

# MID TERM EXAMINATION OCT. - 2024

## ENGINEERING MECHANICS

Time: 01 Hr.

Note: Scientific calculators are allowed as per norm.

Maximum Marks: 30

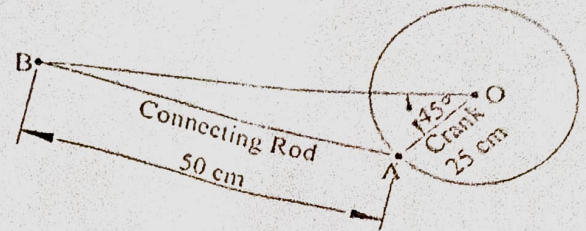
### SECTION-A (Attempt any two questions. Each of 05 Marks)

1. Briefly explain the followings:

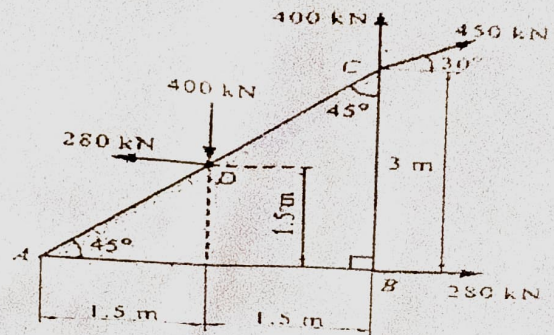
- Principle of transmissibility.
- Varignon's Theorem.
- Angle of repose and angle of friction

- State of Equilibrium.
- Force system and force characteristics.

2. Following figure shows a particular position of the connecting rod BA and crank AO. At this position, the connecting rod of the engine exerts a force 2500N on the crank pin at A. Resolve this force into horizontal and vertical components at A. Also, resolve the given force at A along AO and along a Direction perpendicular to AO.

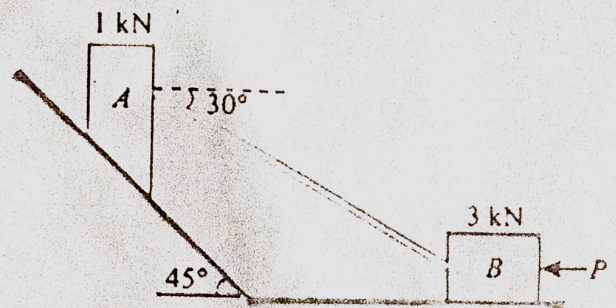


3. Five coplanar forces are acting on a triangular plate ABC as shown in fig. Determine the resultant and locate the point of intersection of the resultant with the horizontal line AB.



### SECTION-B (Attempt any One question, 10 Marks)

- A 6m uniform ladder weighing 300N is placed against a vertical wall. Its inclination with the ground is  $60^\circ$ . At what distance from the lower end of the ladder a man weighing 800N should climb before slipping of the ladder starts. The coefficient of friction for all the contact surfaces is 0.2.
- A block (A) weighing 1 kN rests on a rough inclined plane whose inclination to the horizontal is  $45^\circ$ . This block is connected to another block (B) weighing 3 kN rests on a rough horizontal plane by a weightless rigid bar inclined at an angle of  $30^\circ$  to the horizontal as shown in Fig. Find horizontal force (P) required to be applied to the block (B) just to move the block (A) in upward direction. Assume angle of limiting friction as  $15^\circ$  at all surfaces where there is sliding.



### SECTION-C (Compulsory, 10 Marks)

- Two cylinders P and Q are kept in a channel as shown in fig. The cylinder P has a diameter of 100mm and weight 200N and Q has a diameter of 180mm and weight 500N. Determine the reactions at all the contact surfaces.

