Physicsaholics
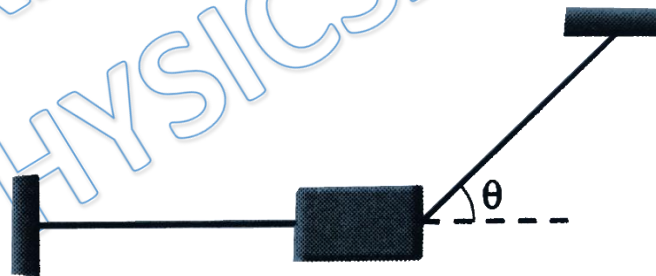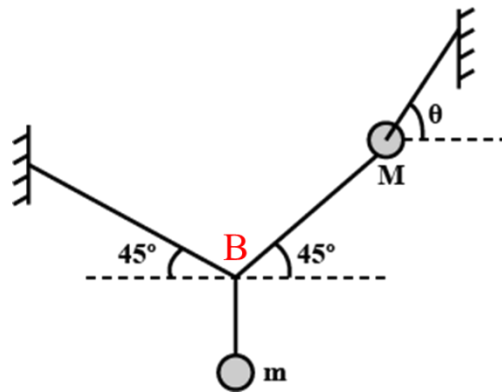
Q 1. Three blocks A, B and C of masses m_1, m_2 and m_3 are placed one over the other as shown in figure. Draw free body diagram of all the three blocks:
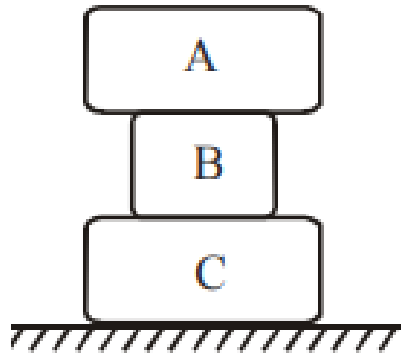

Q 2. A blocked of mass m is attached with two strings as shown in figure. Draw the free body diagram of the block:


Q 3. Two masses m and M are attached with strings as shown. Draw the free body diagram of point B and mass M:

Q 4. Two spheres A and B of masses m_1 and m_2 are placed between two vertical walls as shown in figure .Friction is absent everywhere. Draw the free body diagram of both the spheres:
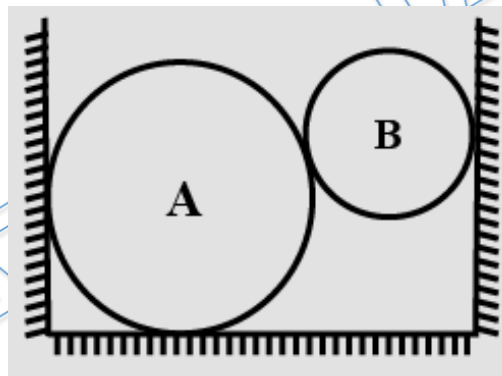

Q 5. A cylinder of weight W is resting on a V-groove as shown in figure. Draw its free body diagram:
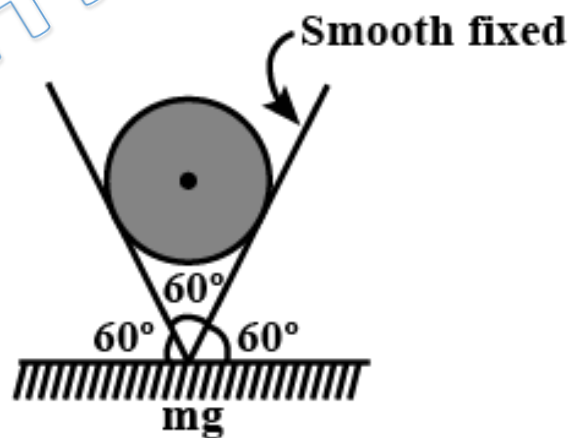
Q 6. Two blocks are placed at rest on a smooth fixed inclined place. A force F acts on block of mass m_1 and is parallel to the inclined plane as shown in figure. Both blocks move up the incline. Then Draw free body diagram blocks of mass m_1 and m_2:
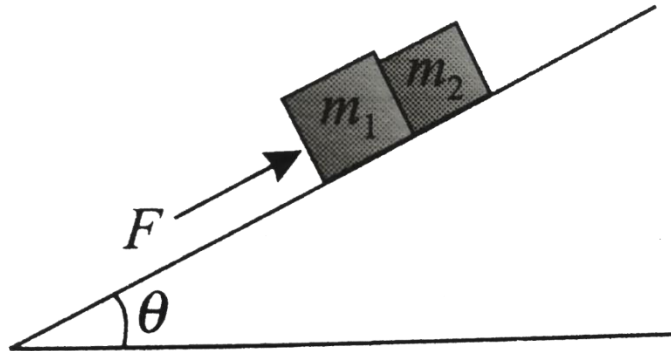

