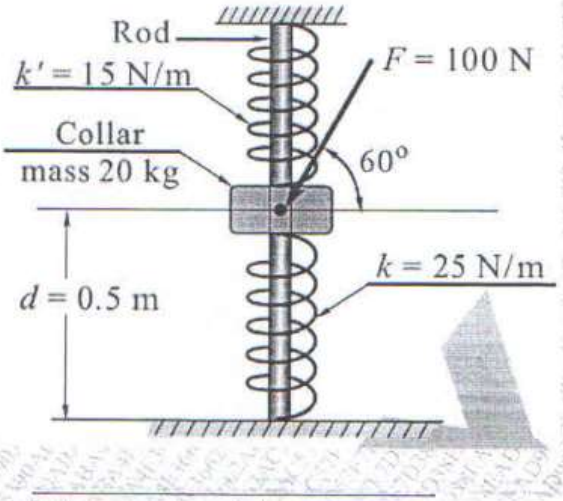
# MAY JUNE 2017

d) Figure shows a collar of mass 20 kg which is supported on the smooth rod. [8]
The attached springs are undeformed when $d = 0.5$ m. Determine the speed of the collar after the applied force of 100 N causes it to displace so that $d = 0.3$ m. The collar is at rest when $d = 0.5$ m. Use work energy principle.

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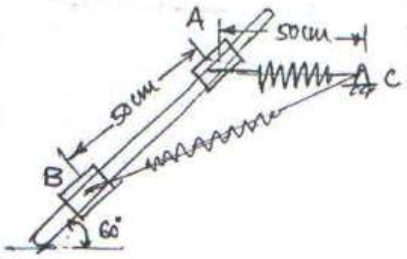
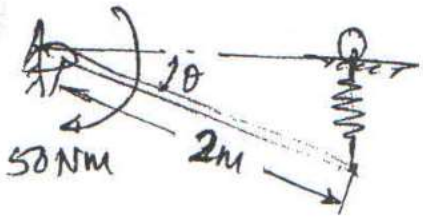
# MAY JUNE 2017

c) A 50N coller slides without friction along a smooth rod which is kept inclined at 60° to the horizontal. The spring attached to the collar and the support 'C'. The spring is unstretched when the coller is at 'A' (AC is horizontal) Determine the value of spring constant 'K' given that the collar has a velocity of 2.5 m/s when it has moved 0.5m along the rod as shown in fig. 06




c) Determine the required stiffness 'K' so that the uniform 7Kg bar AC is in equilibrium when $\theta = 30°$ Due to the collar guide at B the spring remains vertical and is unstretched when $\theta = 0$ Use Principle of Virtual Work. 04



# DEC 2016

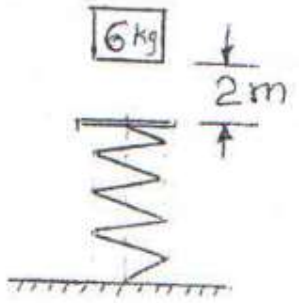



Fig No. 9

(c) A block of mass 6 kg falls from height 2 m onto a spring whose stiffness is 12 N/mm. Find velocity of block when spring gets compressed by 0.1 m. (refer fig No. 9) [6]

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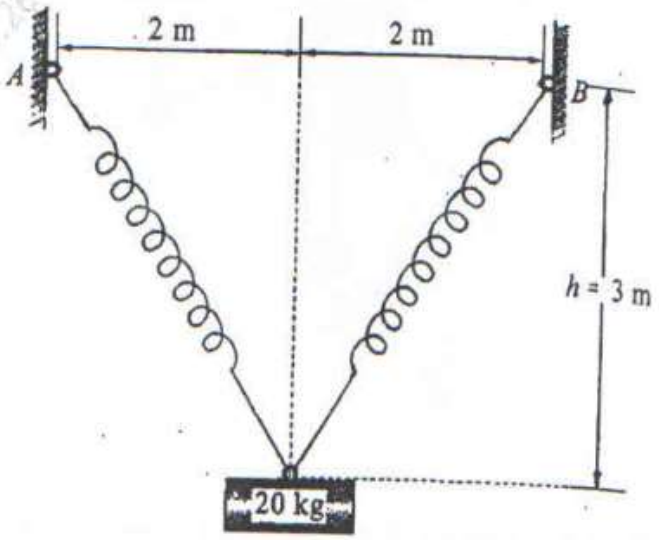
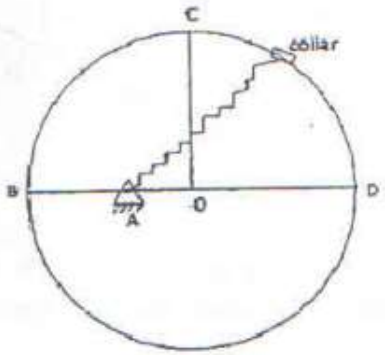
# DEC 2016

**b. A cylinder has a mass of 20kg and is released from rest when h=0 as shown in the figure. Determine its speed when h=3m. The springs each have an unstretched length of 2m. Take k=40N/m.** [6]



