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SUBJECT: 26262, SUSPENSION,
BRAKE, STEERING & TRANSMISSION
SYSTEM OF VEHICLE, 26262

SUBJECT CODE: 26262

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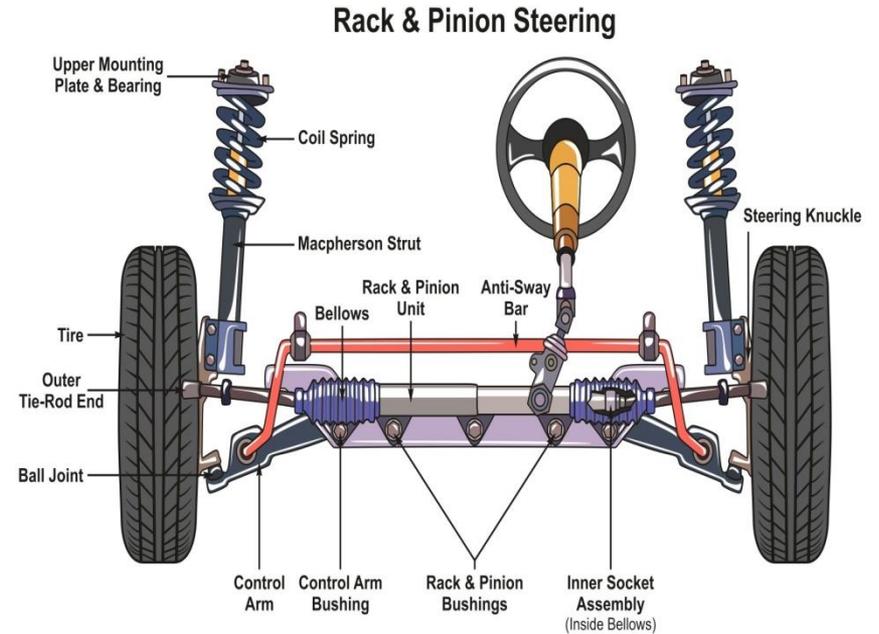
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Suspension systems

1.1 State the suspension system.

গাড়ির চ্যাসিস স্প্রিংস, শক শোষক এবং অ্যাক্সেল দ্বারা সামনের এবং পিছনের চাকার সাথে সংযুক্ত থাকে। একটি সাসপেনশন সিস্টেম বলতে সমস্ত অংশকে বোঝায় যা অংশগুলিকে শক থেকে রক্ষা করতে একসাথে কাজ করে। স্প্রিংস একটি পরোক্ষ উপায়ে অক্ষের সাথে স্বয়ংচালিত চ্যাসিসকে সংযুক্ত করে। বাউন্স, পিচ, রোল বা দোলনা দ্বারা সৃষ্ট রাস্তার ধাক্কা থেকে গাড়ির শরীরকে রক্ষা করার জন্য এটি করা হয়। এই রাস্তার ধাক্কাগুলি একটি আড়ম্বরপূর্ণ যাত্রার জন্য তৈরি করে এবং গাড়ির ফ্রেম এবং শরীরে অতিরিক্ত চাপ দেয়



1.2 Describe the purposes of suspension systems.

Functions or Objectives of Suspension System

1. To eliminate road shocks from transmission to vehicle components.
2. To obtain good road holding while driving, cornering and braking.
3. To keep the proper steering geometry.
4. To obtain a particular height to body structure.
5. To resist the torque and braking reactions.
8. To maintain the stability of the vehicle while traveling over rough road or when turning in order to minimize the rolling, pitching or vertical movement tendency.

সাসপেনশন সিস্টেমের কাজ বা উদ্দেশ্য 1. Vehicle components থেকে রাস্তার শক দূর করা। 2. ড্রাইভিং, কর্নারিং এবং ব্রেক করার সময় ভাল রাস্তা ধরে রাখা। 3. সঠিক স্টিয়ারিং জ্যামিতি রাখা। 4. Vehicle গঠন একটি নির্দিষ্ট উচ্চতা প্রাপ্ত। 5. ঘূর্ণন সঁচারক বল এবং ব্রেকিং প্রতিক্রিয়া প্রতিহত করতে। 8. রুম্ব রাউন্ডের উপর দিয়ে ভ্রমণ করার সময় বা বাঁক নেওয়ার সময় গাড়ির স্থায়িত্ব বজায় রাখা যাতে ঘূর্ণায়মান, পিচিং বা উল্লম্ব চলাচলের প্রবণতা কম হয়।

1.2 Describe the purposes of suspension systems.

What is suspension system?

- Suspension is the term given to the system of springs, shock absorbers and linkages that connects a vehicle to its wheels
- Serve a dual purpose – contributing to the car's handling and braking.
- Protects the vehicle itself and any cargo or luggage from damage and wear

1.2 Describe the purposes of suspension systems.

Functions or Objectives of Suspension System

9. To safeguard the occupants against road shocks and provide a riding comfort.

10. To minimize the effects of stresses due to road shocks on the mechanism of the motor vehicle and provide a cushioning effect.

11. To keep the body perfectly in level while travelling over rough uneven ground. i.e. the up and down movements of wheels should be relative to the body.

12. To prevent the structure of the vehicle from shock loading and vibration due to irregularities of the road surface without impairing its stability.

13. To obtain the requisite height to body structure.

14. To support the body on the axles and keep the proper geometrical relationship between the body and wheels.

1.3 Mention the components of suspension systems.

1. Springs

Springs help absorb the impact when you drive your vehicle over bumpy roads, potholes, or other irregular surfaces. These metal coils bend, so neither the driver nor passengers feel the brunt of the impact.