Q 7. Two blocks of masses m_1 and m_1 are connected with light string. All surfaces are smooth. Then Draw free body diagram blocks of mass m_1 and m_2 and pulley: (pulley is massless)
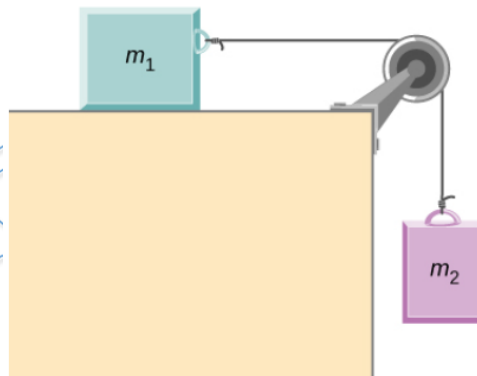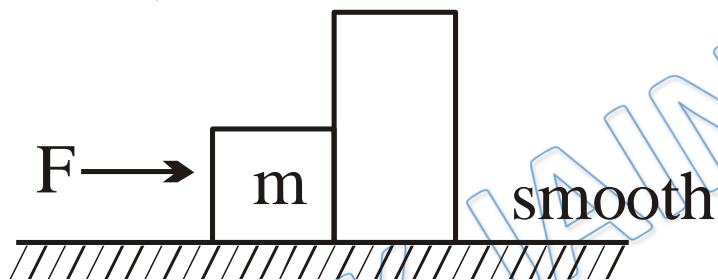

Q 8. Three blocks A, B and C of masses m_1, m_2 and m_3 are connected by massless strings and placed on a smooth surface. A force F is applied on block A, then draw free body diagram of all the three blocks:
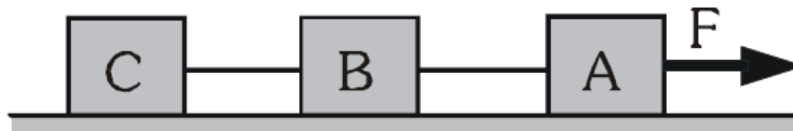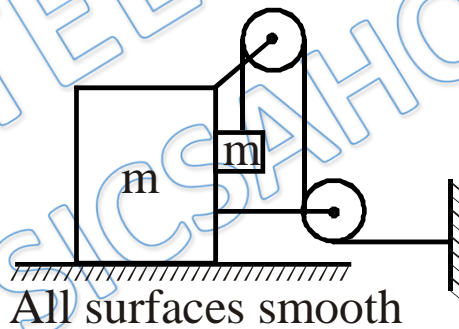

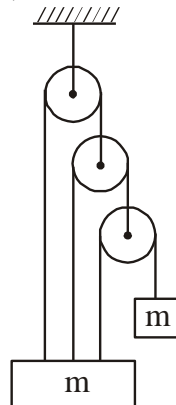Q 9. If vertical wall is smooth and string is massless, then draw the FBD of mass m:
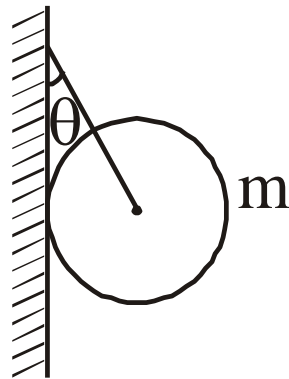
Q 10. If the surface is smooth, then draw the FBD of mass m:

