

EI-180

UITians

B.E. (IInd Sem.) (CGPA) Civil Engg. Exam.-2015

ENGINEERING MECHANICALS

Paper : CE-204

Time Allowed : Three Hours

Maximum Marks : 60

Note : All questions are compulsory.

Internal choice are maintained with questions.

Q.I Fill correct word— 2 each

(a) If resultant is zero, the particle said to be in

(Couple/Moment/ Resultant)

(b) The sense of friction is always..... to the sense of impending motion. *(Same / Opposite)*

(c) If $m+3 > 2j$ it means that the truss contains more member than required to be just rigid and is

(Over rigid / Under rigid / perfect)

Where m = No. of members

j = No. of joints

(2)

UITians

(d) For self locking machine; condition is

$$(\phi > \theta, \theta < \phi, \theta = \phi)$$

Where ϕ = angle of friction

θ = helix angle

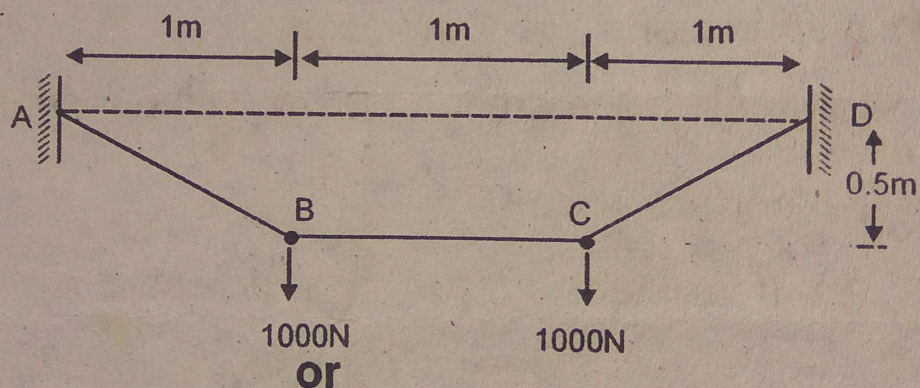
(e) S.I. unit of force is

(Newton / Joule / Watt)

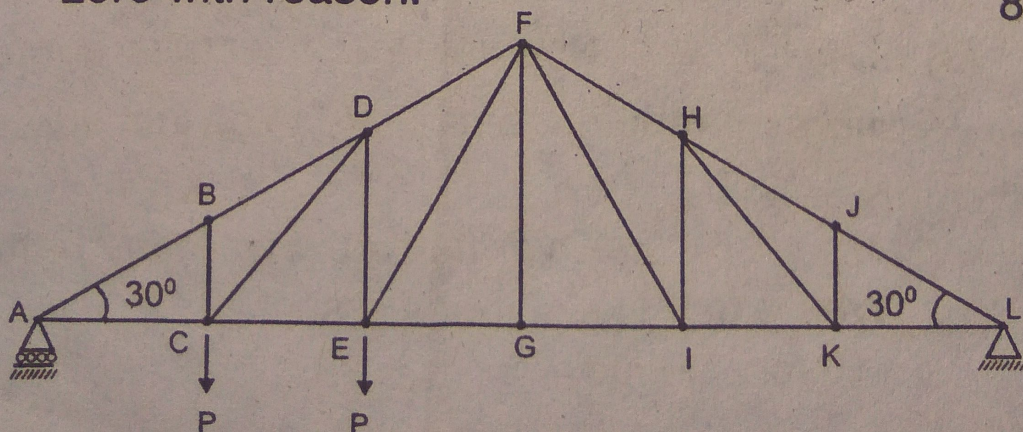
Q.II

(a) Define the system of coplaner and con current forces. 2

(b) Two equal weights each of 1000N is supported by a flexible string as shown. Find the tensions in the portion AB, BC and CD of the string. 8



