AAA COLLEGE OF ENGINEERING AND TECHNOLOGY

Amathur, Sivakasi – 626 005.

INNOVATIVE TEACHING LEARNING METHODS

Name of the Course Instructor : M. Siva Sankar, AP/civil	
Course Code & Name : ME 3351 - Engineering Mechanics	
Date of activity : 6/9	Year/Branch/Semester : II / civil / III
Lecture No. 17	Topic : Free body diagram of a rigid body

A. FLIPPED CLASSROOM (INDIVIDUAL ACTIVITY)

1. PRECLASS CONTENT DELIVERY/ CREATING PRECLASS CONTENT

✓ Choose the form of pre-class content

Recorded video lectures / textbook / Journal readings / Powerpoint Presentation

Date of providing pre-class content : 20/07/2024

✓ What was the duration of video lecture?
[Shorter lectures (10–15 minutes) are more effective than longer lectures].

2. STUDENT CENTERED IN-CLASS LEARNING ACTIVITIES
(Include photographs/video recordings/audio recordings wherever possible)

i. **Individual Exercises :**

Choose the type of activity

Labeling / Rank ordering / Answering Questions (may consist of

Multiple choice type or True/False type)/ Problem solving

Include the questionnaire and key for the chosen activity.

ii. **Role play:**

(Students are given a situation and a role to play of a character in the situation.)

Include a brief write up with photos about the role play in not more than 200 words or attach the video recording of the role play.(Add link)

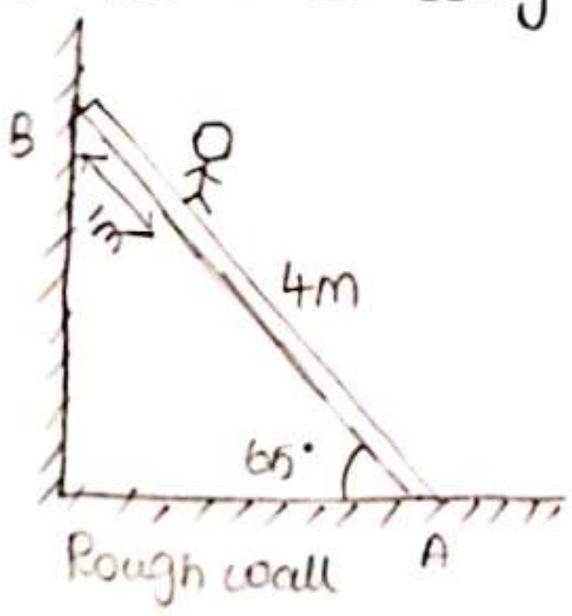
iii. **Personal vignette:**

(Given a topic or learning objective, the students are asked to relate it to their real experiences (personal or professional) by telling a brief story about it.)

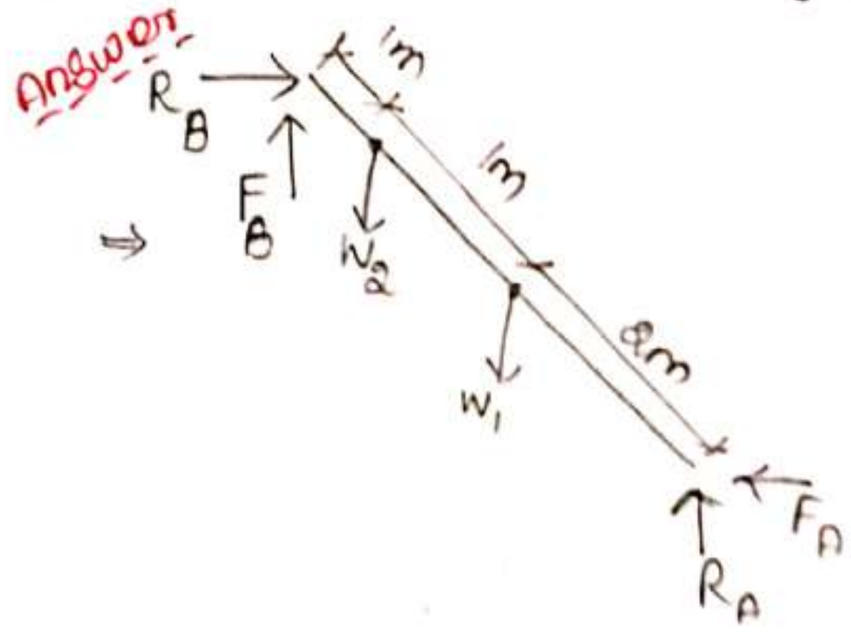
Attach the audio/video recording (Add link)/ hard copy of personal vignette presented by students.