# MAY JUNE 2016

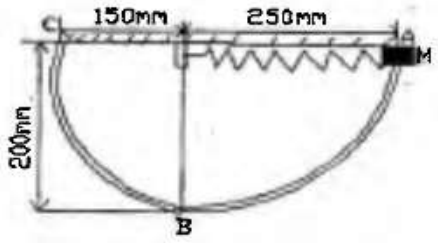
c. A collar of mass 1 kg is attached to a spring ad slides without friction along a circular rod which lies in a horizontal plane. The spring is undeformed when the collar is at B. knowing that the collar is passing through the point D with a speed of 1.8 m/s, determine the speed of the collar when it passes through point C and B. Take Stiffness of the spring, k= 250 N/m, Radius of the circular path = 300 mm and distance OA = 125 mm. [6]




MUPD16448 SARDAR PATEL

# DEC 2015

c) A 2kg collar M is attached to a spring and slides without friction in a vertical plane along the curved rod ABC as shown in figure. The spring has an un-deformed length of 100mm and its stiffness k=800N/m. If the collar is released from rest at A, determine its velocity i) as it passes through B. ii) as it reaches C. [6]




PATEL INSTITUTE

# MAY 2015

c) The platform P (Fig. 8) has negligible mass & is tied down so that the 0.4 m long cords keep a 1 m long spring compressed to 0.6 m. when nothing is on the platform. If 4 kg block is placed on the platform & released from rest after the platform is pushed down 0.1 m., find the maximum height 'h' the block rises in the air, measured from the ground. Use Work & Energy Principle. 6

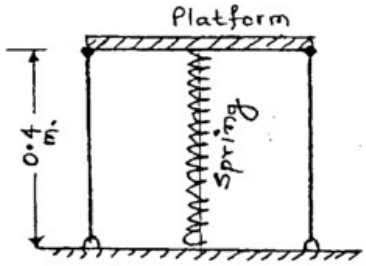
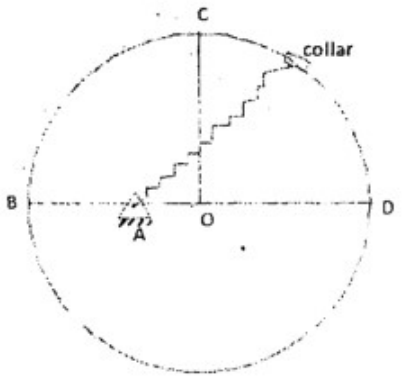



Fig. 8

[TURN OVER

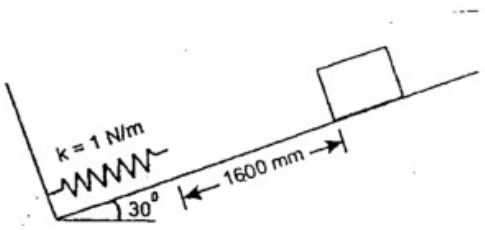
# DEC 2014

c. A collar of mass 1 kg is attached to a spring and slides without friction along a circular rod which lies in a horizontal plane. The spring is undeformed when the collar is at B. knowing that the collar is passing through the point D with a speed of 1.8 m/s, determine the speed of the collar when it passes through point C and B. Take Stiffness of the spring, k= 250 N/m, Radius of the circular path = 300 mm and distance OA = 125 mm. [6]




# MAY 2014

c) A 30N block is released from rest. It slides down a rough incline having coefficient of friction 0.25. Determine the maximum compression of the spring. [6]

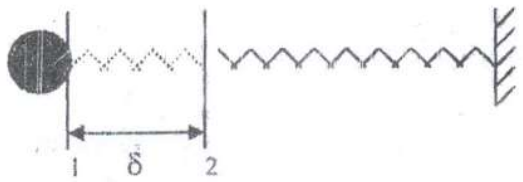


# MAY 2013

(c) Explain work energy principle. 6

# DEC 2012

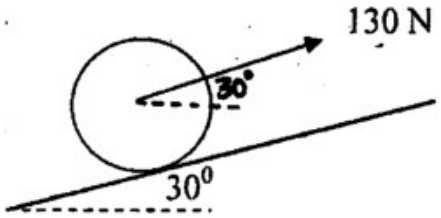
c) A spring of stiffness k is placed horizontally and a ball of mass m strikes the spring with a velocity v, find the maximum compression of the spring. Take m = 5kg, k = 500N/m, v = 3m/s. [06]




# DEC 2010

1E). A 5 Kg mass drops 2m upon a spring whose modulus is 10N/mm. What will be the speed of the block when the spring is deformed 100mm? **(05 Marks)**

1F). Find the work done in rolling a 20Kg wheel a distance 1.5m up a plane inclined $30^0$ with the horizontal as shown in figure. Assume coefficient of friction as 0.25. **(05 Marks)**




**(02 marks)**

3C). State Work Energy Principle & Law of conservation of Momentum principle.

**(04 marks)**