2. Wheels

Wheels and tires are the only part of the [suspension](#) that touches the ground. Not only are they responsible for moving your vehicle, but they also work in conjunction with the suspension system to give you a smooth ride.

3. Shock Absorbers

Shock absorbers work with the springs to absorb the shock of driving on the road. Without these essential components, both the vehicle and passengers would be bouncing up and down each time you drive over rough terrain.

1.3 Mention the components of suspension systems.

4. Rods

Rods are metal links that connect all the different parts of the [suspension system](#) together. These important components are built to last the lifetime of the vehicle. The only way they may break is if your car is involved in a vehicle accident.

5. Joints, Bearings, & Bushings

The various joints, bearings, and bushings connect the rods to the rest of the suspension components, although this is not their only function. These crucial elements allow for sliding and twisting actions that are necessary for the suspension system to work properly.

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1.3 Mention the components of suspension systems.

6. Steering System

While the steering system is not a direct component of the suspension system, it is affected whenever any part of the suspension fails. Together, the steering system and suspension are what make the wheels and tires turn and drive.

7. Frame

The frame is the primary component of the suspension system. It carries the entire weight of the suspension, keeping all the parts connected and working properly

1.4 Classify suspension systems.

The different types of suspension system in automobiles are as follows:

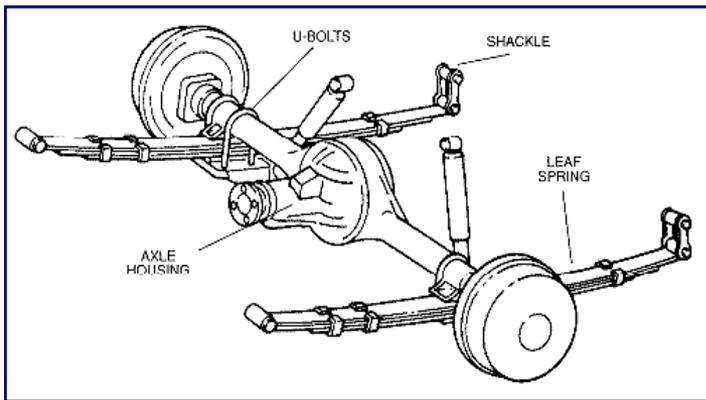
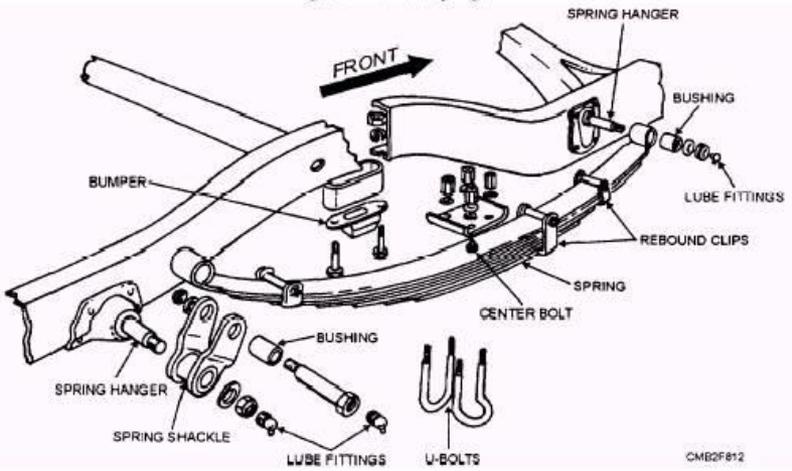
1. Leaf Spring Suspension. (source: patentimages) ...
2. Trailing Arm Suspension. (source: projectchrono) ...
3. Independent Suspension. (source: ads-cz) ...
4. Double-Wishbone Suspension. (source: yting) ...
5. MacPherson Strut Suspension. ...
6. Air Suspension. ...
7. Multi-Link Suspension.

1.4 Classify suspension systems.



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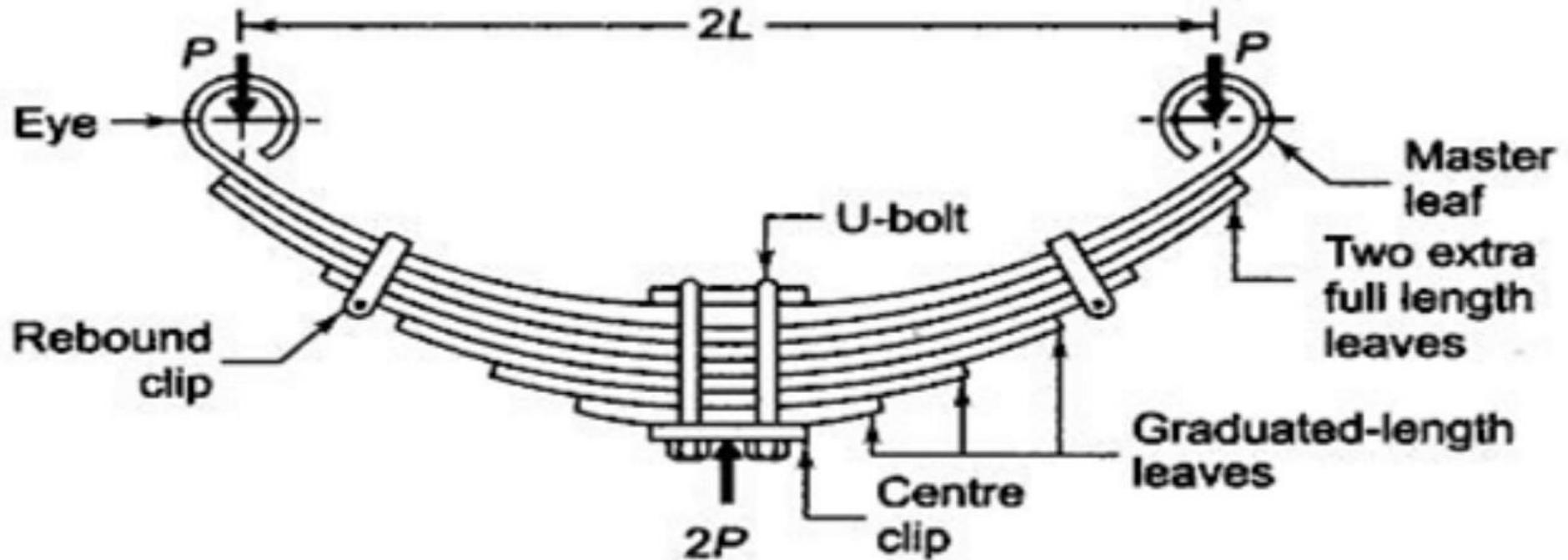
1. Leaf Spring Suspension.