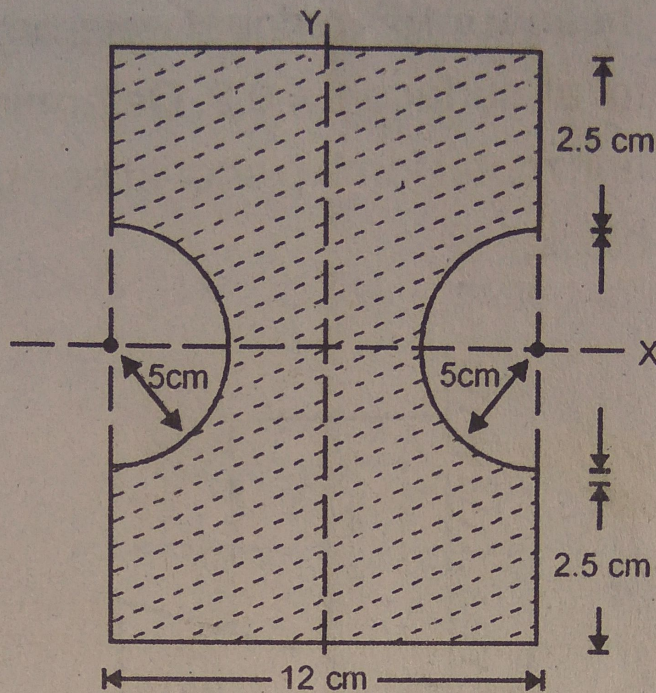
(b) A truss is loaded and supported as shown. Find out the member in which the axial forces are zero with reason. 8



(3)

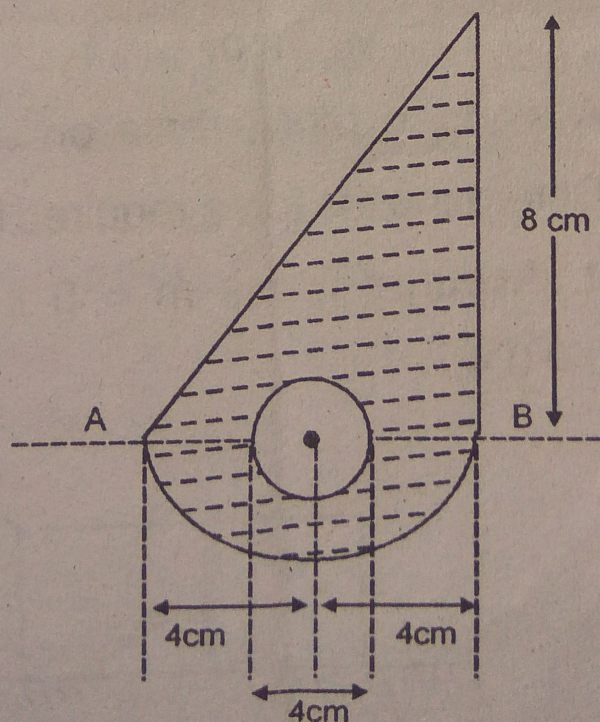
UITians

Q.III Find the moments of inertia of the cross-section of an iron beam with respect to centroidal axis. 10



or

Find the moment of inertia of the shaded area with respect to the centroidal axis parallel to AB.

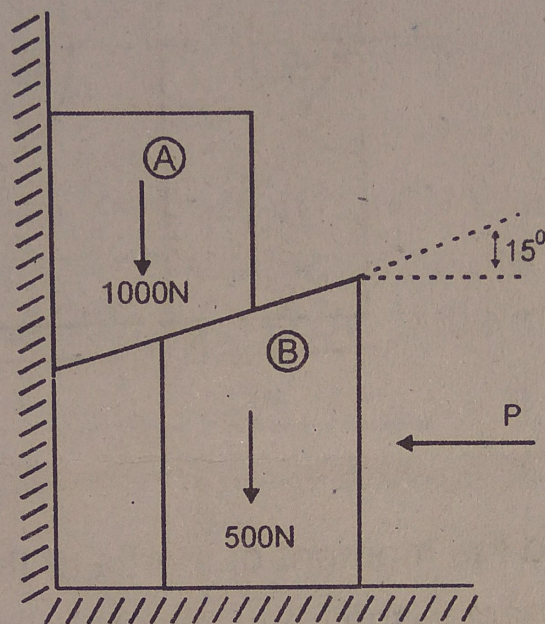


(4)