Q 11. If pulleys and string are massless, then draw the FBD of small block of mass m:

All surfaces smooth

Q 12. If pulleys and string are massless, then draw the FBD of small block of mass m and M:

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7	Shailendra Tanwar	3.6M mins
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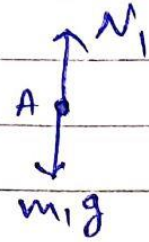
Written Solution Physics DPP

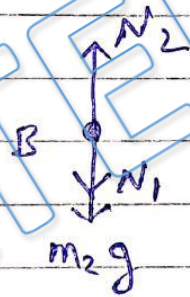## DPP-1 NLM: Free Body Diagram

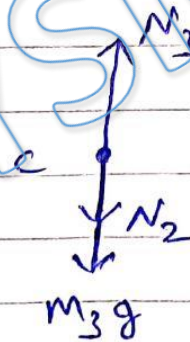### By Physicsaholics Team

Solution: 1

FBD of 'A'

N_1 = Normal force on A between A & B
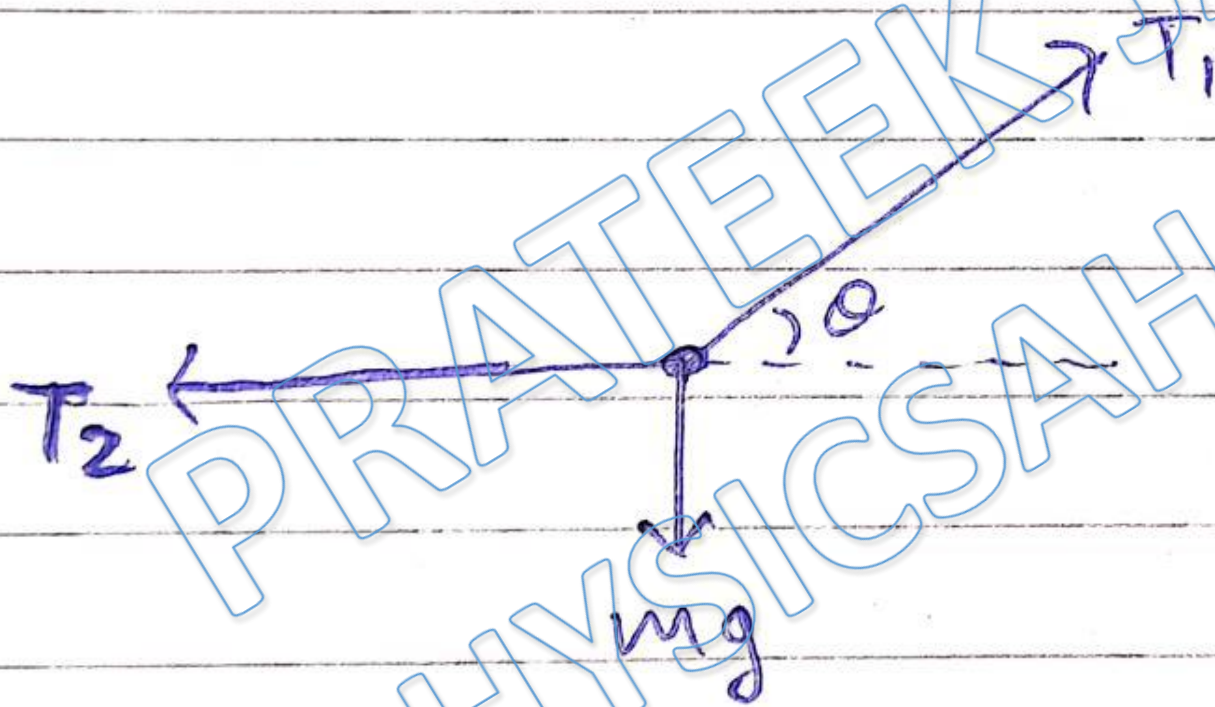
$m_1 g$

