineering**

Program Code : **AE / ME**

Semester : **Fourth**

22438

Course Title : **Theory of Machines**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. Define - Angle of Lap and creep in belts.
b. Define addendum and module in gears.
c. List four types of brakes.
d. List any four applications of clutches.
e. Define- Coefficients of fluctuation of energy and fluctuation speed.
f. State the need of balancing.

Q.2 Attempt any TWO. **12 Marks**

a. Select the gear train for following application with suitable reason - automobile gear box, Hoist crane gear box, Differential, Steering gear box.
b. Draw a labelled sketch of Multiplate clutch and explain its working.
c. Explain the method of balancing of different masses revolving in the same plane.