UITians

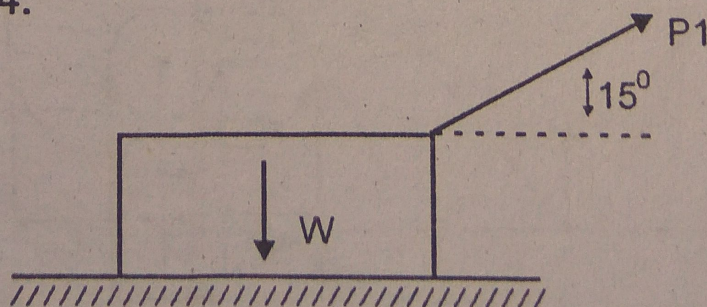
Q.IV (a) What is angle of friction.

(b) A block A weighing 1000N is to be raised by means of 15° wedge B weighing 500N. Assuming for all surface $\mu = 0.2$. Determine what minimum horizontal force p should be applied to raise the block.



or

A wooden block rests on a horizontal plane. Determine the force required to (a) pull it (b) push it. Assume mass $m = 5$ kg (for block) and $\mu = 0.4$.



(5)

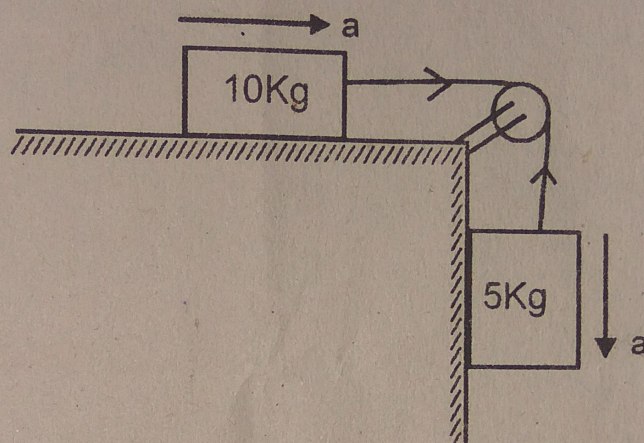
UITians

Q.V (a) What is D-Alembert's principle.

2

(b) Two blocks of masses 10 Kg and 5 Kg are connected by a flexible but in extensible string as shown in figure. Assume $\mu = 0.25$. Find the acceleration of the masses and tension in the sting.

8



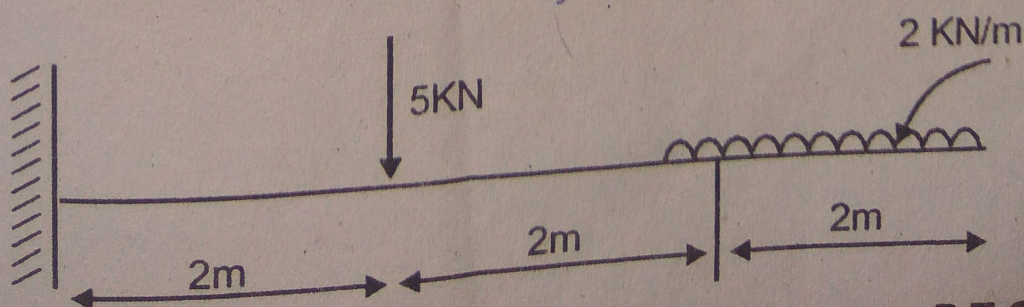
or

What is impact and nature of impact and also define the term coefficient of restitution and also draw graph between force Vs time for impact.

Q.VI (a) What is point of contra-flexure.

2

(b) Draw the shear force and bending moment diagram.



(6)

UITians

or

Draw the shear force and bending moment diagram.

