PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT

1960 PHYSICS (HINGLISH)

FRICTION

Mcq S

1. The coefficent of friction μ and the angle of friction λ are related as

A. $\sin\lambda = \mu$

B. $\cos\lambda = \mu$

C. $\tan\lambda = \mu$

D. None of these

Answer: C

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2. A force of 98 N is required to just start moving a body of mass 100 kg over ice. The coefficient of static friction is

A. 0.6

B. 0.4

C. 0.2

D. 0.1

Answer: D

3. A block weighs W is held against a vertical wall by applying a horizontal force F. The

minimum value of F needed to hold the block is

A. Less than W

B. Equal to W

C. Greater than W

D. Data is insufficent

Answer: C

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4. The maximum static frictional force is

A. Equal to twice the area of surface in contact

B. Independent of the area of surface in contact

C. Equal to the area of surface in contact

D. None of the above

Answer: B

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5. Maximum value of static friction is .

A. Limiting friction

B. Rolling friction

C. Normal reaction

D. Coefficient of friction

Answer: A

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6. Pulling force making an angle θ to the horizontal is applied on a block of weight W placed on a horizontal table. If the angle of friction is α, then the magnitude of force is α , then the magnitude of force required to move the body is equal to

A. $\frac{W \sin \alpha}{> an(\theta - \alpha)}$

B. $\frac{W \cos \alpha}{\cos(\theta - \alpha)}$

C. $\frac{W \sin \alpha}{\cos(\theta - \alpha)}$

D. $\frac{W \tan \alpha}{\sin(\theta - \alpha)}$

Answer: C

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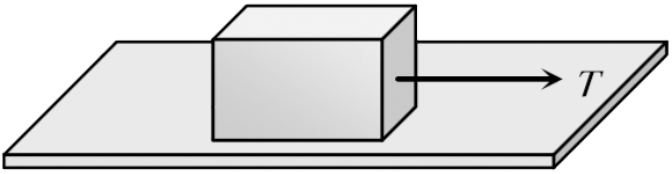
7. 

In the figure shown, a block of weight 10 N resting on a horizontal surface. The coefficent of static friction between the block and the surface $\mu_s = 0.4$. A force of 3.5 N will keep the block in uniform motion, once it has been set in motion. A horizontal force force of 3N is applid to the block, then the block will

A. Move over the surface with constant velocity

B. Move having accelerated motion over the surface

C. Not move

D. First it will move with a constant velocity for some time and then will have accelerated motion

Answer: C

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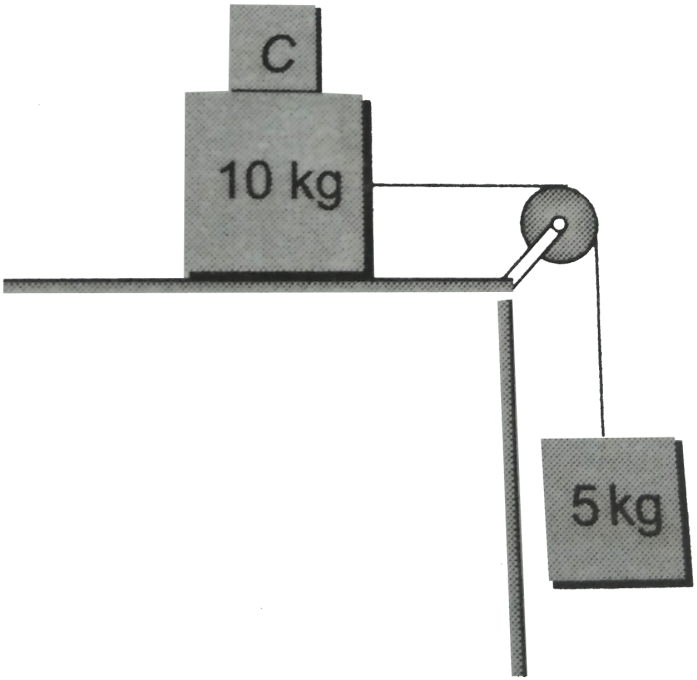
8. Two masses A and B of $10kg$ and $5kg$, respectively , are connected with a string passing over a frictionless pulley fixed at the corner of a table as shown. The coefficient of static friction between A and the table is 0.2. The minimum mass C that should be placed

on A to prevent it from moving is equal to



A. 15 kg

B. 10 kg

C. 5 kg

D. 12 kg

Answer: A

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9. The limiting friction is

A. Always greater than the dynamic friction

B. Always less than the dynamic friction

C. Equal to the dynamic friction

D. Sometimes greater and sometimes less than the dynamic friction

Answer: A

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10. Which is a suitable method to decrease friction

A. Ball and bearings

B. Lubrication

C. polishing

D. all the above

Answer: D

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11. A uniform rope of length L meters is lying over a table. If the coefficient of friction be μ, then the maximum length L_1 of the part of the rope which can overhang the edge without sliding is

A. $\frac{l}{\mu}$

B. $\frac{l}{\mu + l}$

C. $\frac{\mu l}{1+\mu}$

D. $\frac{\mu l}{\mu-1}$

Answer: C

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12. Which of the following statements is not true

A. The coefficient of friction between two surfaces increases as the surface in

contact are made rough

B. The force of friction acts in a direction opposite to the applied force

C. Rolling friction is greater than sliding friction

D. The coefficient of friction between wood and wood is less than 1

Answer: C

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13. A block of 1 kg is stopped against a wall by applying a force F perpendicular to the wall. If $\mu = 0.2$ then minimum value of F will be

A. 980 N

B. 49 N

C. 98 N

D. 490 N

Answer: B

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14. A heavy uniform chain lies on a horizontal table-top. If the coefficient of friction between the chain and table surface is 0.25, then the maximum fraction of length of the chain, that can hang over one edge of the table is

A. 0.2

B. 0.25

C. 0.35

D. 0.15

Answer: A

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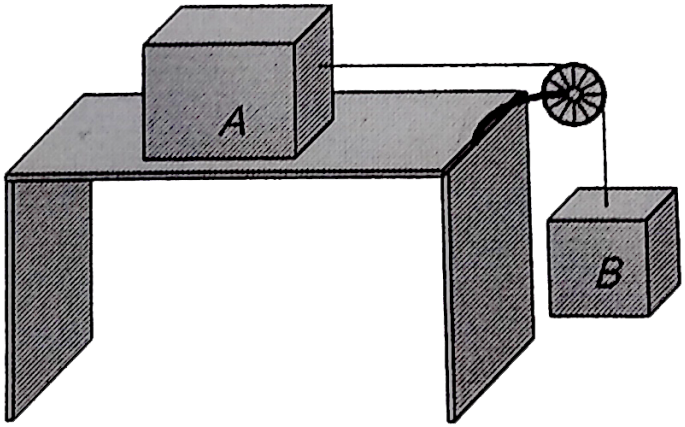
15. The blocks A and B are arranged as shown in the figure. The pulley is frictionless. The mass of A is 10 kg . The coefficient of friction of A with the horizontal surface is 0.20. The minimum mass of B to start the motion will be