Question

Draw the free body diagram for the below figure :-



Answer



W_1 => wt of ladder,
W_2 => wt of man

M. Sri 6/9 COURSE INSTRUCTOR	18/10/24 HoD

Free Body Diagrams

Practice Problems

Name: _____

Construct free-body diagrams for the various situations described below. Use the following forces.

Forces – Frictional Force = F_f
Tensional Force = F_T
Normal Force = F_N
Air Resistance = F_{Air}
Applied Force = F_{App}
Spring Force = F_S
Gravitaional Force = F_w

1. A book is at rest on a table top.
   Diagram the forces acting on the book.

2. A girl is suspended motionless from a bar which hangs from the ceiling by two ropes.
   Diagram the forces acting on the girl.

3. An egg is free-falling from a nest in a tree.
   Neglect air resistance.
   Diagram the forces acting on the egg as it is falling.

4. A flying squirrel is gliding (no *wing flaps*) from a tree to the ground at constant velocity. Consider air resistance.
   Diagram the forces acting on the squirrel.

5. A rightward force is applied to a book in order to move it across a desk with a rightward acceleration. Consider frictional forces.
   Neglect air resistance. Diagram the forces acting on the book.

6. A rightward force is applied to a book in order to move it across a desk at constant velocity. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the book.

7. A college student rests a backpack upon his shoulder. The pack is suspended motionless by one strap from one shoulder. Diagram the vertical forces acting on the backpack.

8. A skydiver is descending with a constant velocity. Consider air resistance. Diagram the forces acting upon the skydiver.

9. A force is applied to the right to drag a sled across loosely-packed snow with rightward acceleration. Diagram the forces acting upon the sled.

10. A car is coasting to the right and slowing down.
    Diagram the forces acting upon the car.

Free Body Diagrams **Practice Problems**

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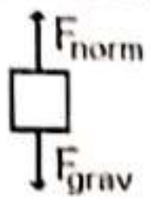
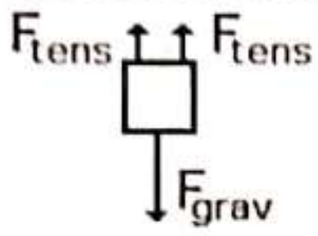
Diagram the forces acting on the book.



2. A girl is suspended motionless from a bar which hangs from the ceiling by two ropes.
Diagram the forces acting on the girl.



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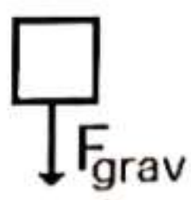

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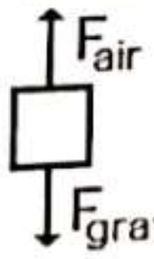

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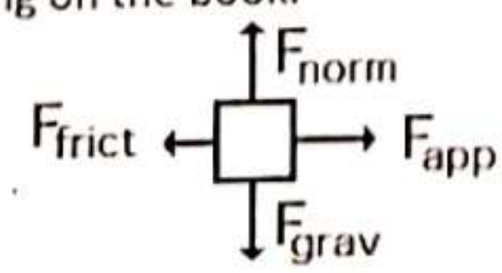

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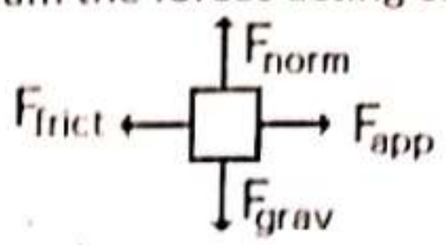

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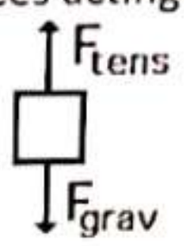

8. A skydiver is descending with a constant velocity. Consider air resistance.
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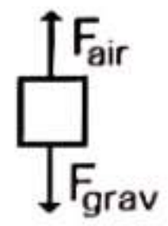

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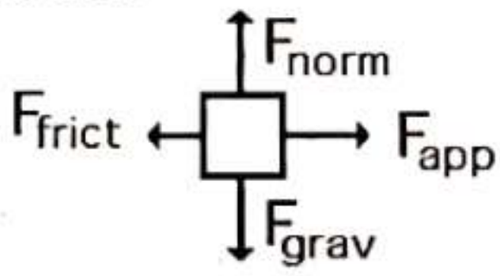

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