FBD of 'B'

N_2 = Normal force between B & C

N_1

$m_2 g$

FBD of 'C'

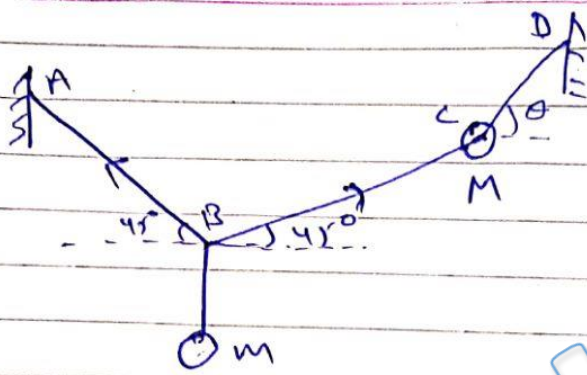N_3 = Normal force between C & surface. ↓ ground
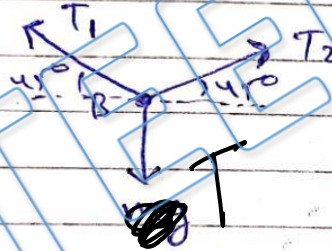
N_2

$m_3 g$

FBD of mass 'm'

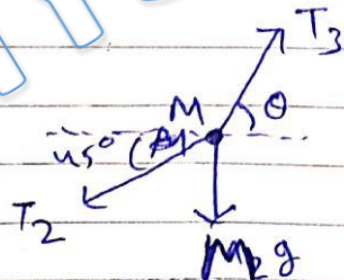T_1 & T_2 are Tension forces

Solution: 3

FBD of Point 'B'

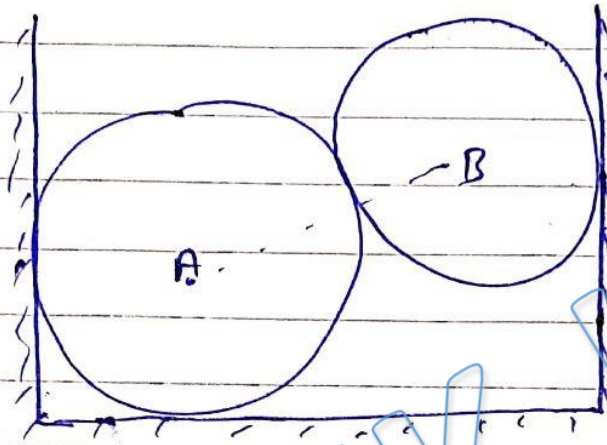T_1 = Tension in string AB

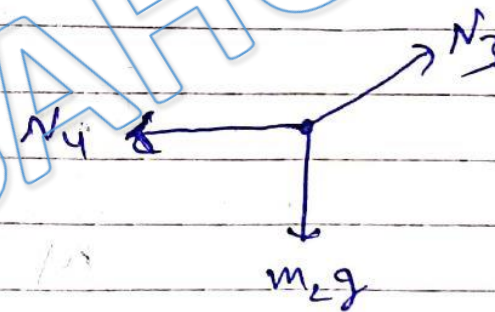T_2 = Tension in string BC
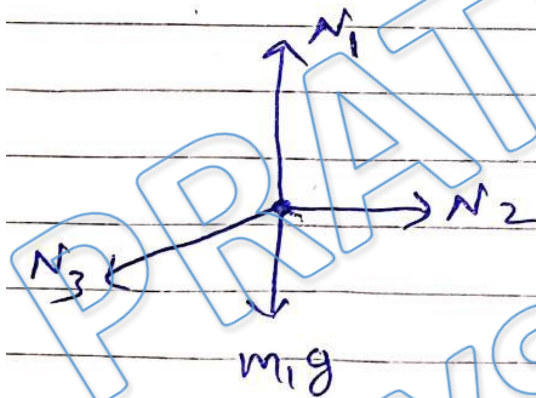
FBD of mass 'M'