A. 2 kg

B. 0.2 kg

C. 5 kg

D. 10 kg

Answer: A

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16. Work done by a frictional force is

A. negative

B. positive

C. zero

D. all of the above

Answer: D

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17. L changes partly from a table which is kept in equilibrium by friction. The maximum length that can withstand without slipping is l , then

coefficient of friction between the table and the chain is

A. $\frac{l}{L}$

B. $\frac{l}{L+l}$

C. $\frac{l}{L-l}$

D. $\frac{L}{L+l}$

Answer: C

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18. When two surfaces are coated with a lubricant, then they

A. Stick to each other

B. Slide upon each other

C. Roll upon each other

D. None of these

Answer: B

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19. A 20 kg block is initially at rest on a rough horizontal surface. A horizontal force of 75 N is required to set the block in motion. After it is in motion, a horizontal force of 60 N is required to keep the block moving with constant speed. The coefficient of static friction is

A. 0.38

B. 0.44

C. 0.52

D. 0.6

Answer: A

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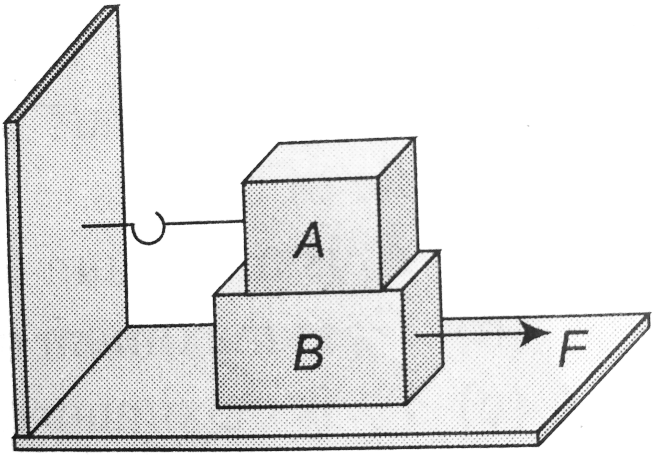
20. A block A with mass 100kg is resting on another block B of mass 200kg. As shown in figure a horizontal rope tied to a wall hold it. The coefficient of friction between A and B is 0.2 while coefficient of friction between B and the ground is 0.3 . the minimum required

force F to start moving B will be.



A. 900 N

B. 100 N

C. 1100 N

D. 1200 N

Answer: C

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21. To avoid slipping while walking on ice, one should take smaller steps because of the

A. Friction of ice is large

B. Larger normal reaction

C. Friction of ice is small

D. Smaller normal reaction.

Answer: B

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22. A box is lying on an inclined plane what is the coefficient of static friction if the box starts sliding when an angle of inclination is 60°

A. 1.173

B. 1.732

C. 2.732

D. 1.677

Answer: B

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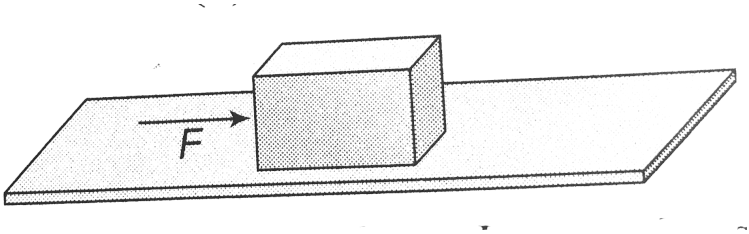
23. A block of mass $2kg$ is kept on the floor. The coefficient of static friction is 0.4 . If a force F of $2.5N$ is applied on the block as shown in the figure, the frictional force between the block and the floor will be.



A. 2.5 N

B. 5 N

C. 7.84 N

D. 10 N

Answer: A

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24. Which one of the following is not used to reduce friction

A. Oil

B. Ball bearings

C. Sand

D. Graphite

Answer: C

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25. If a ladder weighting $250N$ is placed against a smooth vertical wall having coefficient of friction between it and floor 0.3,

then what is the maximum force of friction available at the point of contact between the ladder and the floor?

A. 75 N

B. 50 N

C. 35 N

D. 25 N

Answer: A

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26. A body of mass 2 kg is kept by pressing to a vertical wall by a force of 100 N . The coefficient of friction between wall and body is 0.3. Then the frictional force is equal to

A. 2 N

B. 20 N

C. 50 N

D. 100 N

Answer: B

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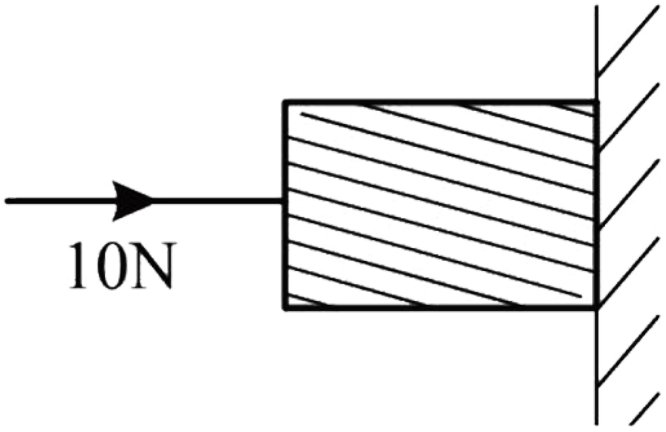
27. A horizontal force of 10N is necessary to just hold a block stationary against as well. The coefficient of friction between the block and the wall is 0.2. The weight of the block is



A. 2 N

B. 20 N

C. 10 N

D. none of the above

Answer: A

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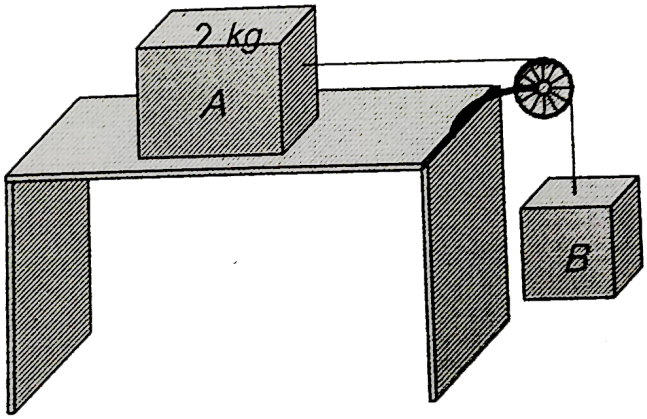
28. The coefficient of static friction, μ_s between block A of mass 2 kg and the table as shown in the figure is 0.2. What would be the

maximum mass value of block B so that the two blocks do not move? The string and the pulley are assumed to be smooth and massless.$\left(g = 10m/s^2\right)$



