Experiment Details

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| Department Name | Basic Science and Humanities |
| Class | FY B.Tech |
| Semester | 1 st |
| Subject Name | Engineering Mechanics Lab |
| Experiment No. | 01 |
| Experiment Name | Verification of Law of Polygon of Forces |

Version History

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| --- | --- | --- | --- | --- |
| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.0 | Sonali Yeranale | MRS. Pooja Patil | 06/10/2020 |
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AIM:

To verify the polygon law of forces.

THEORY:

“Polygon law of forces” states that if a number of forces acting on a particle are represented in magnitude and direction by sides of a polygon taken in same order, then their resultant is represented in magnitude and direction by the closing side of the polygon taken in the opposite direction.

PRE TEST:

1. Which is the correct statement about law of polygon of forces?

* [If any number of forces acting at a point can be represented by the sides of a polygon taken in order, then the forces are in equilibrium](javascript:void(0);)
* [If any number of forces acting at a point can be represented in direction and magnitude by the sides of a polygon, then the forces are in equilibrium](javascript:void(0);)
* [If a polygon representing forces acting at a point is closed then forces are in equilibrium](javascript:void(0);)
* [If any number of forces acting at a point can be represented in direction and magnitude by the sides of a polygon taken in order, then the forces are in equilibrium](javascript:void(0);)

Answer: - [If any number of forces acting at a point can be represented in direction and magnitude by the sides of a polygon taken in order, then the forces are in equilibrium](javascript:void(0);)

1. The unit of force in S.I. units is

* [Kilogram](javascript:void(0);)
* [Newton](javascript:void(0);)
* [Watt](javascript:void(0);)
* [Dyne](javascript:void(0);)

Answer: - Newton

1. Forces are called concurrent when their lines of action meet in

* [One point](javascript:void(0);)
* [Two points](javascript:void(0);)
* [Plane](javascript:void(0);)
* [Perpendicular planes](javascript:void(0);)

Answer: -One point

1. A force acting on a body may

* [Introduce internal stresses](javascript:void(0);)
* [Retard its motion](javascript:void(0);)
* [Change its motion](javascript:void(0);)
* All of the above

Answer: - All of the above

1. A force is completely defined when we specify

* [Magnitude](javascript:void(0);)
* [Direction](javascript:void(0);)
* [Point of application](javascript:void(0);)
* [All of the above](javascript:void(0);)

Answer: - All of the above

PROCEDURE:

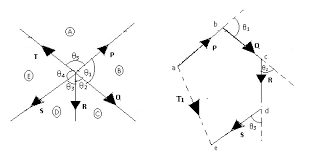


Fig :- space diagram and vector diagram

* 1. Set the board in a vertical plane and fix the paper sheet with drawing pins.
  2. Pass a thread over two pulleys.
  3. Take a second thread and tie the middle of this thread to the middle of first thread.
  4. Pass the ends of the second thread over the other set of two pulleys.
  5. Take a third thread and tie its one end to the point of first two threads.
  6. Attach pans to the free ends of the threads as shown in Fig.
  7. Place the weights in the pans in such a manner that the knot comes approximately in the centre of the paper.
  8. Take the mirror strip and place it under the threads turn by turn and mark the points by keeping the eye, the thread and its image in the same line without disturbing the system.
  9. Mark the lines of forces and write down the magnitude of forces.
  10. Remove the paper from the board and produce the lines to meet at O.
  11. Select a suitable scale draw the vector diagram by moving in one direction(i.e. clockwise or anticlockwise).

Draw ab parallel to AB and cut it equal to force P ;

draw bc parallel to BC and cut it equal to Q ;

draw cd parallel to CD and cut it

POST TEST:

1. Which of the following is a vector quantity

* energy
* mass
* momentum
* angle
* speed.

Answer: - momentumBottom of Form

1. A number of forces acting at a point willbe in equilibrium if

* their total sum is zero
* two resolved parts in two directions at right angles are equal
* sum of resolved parts in any twoper-pendicular directions are both zero
* all of them are inclined equally
* none of the above.

Answer: - sum of resolved parts in any twoper-pendicular directions are both zero

1. The forces, which meet at one point, but their lines of action do not lie in a plane, are called

* [Coplanar non-concurrent forces](javascript:void(0);)
* [Non-coplanar concurrent forces](javascript:void(0);)
* [Non-coplanar non-concurrent forces](javascript:void(0);)
* [Intersecting forces](javascript:void(0);)

Answer: -Non-coplanar concurrent forces

Top of Form

1. In order to completely specify angular displacement by a vector, it must fix

* Direction of the axis of rotation
* Magnitude of angular displacement
* Sense of angular displacement
* All of these

Answer: - All of these

1. The moment of inertia of a rectangular section 3 cm wide and 4 cm deep about *X*-*X* axis is
   * 9 cm4
   * 12 cm4
   * 16 cm4
   * 20 cm4

Answer:- 16 cm4

REFERENCES:

Engineering Mechanics by S. S. Bhavikattis, Engineering Mechanics