T_3 = Tension in string CD

Solution: 4

FBD of sphere 'A'
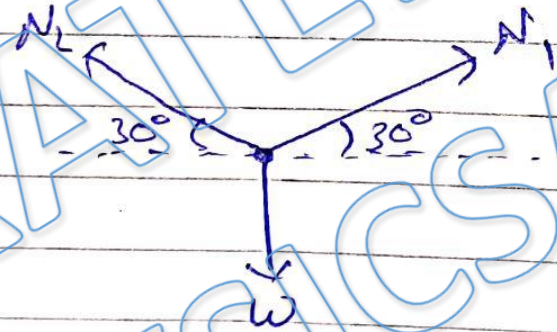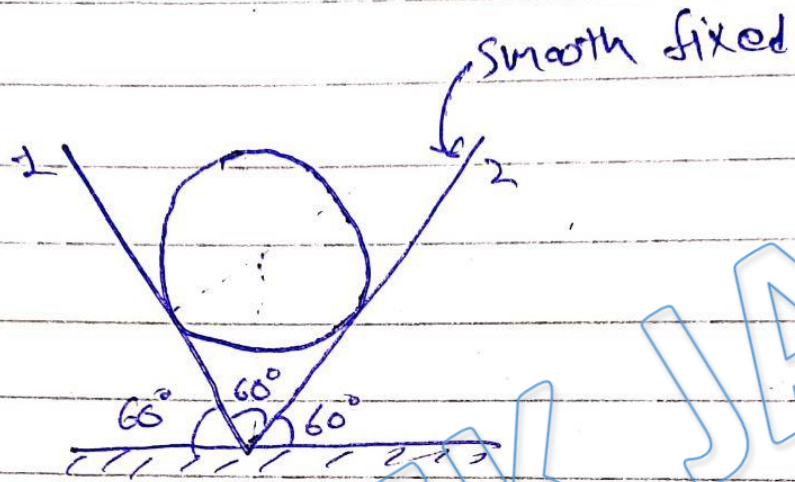
FBD of sphere 'B'

N_2 = Normal reaction on sphere A by left wall

N_1 = Normal reaction on sphere 'A' by ground surface.

N_3 = Normal reaction between sphere A and B
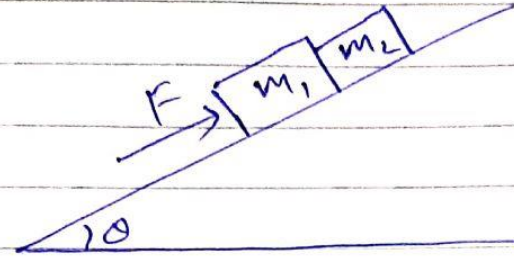
N_4 = Normal reaction on sphere B by right wall.

Solution: 5

Smooth fixed

1   2

60° 60° 60°
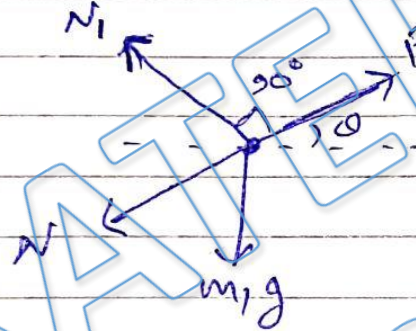60°   60°

N_2 N_1

30°   30°

W

N_1 = Normal reaction on weight W by wall -1.

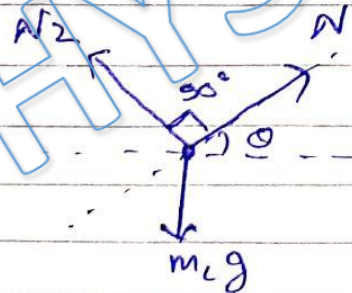N_2 = Normal reaction on weight W by wall -2.

Solution: 6

FBD of 'm₁'
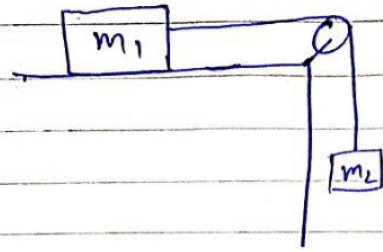
N_1 = Normal reaction on m_1 by inclined plane.