A. 2.0 kg

B. 4.0 kg

C. 0.2 kg

D. 0.4 kg

Answer: D

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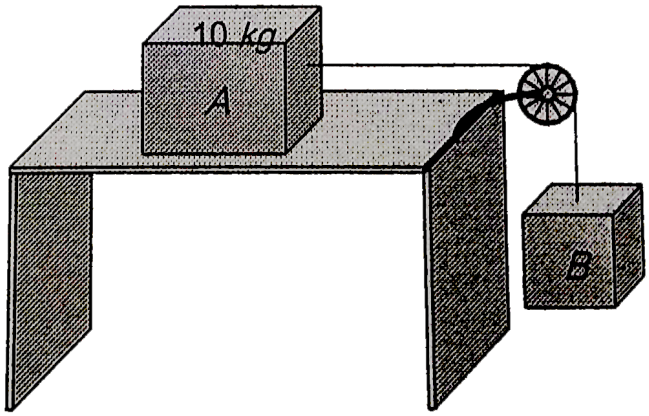
29.



If mass of A=10 kg, coefficent of static friction

=0.2 coefficient of kinetic friction =0.2 then mass of B to start motion is

A. 2 kg

B. 2.2 kg

C. 4.8 kg

D. 200 kg

Answer: A

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30. A uniform metal chain is placed on a rough table such that the one end of chain hangs down over the edge of the table, when one-third of its length hang over the edge, the chain starts sliding. Then the coefficient of static friction is

A. $\frac{3}{4}$

B. $\frac{1}{4}$

C. $\frac{2}{3}$

D. $\frac{1}{2}$

Answer: D

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31. A lift is moving down with an acceleration equal to the acceleration due to gravity. A body of mass M kept on the floor of the lift is pulled horizontally If the coefficient of friction is μ then the frictional resistance offered by the body is .

A. mg

B. μmg

C. $2\mu mg$

D. $zero$

Answer: D

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32. If a ladder weighting $250N$ is placed against a smooth vertical wall having coefficient of friction between it and floor 0.3, then what is the maximum force of friction

available at the point of contact between the ladder and the floor?

A. 75 N

B. 50 N

C. 35 N

D. 25 N

Answer: A

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33. Which one of the following statements is correct

A. Rolling friction is greater than sliding friction

B. Rolling friction is less than sliding friction

C. Rolling friction is equal to sliding friction

D. Rolling friction and sliding friction are same

Answer: B

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34. The maximum speed that can be achieved without skidding by a car on a circular unbanked road of radius R and coefficient of static friction μ , is

A. μRg

B. $Rg\sqrt{\mu}$

C. $\mu\sqrt{Rg}$

D. $\sqrt{\mu Rg}$

Answer: D

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35. A car is moving along a straight horizontal road with a speed v_0 . If the coefficient of friction between the tyres and the road is μ , the shortest distance in which the car can be stopped is

A. $\frac{v_0^2}{2\mu g}$

B. $\frac{v_0}{\mu g}$

C. $\left(\frac{v_0}{\mu g}\right)^2$

D. $\frac{v_0}{\mu}$

Answer: A

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36. A block of mass 5kg is on a rough horizontal surface and is at rest. Now a force of 24 N is imparted to it with negligible impulse. If the coefficient of kinetic friction is

0.4 and $g = 9.8m/s^2$, then the acceleration of the block is

A. $0.26m/s^2$

B. $0.39m/s^2$

C. $0.69m/s^2$

D. $0.88m/s^2$

Answer: D

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37. A body of mass 2 kg is being dragged with uniform velocity of 2 m / s on a rough horizontal plane. The coefficient of friction between the body and the surface is 0.20. The amount of heat generated in 5 sec is

. $\left(4.2\text{joule}/cal \text{ and } g = 9.8m/s^2\right)$

A. 9.33 cal

B. 10.21 cal

C. 12.67 cal

D. 13.34 cal

Answer: A

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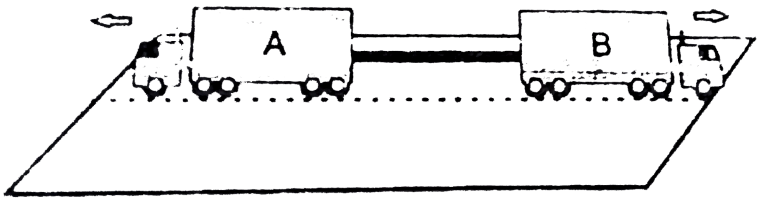
38. Two carts of masses $200kg$ and $300kg$ on horizontal rails are pushed apart. Suppose the coefficient of friction between the carts and the rails are same. If the $200kg$ cart travels a distance of $36m$ and stops. Then the distance travelled by the cart weighing $300kg$ is : (if

both have same initial speed)



A. 32 m

B. 24 m

C. 16 m

D. 12 m

Answer: C

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39. A body B lies on a smooth horizontal table and another body A is placed on B. The coefficient of friction between A and B is μ. What acceleration given to B will cause slipping to occur between A and B

A. μg

B. g / μ

C. μ / g

D. $\sqrt{\mu g}$

Answer: A

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40. A 60 kg body is pushed with just enough force to start it moving across a floor and the same force continues to act afterwards. The coefficient of static friction and sliding friction are 0.5 and 0.4 respectively. The acceleration of the body is

A. $6m/s^2$

B. $4.9m/s^2$

C. $3.92m/s^2$

D. $1m/s^2$

Answer: D

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41. A car turns a corner on a slippery road at a constant speed of $10m/s$. If the coefficient of friction is 0.5, the minimum radius of the arc in meter in which the car turns is

A. 20

B. 10

C. 5

D. 4

Answer: A

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42. A motorcyclist of mass m is to negotiate a curve of radius r with a speed v . The minimum value of the coefficient of friction so that this negotiation may take place safely, is

A. v^2rg

B. $\frac{v^2}{gr}$

C. $\frac{gr}{v^2}$

D. $\frac{g}{v^2r}$

Answer: B

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43. On a rough horizontal surface, a body of mass 2 kg is given a velocity of 10 m / s . If the

coefficient of friction is 0.2 and $g = 10m/s^2$, the body will stop after covering a distance of

A. 10 m

B. 25 m

C. 50 m

D. 250 m

Answer: B

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44. A block of mass 50 kg can slide on a rough horizontal surface. The coefficient of friction between the block and the surface is 0.6. The least force of pull acting at an

angle of 30° to the upwawrd drawn ve3rtical which causes the block to just slide is

A. 29.43 N

B. 219.6 N

C. 21.96 N

D. 294.3 N

Answer: D

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45. A body of 10 kg is acted by a force of 129.4 N if $g = 9.8m/\sec^2$. The acceleration of the block is $10m/s^2$. What is the coefficient of kinetic friction

