

**Scheme – I**

**Sample Question Paper**

**Programme Name : Diploma in Production Engineering / Production Technology**

**Programme Code : PG / PT**

**Semester : Third**

**Course Title : Theory of Machines**

**Marks : 70**

**22344**

**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 different inversion of Four bar Chain Mechanism
- b) Define-Kinematic Pair
- c) State the necessity of Acceleration diagram of Mechanism
- d) State the applications of Cam
- e) Define- lift of Cam
- f) List any 4 applications of clutches
- g) State the necessity of Balancing

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

**12 Marks**

- a) Explain with example- Lower pair and higher Pair
- b) Differentiate between Simple and Compound Gear Train
- c) Describe the construction of spherical faced follower
- d) Describe the construction of Epicyclical gear train

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

**12 Marks**

- a) Explain the mechanism of pendulum pump
- b) Draw the construction of 'Scotch yoke Mechanism'
- c) Explain the principle of working of Internal Expanding Brake
- d) Distinguish between Radial and Cylindrical Cam

- 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) Explain with sketch the construction and working of 'Whitworth's quick Return Mechanism'
- b) In the Single slider crank mechanism crank  $OB=50\text{mm}$ , the length of connecting rod  $AB=125\text{ mm}$ . The point 'G' is at  $60\text{ mm}$  from point 'B', crank OB is turned  $45^\circ$  from OA. The Crank rotates at  $200\text{ rpm}$ , 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  $40\text{mm}$  during  $90^\circ$  of cam rotation with SHM, Dwell for  $30^\circ$ , during return stroke  $60^\circ$  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 Reverted gear train and state its four applications.
- b) In slider crank mechanism length of crank and connecting rod is  $30\text{mm}$  and  $120\text{mm}$ . The crank rotates at  $180\text{ rpm}$  clockwise. When crank rotates  $45^\circ$  from Inner Dead centre. Find Velocity and acceleration of Slider using Klein's construction
- c) Explain with sketch construction of Hartnell Governor

**Q.6) Attempt any TWO of the following.**

**12 Marks**

- a) A leather belt is  $125\text{mm}$  wide and  $6\text{mm}$  thick transmit power from pulley  $750\text{mm}$  diameter which runs at  $500\text{ rpm}$ . The angle of lap is  $150^\circ$  and coeff of friction  $=0.3$ . If mass of  $1\text{ m}^3$  of leather is  $1\text{Kg}$  and stress in the belt is not to exceed  $2.75\text{MPa}$ , find maximum power that can be transmitted
- b) Explain with sketch construction of Diaphragm Clutch.
- c) Draw Turning Moment diagram for single cylinder 4-stroke petrol engine with explanation

**Scheme – I**

**Sample Test Paper - I**

**Programme Name : Diploma in Production Engineering / Production Technology**

**Programme Code : PG / PT**

**Semester : Third**

**Course Title : Theory of Machines**

**Marks : 20**

22344

**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
- b. List different types of Constrained Motion
- c. Define- Space Diagram
- d. State term Relative velocity
- e. List different types of motion with which follower moves
- f. State the applications of Cam

**Q.2 Attempt any TWO**

**12 Marks**

- a. Draw the sketch of 'Elliptical Trammel'
- b. In the Single slider crank mechanism crank  $OB=50\text{mm}$ , the length of connecting rod  $AB=125\text{ mm}$ . the point 'G' is at  $60\text{ mm}$  from point 'B', crank  $OB$  is turn  $45^\circ$  from  $OA$ . The Crank rotates at  $200\text{ rpm}$ , find out the velocity of point 'G' and angular acceleration of  $AB$
- c. The cam is to give following motion to knife edge follower -1. Outstroke during  $60^\circ$  degree 2. Dwell =  $30^\circ$  degree 3. Return stroke =  $60^\circ$  degree 4. Dwell for remaining  $210^\circ$  degree. Draw a Cam Profile of a given cam if stroke of follower is  $40\text{mm}$  and minimum radii of cam is  $50\text{mm}$ , the follower moves with uniform velocity during both outward and inward stroke

**Scheme – I**

**Sample Test Paper - II**

**Programme Name : Diploma in Production Engineering / Production Technology**

**Programme Code : PG / PT**

**Semester : Third**

**Course Title : Theory of Machines**

**Marks : 20**

**22344**

**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
- b. State Law of Gearing
- c. List different types of brakes
- d. List any 4 applications of clutches
- e. Define- Coefficient of fluctuation of energy
- f. List different types 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. Explain with sketch construction of Multiplate clutch
- c. Explain the method of balancing of different masses revolving in the same plane