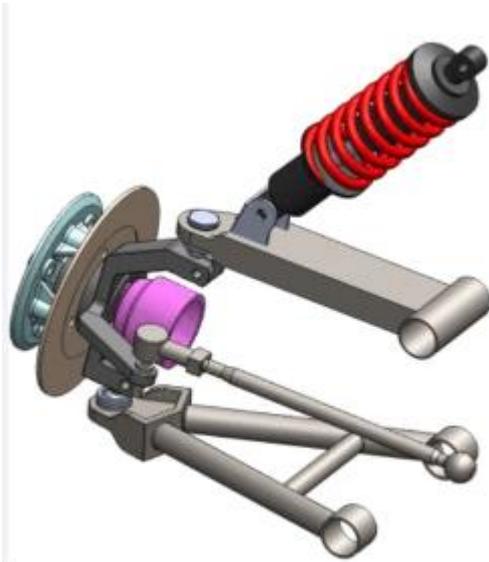
Solid Axle, Leaf Spring Suspension



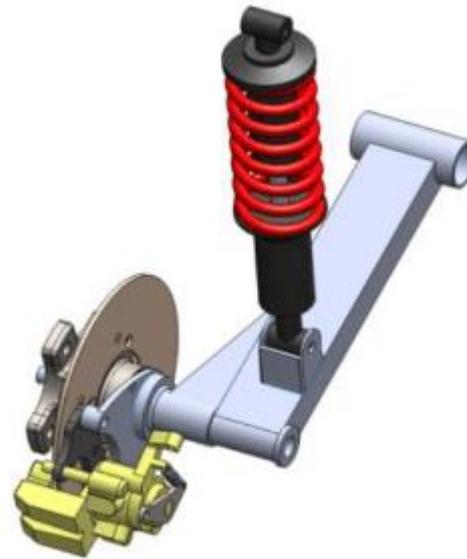
1. Leaf Spring Suspension.