A. 0.03

B. 0.01

C. 0.3

D. 0.25

Answer: C

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46. Assuming the coefficient of friction between the road and tyres of a car to be 0.5, the maximum speed with which the car can move round a curve of 40.0 m radius without slipping, if the road is unbanked, should be

A. 25 m/s

B. 19 m/s

C. 14 m/s

D. 11 m/s

Answer: C

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47. Consider a car moving along a straight horizontal road with a speed of 72 km / h . If the coefficient of kinetic friction between the tyres and the road is 0.5, the shortest distance

in which the car can be stopped is $[g = 10ms^{-2}]$

A. 30 m

B. 40 m

C. 72 m

D. 20 m

Answer: B

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48. A 500 kg horse pulls a cart of mass 1500 kg along a level road with an acceleration of $1ms^{-2}$. ms . If the coefficient of sliding friction is 0.2, then the force exerted by the horse in forward direction is

A. 3000 N

B. 4000 N

C. 5000 N

D. 6000 N

Answer: D

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49. Find the maximum speed at which a car can turn round a curve of $30m$ radius on a level road if coefficient of friction between the tyres and road is 0.4. $Takeg = 10m / s^2$.

A. 9.84 m/s

B. 10.84 m/s

C. 7.84 m/s

D. 5.84 m/s

Answer: B

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50. A block of mass 50 kg slides over a horizontal distance of 1m. If the coefficient of friction between their surface is 0.2, then work done against friction is (take $g = 9.8m/s^2$) :

A. 98 J

B. 72 J

C. 56 J

D. 34 J

Answer: A

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51. On the horizontal surface of a truck $(\mu = 0.6)$ a block of mass 1 kg is placed. If the truck is accelerating at the rate of $5m/\sec^2$ then friction force on the block will be

A. 5 N

B. 6 N

C. 5.88 N

D. 8 N

Answer: A

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52. A vehicle of mass M is moving on a rough horizontal road with a momentum P If the coefficient of friction between the tyres and the road is μ is then the stopping distance is .

A. $\frac{P}{2\mu Mg}$

B. $\frac{P^2}{2\mu Mg}$

C. $\frac{P}{2\mu M^2 g}$

D. $\frac{P^2}{2\mu M^2 g}$

Answer: D

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53. A body of weight 64 N is pushed with just enough force to start it moving across a horizontal floor and the same force continues

to act afterwards. If the coefficients of static and dynamic friction are 0.6 and 0.4 respectively, the acceleration of the body will be (Acceleration due to gravity = g)

A. $\frac{g}{6.4}$

B. 0.64 g

C. $\frac{g}{32}$

D. 0.2 g

Answer: D

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54. When a body is moving on a surface, the force of friction is called

A. Static friction

B. Dynamic friction

C. Limiting friction

D. Rolling friction

Answer: B

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55. A block of mass $10kg$ is placed on a rough horizontal surface having coefficient of friction $\mu = 0.5$. If a horizontal force of $100N$ is acting on it, then acceleration of the body will be.

A. $0.5m/s^2$

B. $5m/s^2$

C. $10m/s^2$

D. $15m/s^2$

Answer: B

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56. It is easier to roll a barrel than pull it along the road. This statement is

A. $false$

B. $true$

C. Ucertain

D. Not possible

Answer: B

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57. A marble block of mass 2 kg lying on ice when given a velocity of $6m/s$ is stopped by friction in 10s. Then the coefficient of friction is

A. 0.01

B. 0.02

C. 0.03

D. 0.06

Answer: D

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58. A horizontal force of 129.4 N is applied on a 10 kg block which rests on a horizontal surface. If the coefficient of friction is 0.3, the acceleration should be

A. $9.8m/s^2$

B. $10m/s^2$

C. $12.6m/s^2$

D. $19.6\frac{m}{s^2}$

Answer: B

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59. A 60 kg weight is dragged on a horizontal surface by a rope upto 2 metres. If coefficient of friction is $\mu = 0.5$ the angle of rope with the surface is 60° and $g = 9.8m/\sec^2$, then work done is

A. 294 joules

B. 315 joules

C. 588 joules

D. 197 joules

Answer: B

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60. A car having a mass of 1000 kg is moving at a seed of 30 metres/sec. Brakes are applied to bring the car to rest if the frictional force

between the tyres and the road surface is 5000 newtons,t he car will come to reast in

A. 5 sec

B. 10 sec

C. 12 sec

D. 6 sec

Answer: D

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61. if μ_s, μ_k and μ_r are coefficeints of static friction, sliding friction and rolling friction, then.

A. $\mu_s < \mu_k < \mu_r$

B. $\mu_k < \mu_r < \mu_s$

C. $\mu_r < \mu_k < \mu_s$

D. $\mu_r = \mu_k = \mu_s$

Answer: C

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62. A body of mass 5 kg rests on a rough horizontal surface of coefficient of friction 0.2. The body is pulled through a distance of 10 m by a horizontal force of 25 N . The kinetic energy acquired by it is $\left(g = 10ms^2\right)$

A. 330 J

B. 150 J

C. 100 J

D. 50 J

Answer: B

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63. A motorcycle is travelling on a curved track of radius 500 m. If the coefficient of friction between road and tyres is 0.5, the speed avoiding skidding will be

A. 50 m/s

B. 75 m/s

C. 25 m/s

D. 35 m/s

Answer: A

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64. A fireman of mass 60 kg slides down a pole. He is pressing the pole with a force of 600N. The coefficient of friction between the hands and the pole is 0.5, with what acceleration will the fireman slide down $\left(g = 10\frac{m}{s^2}\right)$

A. $1m/s^2$

B. $2.5m/s^2$

C. $10m/s^2$

D. $5m/s^2$

Answer: D

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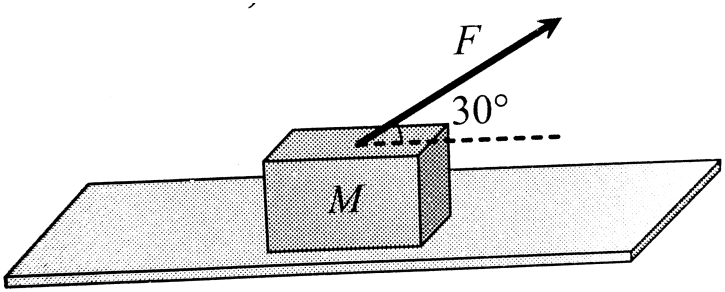
65. A block of mass $m = 5kg$ is resting on a rough horizontal surface for which the coefficient of friction is 0.2 . When a force $F = 40N$ is applied, the acceleration of the

block will be $\left(g = 10m/s^2\right)$.