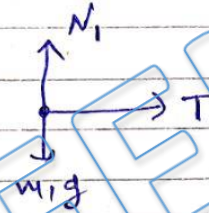N' = Normal reaction between m_1 & m_2

FBD of 'm₂'

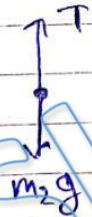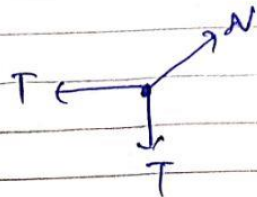N_2 = Normal reaction on m_2 by inclined plane.

Solution: 7

FBD of 'm₁'

N_1

$\rightarrow T$

m_1g

T = Tension in String.
N_1 = Normal reaction
on m_1 by surface.

FBD of 'm₂'

$\uparrow T$

m_2g

FBD of Pulley

N

$T \leftarrow$

T

N = Normal reaction on
Pulley by surface.

Solution: 8

$$\boxed{C} - \boxed{B} - \boxed{A} \rightarrow F$$

FBD of 'A'

N_1 = Normal reaction on A by surface.

T_{AB} ← • → F

$m_1 g$

T_{AB} = Tension in the string between blocks A & B.

FBD of 'B'

N_2

T_{BC} ← • → T_{AB}

$m_2 g$

N_2 = Normal reaction on B by ground surface.

T_{BC} = Tension in string between blocks B & C

FBD of 'C'