2. Trailing Arm Suspension.



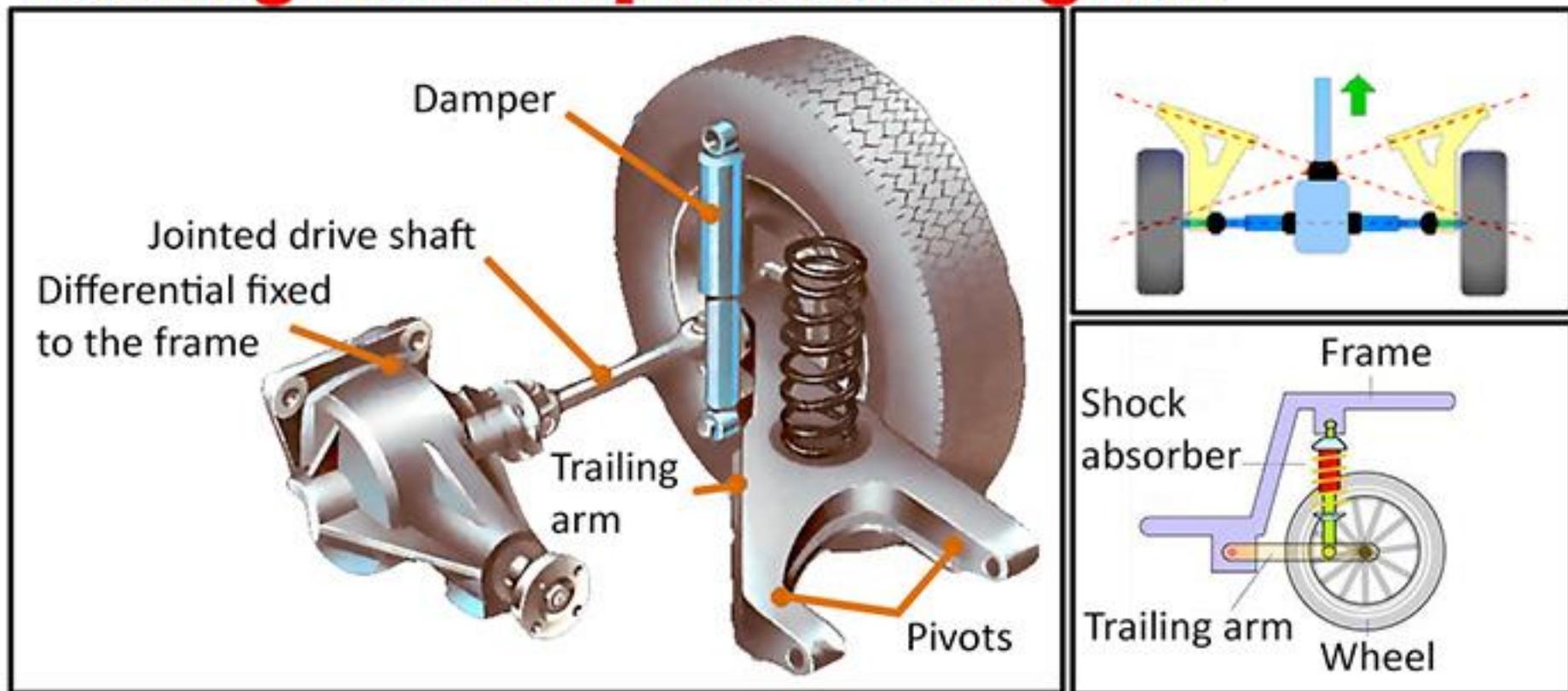
(a) Double-A arm



(b) Rear trailing arm

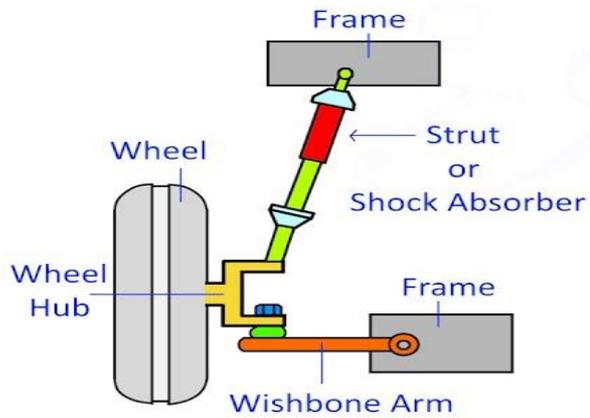
2. Trailing Arm Suspension.