A. $5.73m/\sec^2$

B. $8.0m/\sec^2$

C. $3.17m/\sec^2$

D. $10.0m/\sec^2$

Answer: A

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66. A body is moving along a rough horizontal surface with an initial velocity 6m/s m If the body comes to rest after travelling 9 m , then the coefficient of sliding friction will be

A. 0.4

B. 0.2

C. 0.6

D. 0.8

Answer: B

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67. Consider a car moving on a straight road with a speed of $100m/s$. The distance at which car can be stopped is $[\mu_k = 0.5]$

A. 100 m

B. 400 m

C. 800 m

D. 1000 m

Answer: D

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68. A cylinder of 10 kg is sliding in a plane with an initial velocity of 10 m / s . If the coefficient of friction between the surface and cylinder is 0.5 then before stopping, it will cover. $(g = 10m/s^2)$

A. 2.5 m

B. 5 m

C. 7.5 m

D. 10 m

Answer: D

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69. When a body is lying on a rough inclined plane and does not move, the force of friction

A. is equal to μR

B. is less than μR

C. is greater than μR

D. is equal to R

Answer: B

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70. When a body is placed on a rough plane inclined at an angle θ to the horizontal, its acceleration is

A. $g(\sin\theta - \cos\theta)$

B. $g(\sin\theta - \mu\cos\theta)$

C. $g(\mu\sin\theta 1 - \cos\theta)$

D. $g\mu(\sin\theta - \cos\theta)$

Answer: B

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71. A block is at rest on an inclined plane making an angle α with the horizontal . As the angle α of the incline is increased the block starts slipping when the angle of inclination becomes θ. The coefficient of static friction between the block and the surface of the inclined plane is or A body starts sliding down

at an angle θ to the horizontal. Then the coefficient of friction is equal to

A. $\sin\theta$

B. $\cos\theta$

C. $\tan\theta$

D. independent of θ

Answer: C

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72. A given object taken n time more time to slide down 45° rough inclined plane as it taken to slide down a perfectly smooth 45° incline The coefficient of kintic friction between the object and the incline is .

A. $\left(1-\frac{1}{n^2}\right)$

B. $\frac{1}{1-n^2}$

C. $\sqrt{\left(1-\frac{1}{n^2}\right)}$

D. $\sqrt{\frac{1}{1-n^2}}$

Answer: A

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73. The force required just to move a body up an inclined plane is double the force required just to prevent the body sliding down. If the coefficient of friction is 0.25 , the angle of inclination of the plane is

A. 36.8°

B. 45°

C. 30°

D. 42.6°

Answer: A

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74. Starting from rest , a body slides down at 45° inclined plane in twice the time it takes to slide down the same distance in the absence of friction. The coefficient of friction between the body and the inclined plane is

A. 0.33

B. 0.25

C. 0.75

D. 0.8

Answer: C

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75. The coefficient of friction between a body and the surface of an inclined plane at 45° is

0.5. if $g = 9.8m/s^2$, the acceleration of the body downwards I m/s^2 is

A. $\frac{4.9}{\sqrt{2}}$

B. $4.9\sqrt{2}$

C. $19.6\sqrt{2}$

D. 4.9

Answer: A

Watch Video Solution

76. A box is placed on an inclined plane and has to be pushed down.The angle of inclination is

A. Equal to angle of friction

B. More than angle of friction

C. Equal to angle of repose

D. Less than angle of repose

Answer: D

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77. A force of 750 N is applied to a block of mass 102 kg to prevent it from sliding on a plane with an inclination angle 30° with the horizontal. If the coefficients of static friction and kinetic friction between the block and the plane are 0.4 and 0.3 respectively, then the frictional force acting on the block is

A. 750 N

B. 500 N

C. 345 N

D. 250 N

Answer: D

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78. A block is lying on an inclined plane which makes 60° with the horizontal. If coefficient of friction between block and plane is 0.25 and $g = 10m/s^2$, , then acceleration of the block when it moves along the plane will be

A. $2.50m/s^2$

B. $5.00m / s^2$

C. $7.4m / s^2$

D. $8.66m / s^2$

Answer: C

Watch Video Solution

79. A body of mass 100 g is sliding from an inclined plane of inclination 30°. What is the frictional force experienced if $\mu = 1.7$.

A. $1.7 \times \sqrt{2} \times \frac{1}{\sqrt{3}} N$

B. $1.7 \times \sqrt{3} \times \frac{1}{2} N$

C. $1.7 \times \sqrt{3} N$

D. $1.7 \times \sqrt{2} \times \frac{1}{3} N$

Answer: B

Watch Video Solution

80. A body takes just twice the time as long to slide down a plane inclined at 30° to the horizontal as if the plane were frictionless. The

coefficient of friction between the body and the plane is

A. $\frac{\sqrt{3}}{4}$

B. $\sqrt{3}$

C. $\frac{4}{3}$

D. $\frac{3}{4}$

Answer: A

Watch Video Solution

81. A brick of mass 2kg begins to slide down on a plane inclined at an angle of 45° with the horizontal. The force of friction will be

A. $19.6\sin 45^\circ$

B. $19.6\cos 45^\circ$

C. $9.8\sin 45^\circ$

D. $9.8\cos 45^\circ$

Answer: A

Watch Video Solution

82. The upper half of an inclined plane with inclination ϕ is perfectly smooth while the lower half is rough. A body starting from rest at the top will again come to rest at the bottom if the coefficient of friction for the lower half is given by

A. $\mu = \sin\theta$

B. $\mu = \cos\theta$

C. $\mu = 2\cos\theta$

D. $\mu = 2\tan\theta$

Answer: D

Watch Video Solution

83. A body is sliding down an inclined plane having coefficient of friction 0.5. If the normal reaction is twice that of resultant downward force along the inclined plane, then find the angle between the inclined plane and the horizontal .

A. 15°

B. 30°

C. 45°

D. 60°

Answer: C

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84. A body of mass 10 kg is lying on a rough plane inclined at an angle of 30° to the horizontal and the coefficient of friction is 0.5.

the minimum force required to pull the body up the plane is

A. 914 N

B. 91.4 N

C. 9.14 N

D. 0.914 N

Answer: B

 Watch Video Solution

85. A block of mass 1 kg slides down on a rough inclined plane of inclination 60° starting from its top. If the coefficient of kinetic friction is 0.5 and length of the plane is 1 m , then work done against friction is (Take $g = 9.8m/s^2$)

A. 9.82 J

B. 4.94 J

C. 2.45 J

D. 1.96 J

Answer: C

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86. A block of mass 10 kg is placed on an inclined plane when the angle of inclination is 30°. The block just begins to slide down the plane. The force of static friction is

A. 10 kg wt

B. 89 kg w

C. 49 kg wt

D. 5 kg wt

Answer: D

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87. A body of 5 kg weight kept on a rough inclined plane of angle 30° starts sliding with a constant velocity. Then the coefficient of friction is (assume $g = 10m/s^2$)