N_3

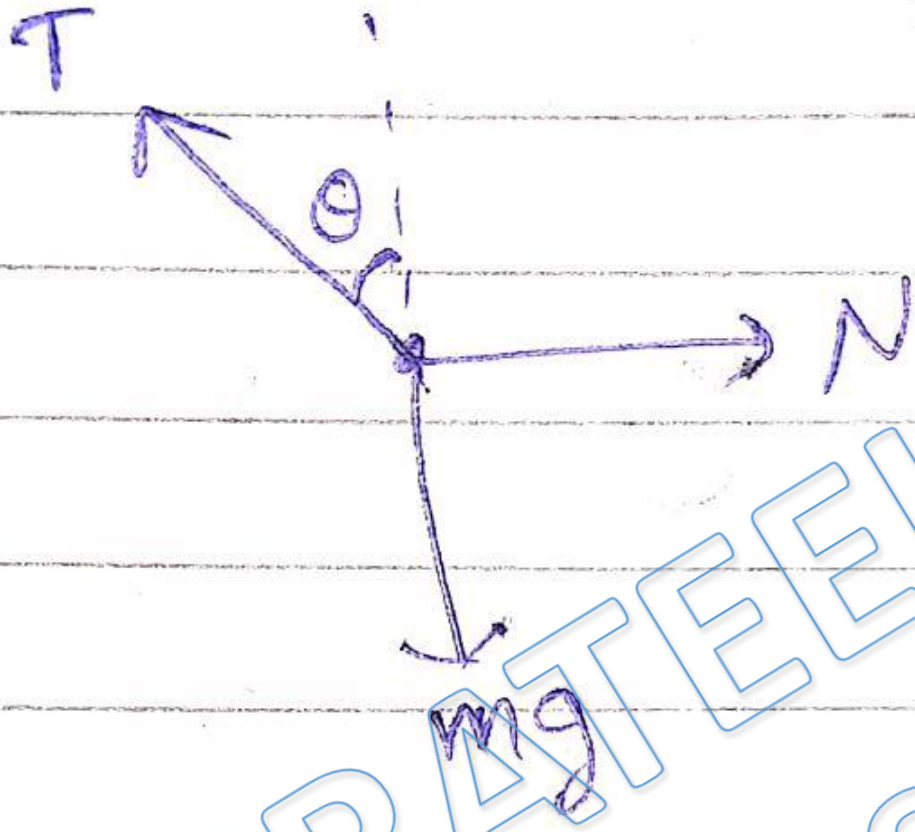• → T_{BC}

$m_3 g$

N_3 = Normal force on C by ground surface.
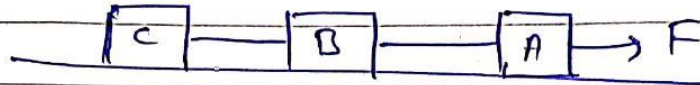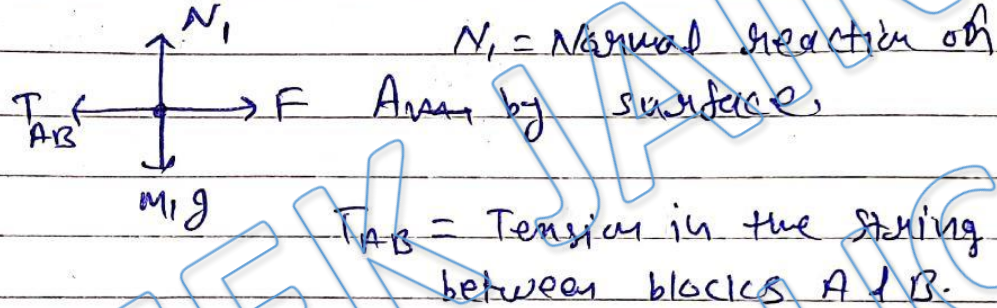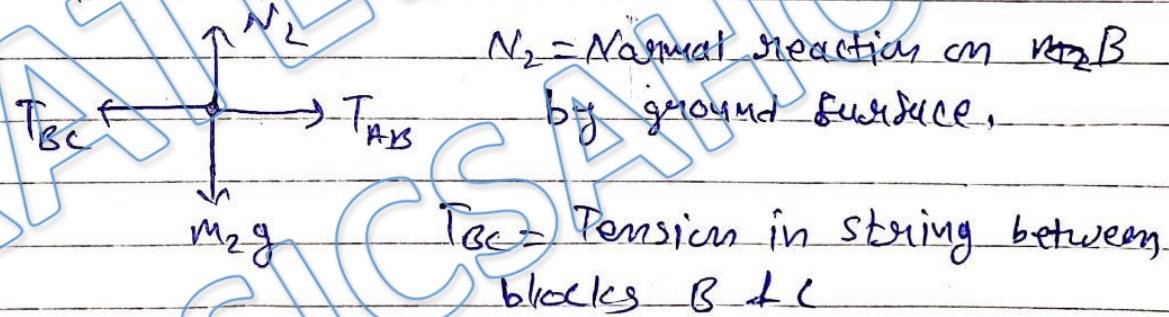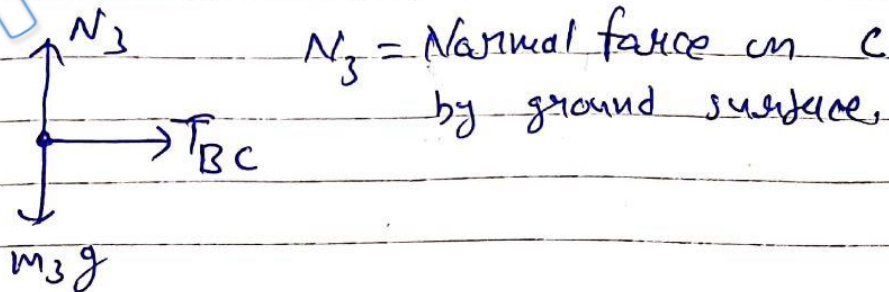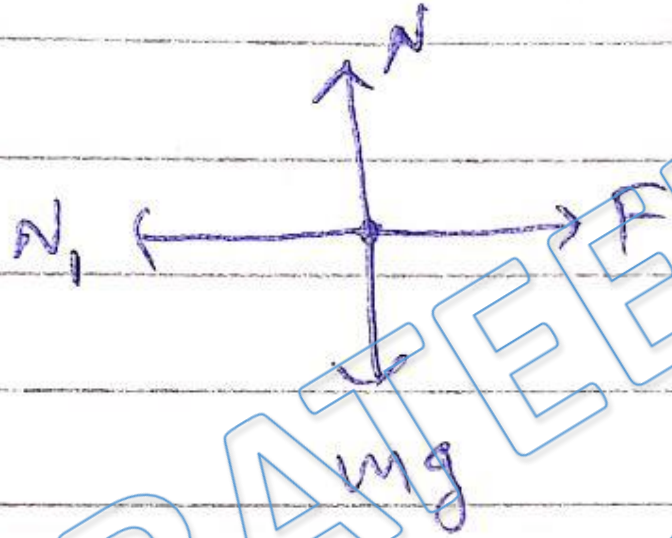
Solution: 9