Trailing-arm suspension diagram

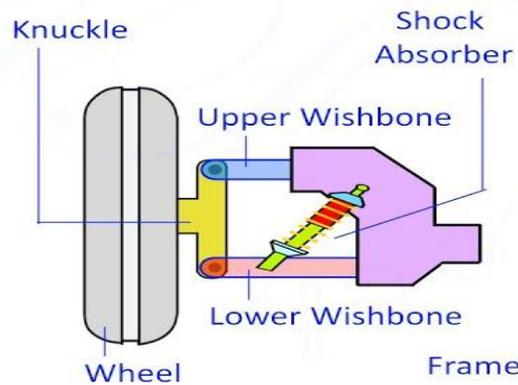


2. Trailing Arm Suspension.

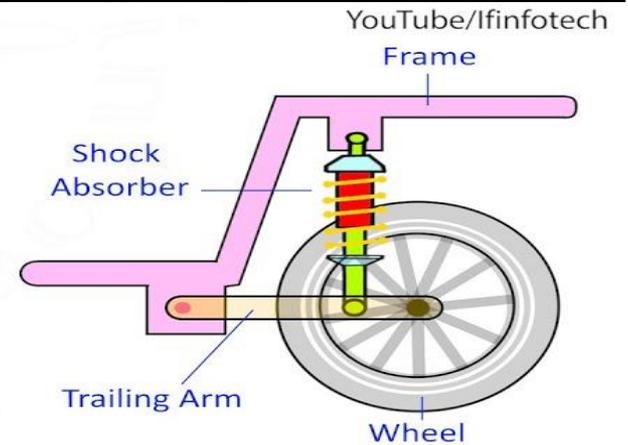
Macpherson Strut Suspension



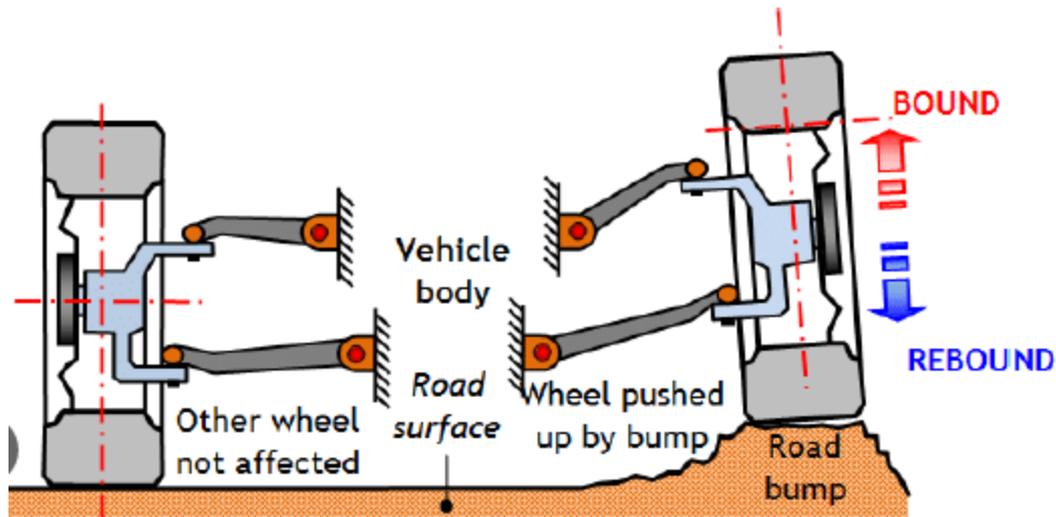
Double Wishbone Suspension



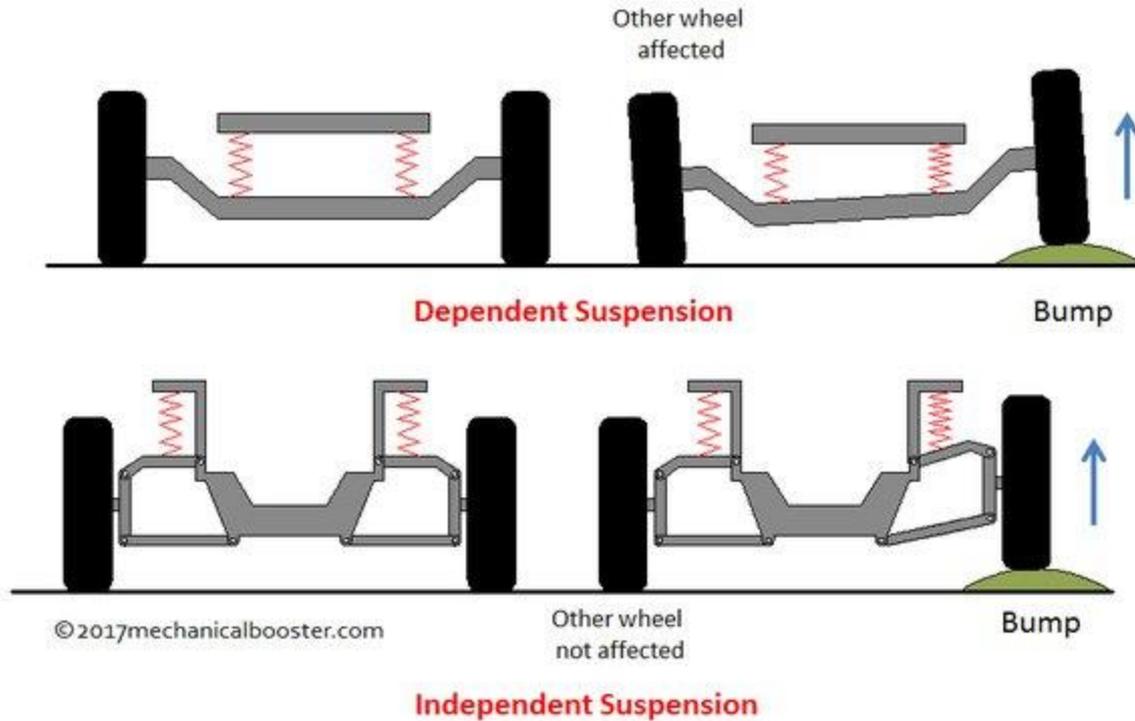
Trailing Arm Suspension



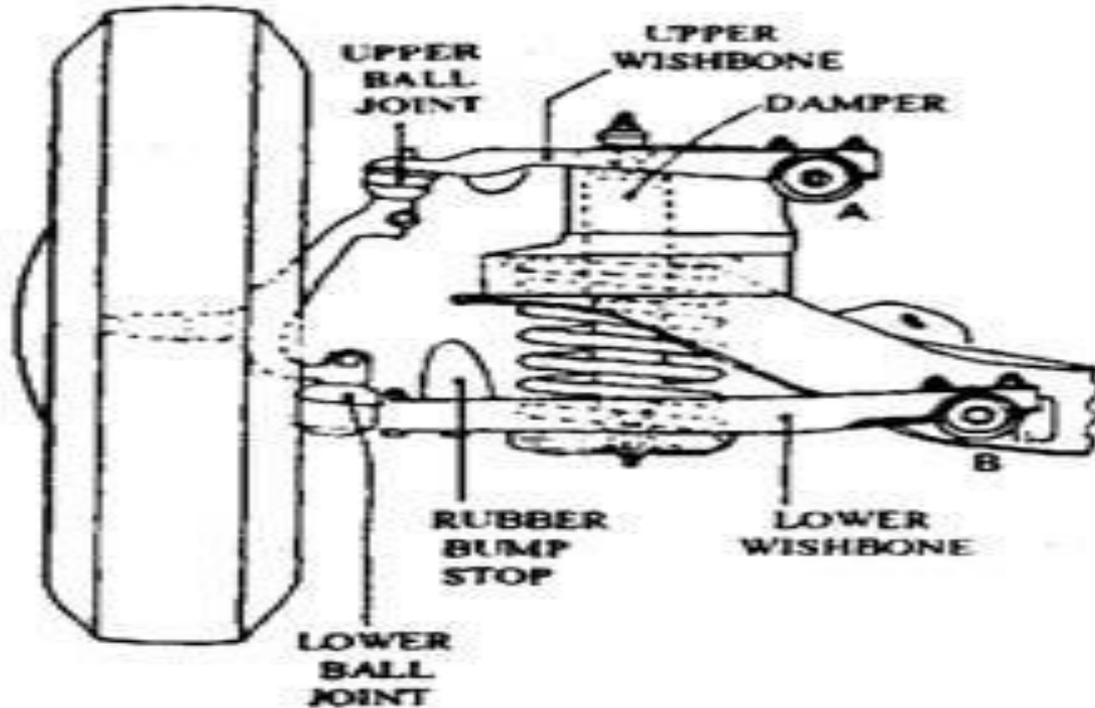
3. Independent Suspension.