A. $1/\sqrt{3}$

B. $2/\sqrt{3}$

C. $\sqrt{3}$

D. $2\sqrt{3}$

Answer: A

Watch Video Solution

88. $300J$of work is done in slide a $2kg$ block up an inclined plane of height $10m$. `Taking g = 10 m//s^(2), work done against friction is

A. 100 J

B. 200 J

C. 300 J

D. zero

Answer: A

Watch Video Solution

89. A 2 kg mass starts from rest on an inclined smooth surface with inclination 30° and length 2m. How much will it travel before

coming to rest on a frictional surface with frictional coefficient of 0.25

A. 4 m

B. 6 m

C. 8 m

D. 2 m

Answer: A

 Watch Video Solution

90. A block rests on a rough inclined plane making an angle of 30° with horizontal. The coefficient of static friction between the block and inclined plane is 0.8 . If the frictional force on the block is $10N$, the mass of the block in kg is $\left(g = 10m/s^2\right)$

A. 2.0

B. 4.0

C. 1.6

D. 2.5

Answer: A

Watch Video Solution

91. A body takes time t to reach the bottom of a smooth inclined plane of angle θ with the horizontal. If the plane is made rough, time taken now is $2t$.The coefficient of friction of the rough surface is

A. $\frac{2}{3}\tan\theta$

B. $\frac{1}{4}\tan\theta$

C. $\frac{1}{2}\tan\theta$

D. $\frac{3}{4}\tan\theta$

Answer: D

Watch Video Solution

92. A block is kept on an inclined plane of inclination θ of length l. the velocity of particle at the bottom of inclined is (the coefficient of friction is μ)

A. $\sqrt{2gl(\mu\cos\theta-\sin\theta)}$

B. $\sqrt{2gl(\sin\theta-\mu\cos\theta)}$

C. $\sqrt{2gl(\sin\theta+\mu\cos\theta)}$

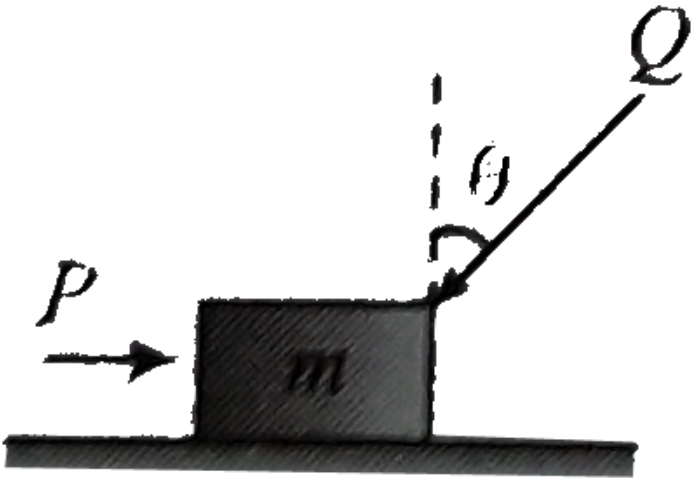
D. $\sqrt{2gl(\cos\theta+\mu\sin\theta)}$

Answer: B

Watch Video Solution

93. A block of mass m lying on a horizontal plane , is acted upon by a horizontal force p and another force Q inclined at an angle θ to

the vertical .The block will remain in equilibrium if the coefficient of friction between it and the surface is (assume $p > Q$)



A. $\dfrac{(P + Q\sin\theta)}{(mg + Q\cos\theta)}$

B. $\dfrac{(P\cos\theta + Q)}{(mg - Q\sin\theta)}$

C. $\dfrac{(P + Q\cos\theta)}{(mg + Q\sin\theta)}$

D. $\frac{(\Psi n\theta - Q)}{(mg - Q\cos\theta)}$

Answer: A

Watch Video Solution

94. Which of the following is correct , when a person walks on the rough surface.

A. The frictional force exerted by the surface keeps him moving

B. The force which the man exerts on the floor keeps him moving

C. The reaction of the force which the man exerts on floor keeps him moving

D. None of the above

Answer: C

 Watch Video Solution

95. A block of mass 0.1 is held against a wall applying a horizontal force of 5N on block. If the coefficient of friction between the block and the wall is 0.5, the magnitude of the frictional force acting on the block is:

A. 2.5 N

B. 0.98 N

C. 4.9 N

D. 0.49 N

Answer: B

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96. A body of mass M is kept n a rough horizontal surfasce (friction coefficient $= \mu$). A person is trying to pull he body by applying a horizontal force but the body is not moving. The force by the surface on A is F, where

A. $F = Mg$

B. $F = \mu Mgf$

C. $Mg \leq F \leq Mg\sqrt{1 + u^2}$

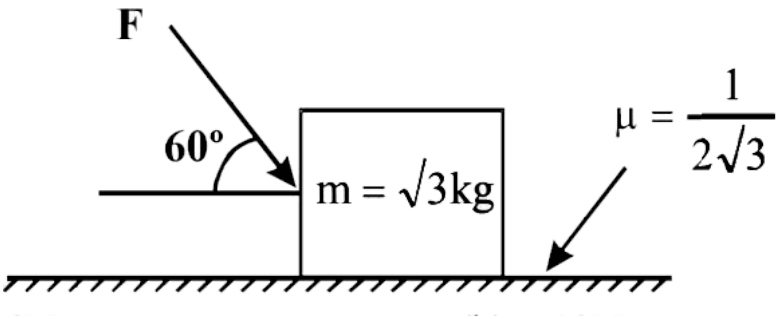
D. $Mg \geq F \geq Mg\sqrt{1+u^2}$

Answer: C

Watch Video Solution

97. What is the maximum value of the force F such that the block shown in the arrangement,

does not move?



A. 20 N

B. 10 N

C. 12 N

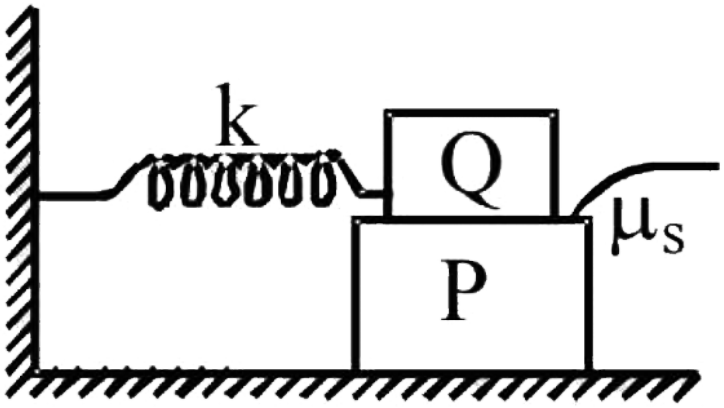
D. 15 N

Answer: A

Watch Video Solution

98. A block P of mass m is placed on horizontal frictionless plane. A second block of same mass m is placed on it and is connected to a spring of spring constant k, the two blocks are pulled by distance A. Block Q oscillates without slipping. What is the maximum value of

frictional force between the two blocks.