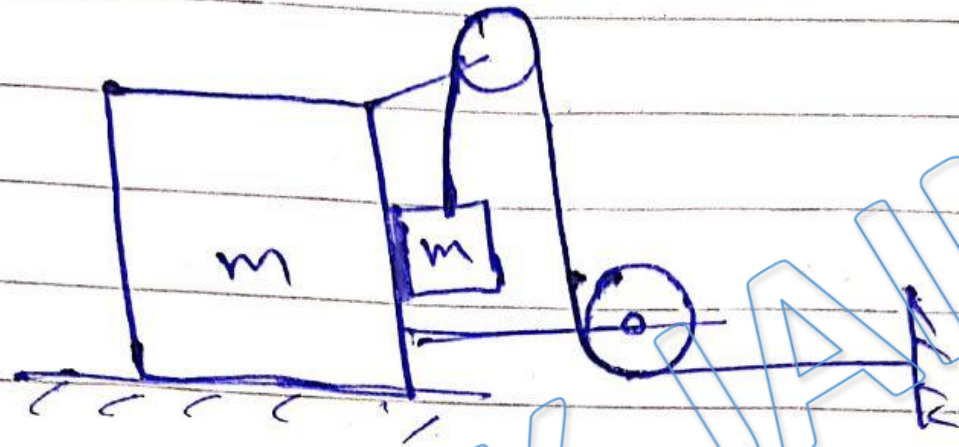N = Normal reaction on mass 'm' by wall;

T = Tension in string.

Solution: 10

FBD of 'm'

N = Normal reaction on m by ground surface.
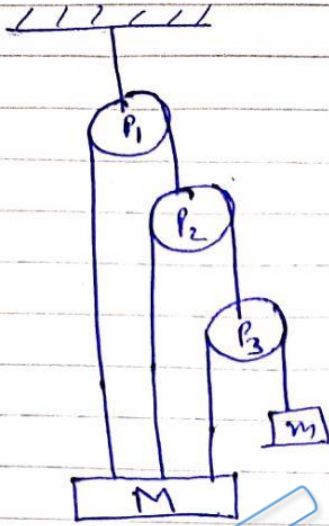
N_1 = Normal reaction between m & M

Solution: 11

FBD of small block

$$\uparrow T$$

$$\longrightarrow N$$

$$\downarrow mg$$
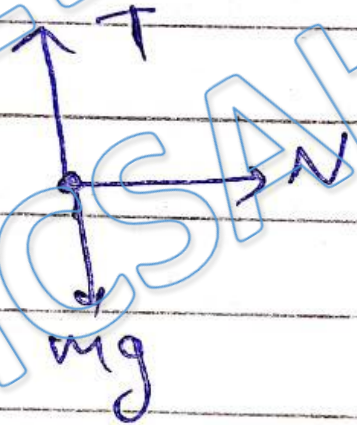
T = Tension in string

N = Normal reaction between both blocks

Solution: 12

FBD of 'm'

T_3 = Tension in the string passing over Pulley P_3.

FBD of 'M'

$T_1 + T_2 + T_3$
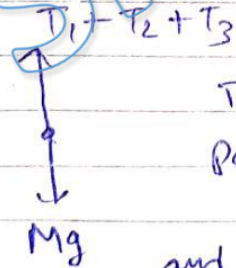
T_1 = Tension in the string passing over the pulley P_1

and T_2 = Tension in the string passing over the pulley P_2.

Mg

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Chalo Niklo