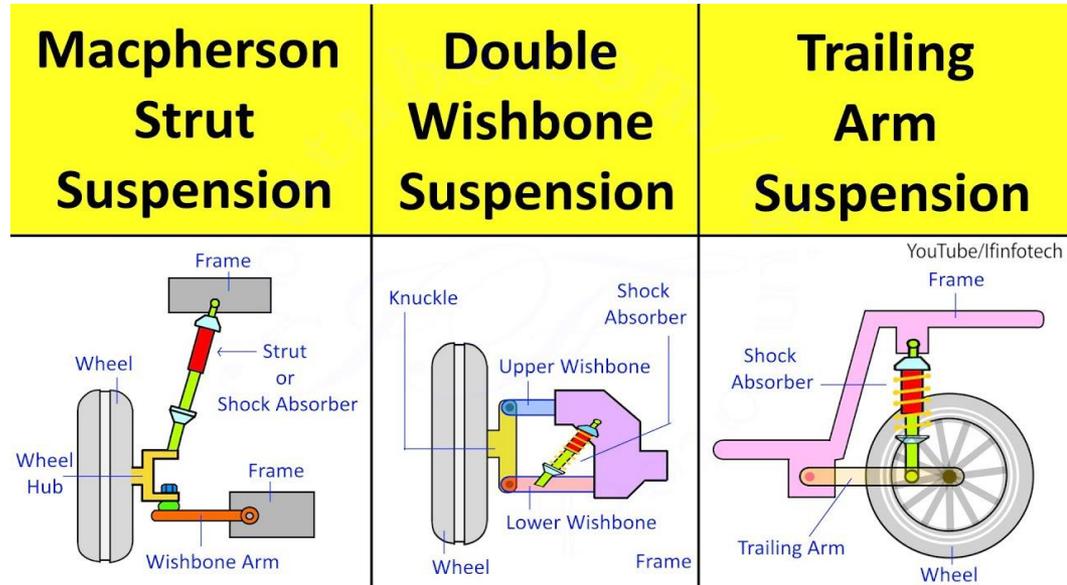
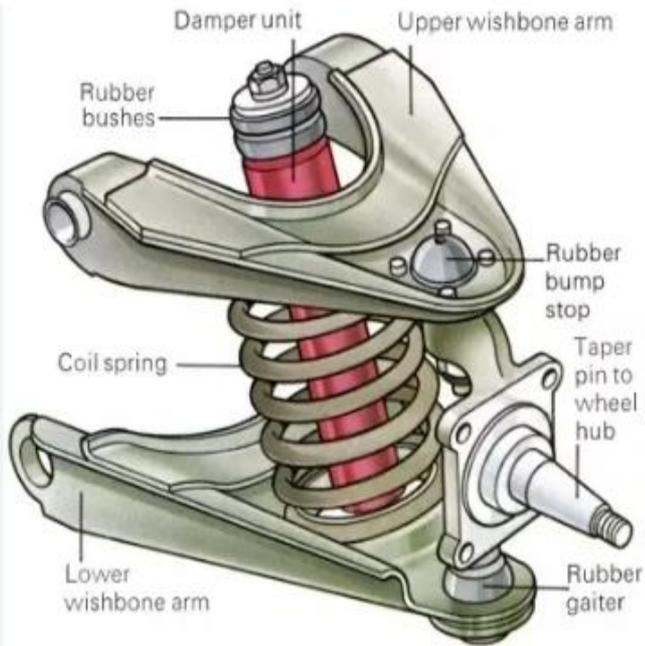
3. Independent Suspension.



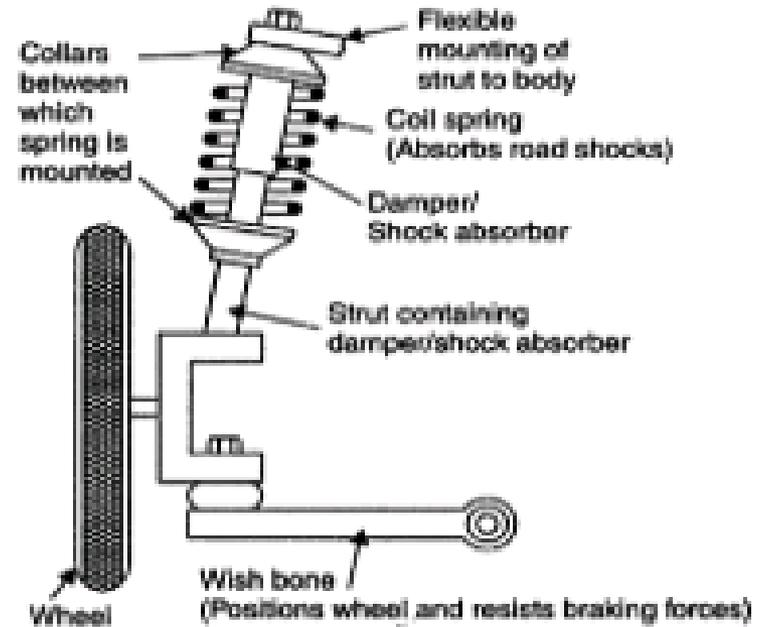
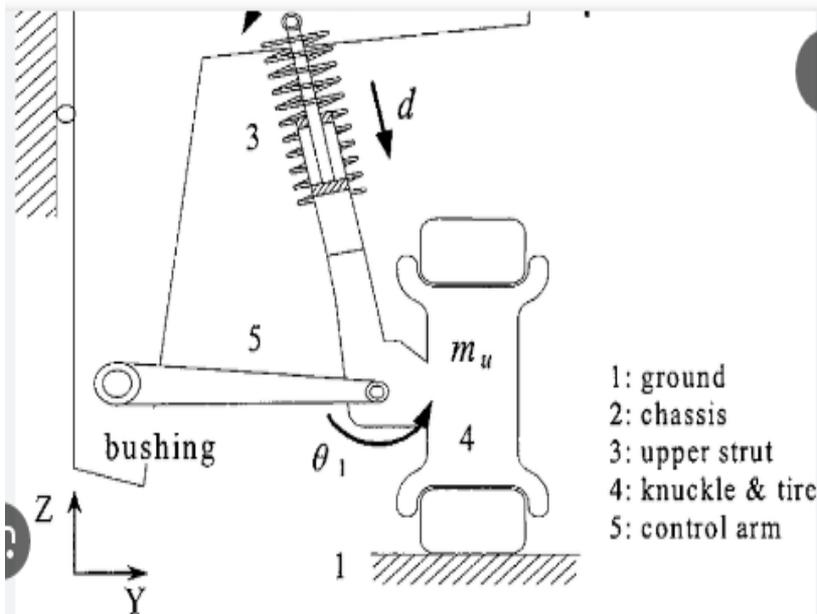
3. Independent Suspension.