A. kA

B. $\frac{kA}{2}$

C. Zero

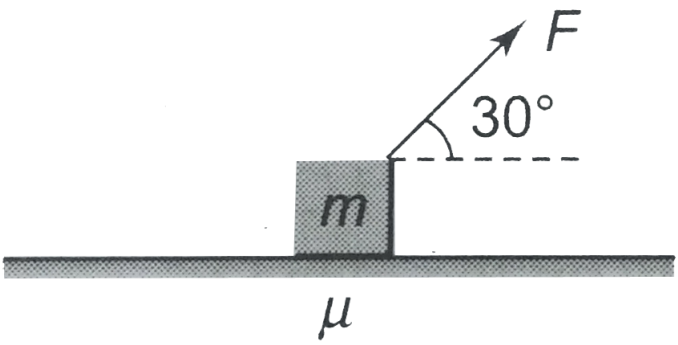
D. $\mu_s mg$

Answer: B

Watch Video Solution

99. A block of mass m lying on a rough horizontal surface of friction coefficient μ is pulled by a force F as shown , the limiting

friction between the block and surface will be



A. μmg

B. $\mu\left[mg+\left(\frac{F}{2}\right)\right]$

C. $\mu\left[mg-\left(\frac{F}{2}\right)\right]$

D. $\mu\left[mg-\left(\frac{\sqrt{3}F}{2}\right)\right]$

Answer: C

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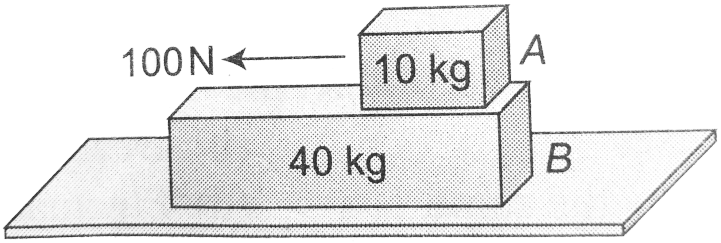
100. A 40kg slab rests on a frictionless floor as shown in the figure. A 10kg block rests on the top of the slab. The static coefficient of friction between the block and slab is 0.60 while the kinetic friction is 0.40 . The 10kg block is acted upon by a horizontal force 100N. if $g = 9.8m/s^2$, the resulting acceleration of the slab will be.



A. $1m/s^2$

B. $1.5m/s^2$

C. $2m/s^2$

D. $6.1m/s^2$

Answer: A

Watch Video Solution

101. A block of mass 2kg rests on a rough inclined plane making an angle of 30° with the horizontal. The coefficient of static friction

between the block and the plane is 0.7. The frictional force on the block is

A. $9.8N$

B. $0.7 \times 9.8 \times \sqrt{3}N.$

C. $9.8 \times \sqrt{3}N$

D. $0.8 \times 9.8N$

Answer: A

Watch Video Solution

102. When a bicycle is motion the force of friction exerted by the ground on the two wheels is such that is acts .

A. In the backward direction on the front wheel and in the forward direction on the rear wheel

B. In the forward direction on the front wheel and in the backward direction on the rear wheel

C. In the backward direction on both front and the rear wheels

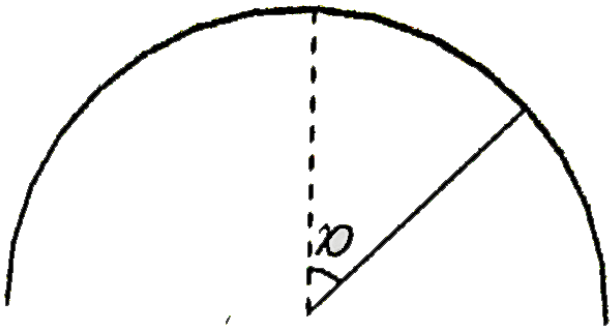
D. In the forward direction on both front and the rear

Answer: A::C

Watch Video Solution

103. An insect crawls up a hemispherical surface very slowly (see the figure). The coefficient of friction between the insect and

the surface is 1/3. If the line joining the centre of the hemispherical surface to the insect makes an angle α with the vertical, the maximum possible value of α is given by



A. $\cot \alpha = 3$

B. $\tan \alpha = 3$

C. $\sec \alpha = 3$

D. $co\sec\alpha = 3$

Answer: A

Watch Video Solution

104. Assertion: On a rainy day, it is difficult to drive a car or bus at high speed.

Reason: The value of coefficient of friction is lowered due to wetting of the surface.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

105. Assertion : When a bicycle is in motion, the force of friction exerted by the ground on the two wheels is always in forward direction. Reason : The frictional force acts only when the bodies are in contact

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B.

C.

D. If assertion is false but reason is true.

Answer: D

Watch Video Solution

106. Assertion: Pulling a lawn roller is easier than pushing it.

Reason: Pulling increases the apparent weight and hence the force of friction.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

Watch Video Solution

107. Assertion : Angle of repose is equal to angle of limiting friction.

Reason : When the body is just at the point of motion, the force of friction in this stage is called as limiting friction.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

 Watch Video Solution

108. Assertion: Two bodies of masses M and $m(M > m)$ are allowed to fall from the same height if the air resistance for each be the same then both the bodies will reach the earth simultaneously.

Reason: For same air resistance, acceleration of both the bodies will be same.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

109. Assertion: Friction is a self-adjusting force.

Reason: Friction does not depend upon mass of the body

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

110. Assertion : The value of dynamic friction is less than the limiting friction.

Reason : Once the motion has started, the inertia of rest has been overcome.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

111. Assertion: The acceleration of a body down a rough inclined plane is grater than the acceleration due to gravity.

Reason: The body is able to slide on an inclined plane only when its acceleration is greater than acceleration due to gravity.

A. If both assertion and reason are true and t he reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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112. A force of 19.6 N when applied parallel to the surface just moves a body of mass 10 kg kept on a horizontal surface. If a 5 kg mass is kept on the first mass, the orce applied parallel to the surface to just move the combined body is

A. 29.4 N

B. 39.2 N

C. 18.6 N

D. 42.6 N

Answer:

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113. If the normal force is doubled, the coefficient of friction is

A. Not charnged

B. Halved

C. Doubled

D. Tripled

Answer:

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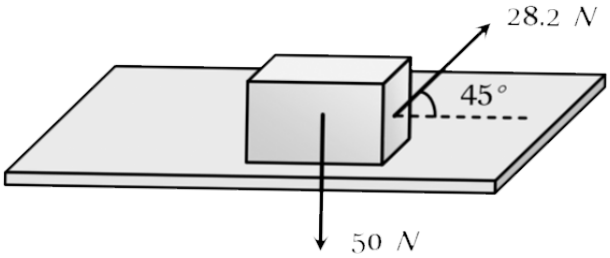
114.



A body of weight 50 N placed on a horizontal surface is just moved by a force of 28.2 N. the frictional force and the narmal reaction are

A. 10 N, 15 N

B. 20 N, 30 N

C. 2 N, 3 N

D. 5 N, 6 N

Answer: B

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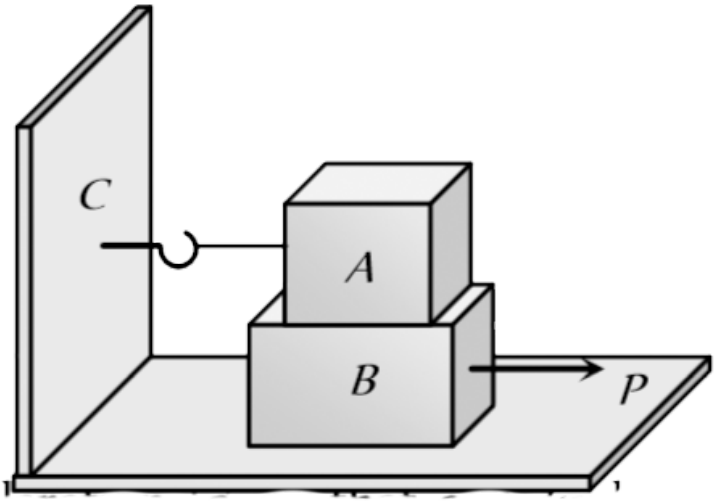
115. 

Block A weighing 100 kg rests on a block B and is tied with a horizontal string to the wall at C. Block B weighs 200 kg. The coefficient of friction between A and B is 0.25 and between B and the surface is 1/3. The horizontal force P necessary to move the block B should be $(g = 10m/s^2)$

A. 1150 N

B. 1250 N

C. 1300 N

D. 1420 N

Answer: B

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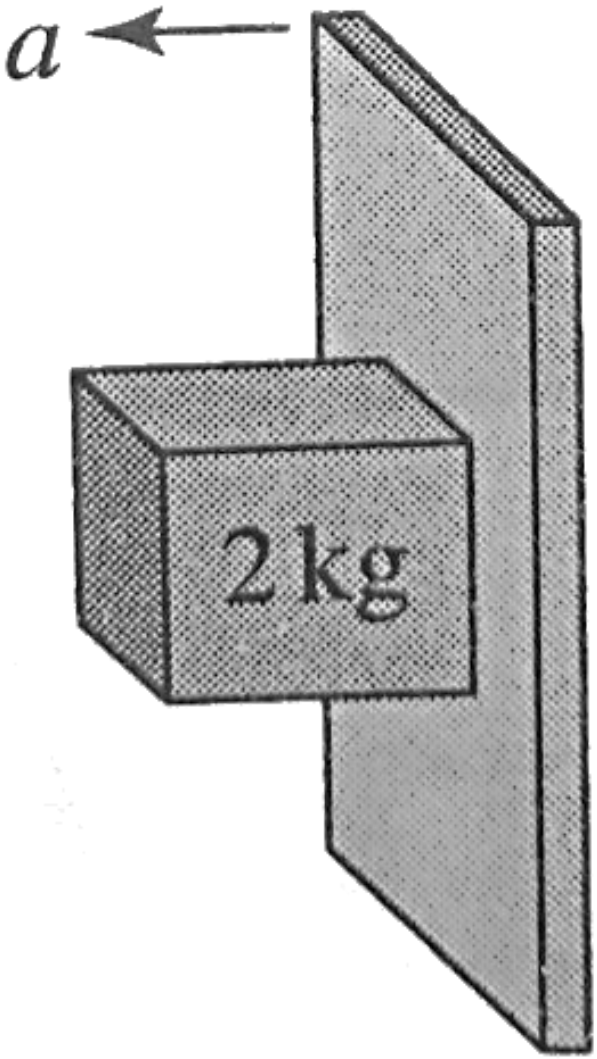

116.

A rough vertical board has an acceleration a so that a 2 kg block pressing against it dows

not fall. The coefficient of friction between the block and the board should be

A. $> g/a$

B. $< g/a$

C. $= g/a$

D. $> a/g$

Answer:

Watch Video Solution

117. A stone weighing 1 kg and sliding on ice with a velocity of 2 m / s is stopped by friction in 10 sec . The force of friction (assuming it to be constant) will be

A. $-20N$

B. $-0.2N$

C. $0.2N$

D. $20N$

Answer:

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118. A body of mass 10 kg slides a long a rough horizontal surfce. The coefficient of friction is $1/\sqrt{3}$. Taking $g = 10m/s^2$. The least force which acts at an angle of 30° to the horizontal is

A. 25 N

B. $100N$

C. $50N$

D. $\frac{50}{\sqrt{3}}N$

Answer: C

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119. A lift is moving down with an acceleration equal to the acceleration due to gravity. A body of mass M kept on the floor of the lift is pulled horizontally If the coefficient of friction is μ then the frictional resistance offered by the body is .

A. Mg

B. μMg

C. $2\mu Mg$

D. zero

Answer:

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120. In the above question, if the lift is moving upwards with a uniform velocity, then the frictional resistance offered by the body is

A. Mg

B. μMg

C. $2\mu Mg$

D. zero

Answer:

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121. A body of mass 2 kg is moving on the ground comes to rest after some time. The coefficient of kinetic friction between the body

and the ground is 0.2. The etardation in the body is

A. $9.8m/s^2$

B. $4.73m/s^2$

C. $2.16m/s^2$

D. $1.96m/s^2$

Answer:

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122. A cyclist moves in a circular track of radius 100 m . If the coefficient of friction is 0.2, then the maximum velocity with which the cyclist can take the turn with leaning inwards is

A. 9.8 m/s

B. 1.4 m/s

C. 140 m/s

D. 14 m/s

Answer:

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123. A block of mass 5kg lies on a rough horizontal table. A force of 19.6 N is enough to keep the body sliding at uniform velocity. The coefficient of sliding friction is

A. 0.5

B. 0.2

C. 0.4

D. 0.8

Answer:

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124. A motor car has a width 1.1m between wheels. Its centre of gravity is 0.62 m above the ground and the coefficient of friction between the wheels and the road is 0.8. What is the maximum possible speed, if the centre of gravity inscribes a circle of radius 15 m ? (Road surface is horizontal)

A. 7.64 m/s

B. 6.28 m/s

C. 10.84 m/s

D. 11.23 m/s

Answer: C

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125. A child weighing 25 kg slides down a rope hanging from the branch of a tall tree. If the

force of friction acting against him is 2 N , what is the acceleration of the child

A. $22.5m / s^2$

B. $8m / s^2$

C. $5m / s^2$

D. $9.72m / s^2$

Answer: D

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