4. Double-Wishbone Suspension.

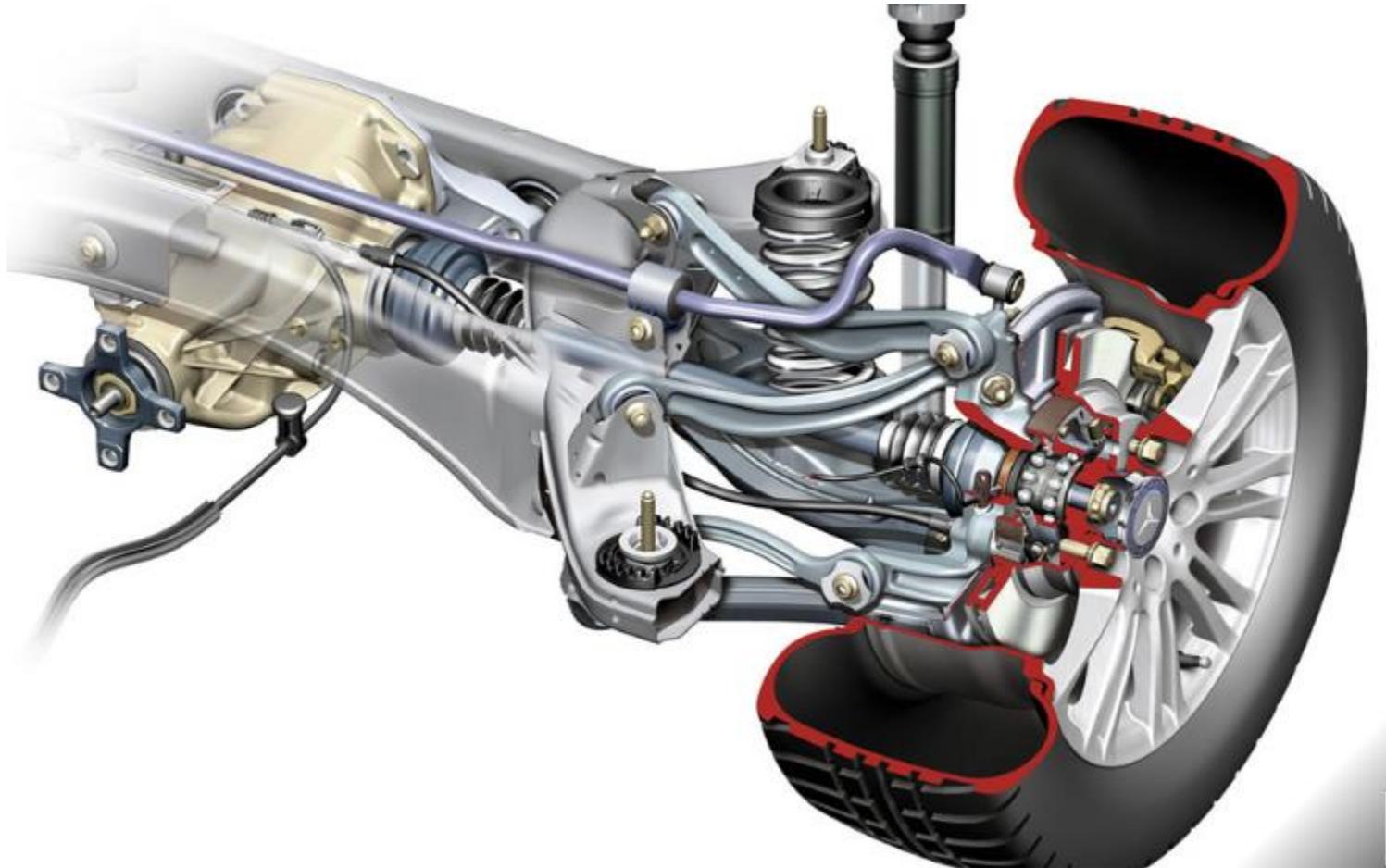


5. MacPherson Strut Suspension.



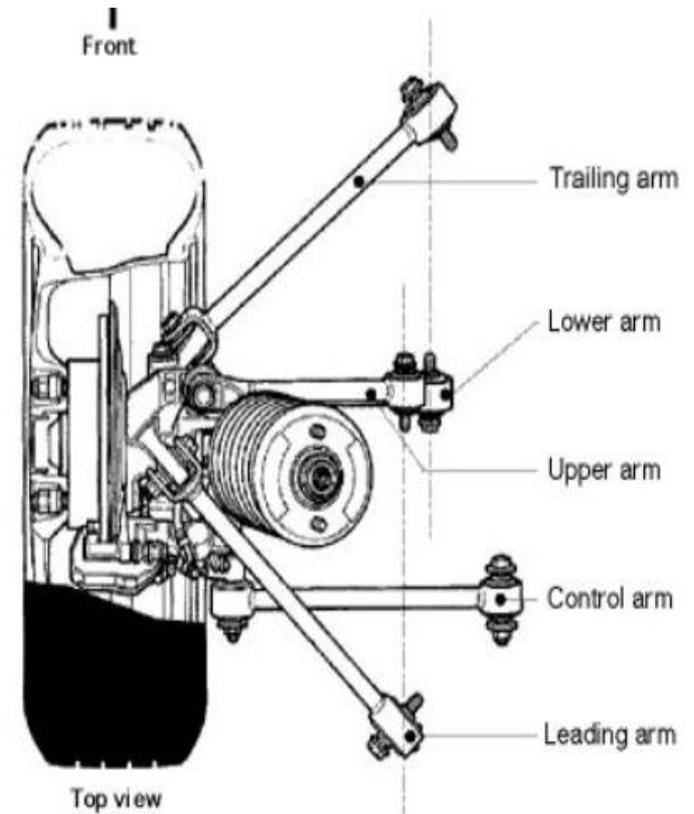
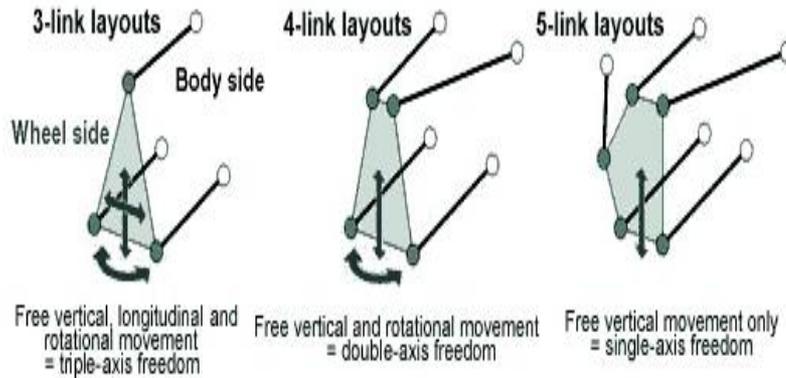
Mac-pherson strut Suspension

7. Multi-Link Suspension



7. Multi-Link Suspension

Five-link Suspension Characteristics (all arms feature pivot supports at both ends)



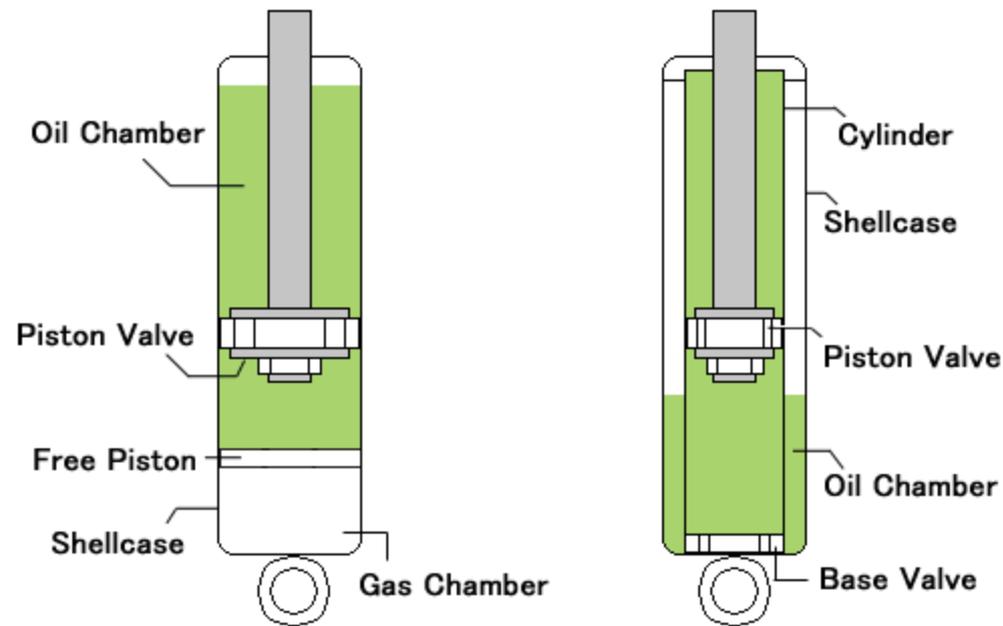
1.6 Describe construction and operation of shock absorber and springs used in automobile suspension systems.

A **shock absorber** or **damper** is a mechanical or [hydraulic](#) device designed to absorb and [damp shock](#) impulses. It does this by converting the [kinetic energy](#) of the shock into another form of energy (typically [heat](#)) which is then dissipated. Most shock absorbers are a form of [dashpot](#) (a damper which resists motion via viscous friction).

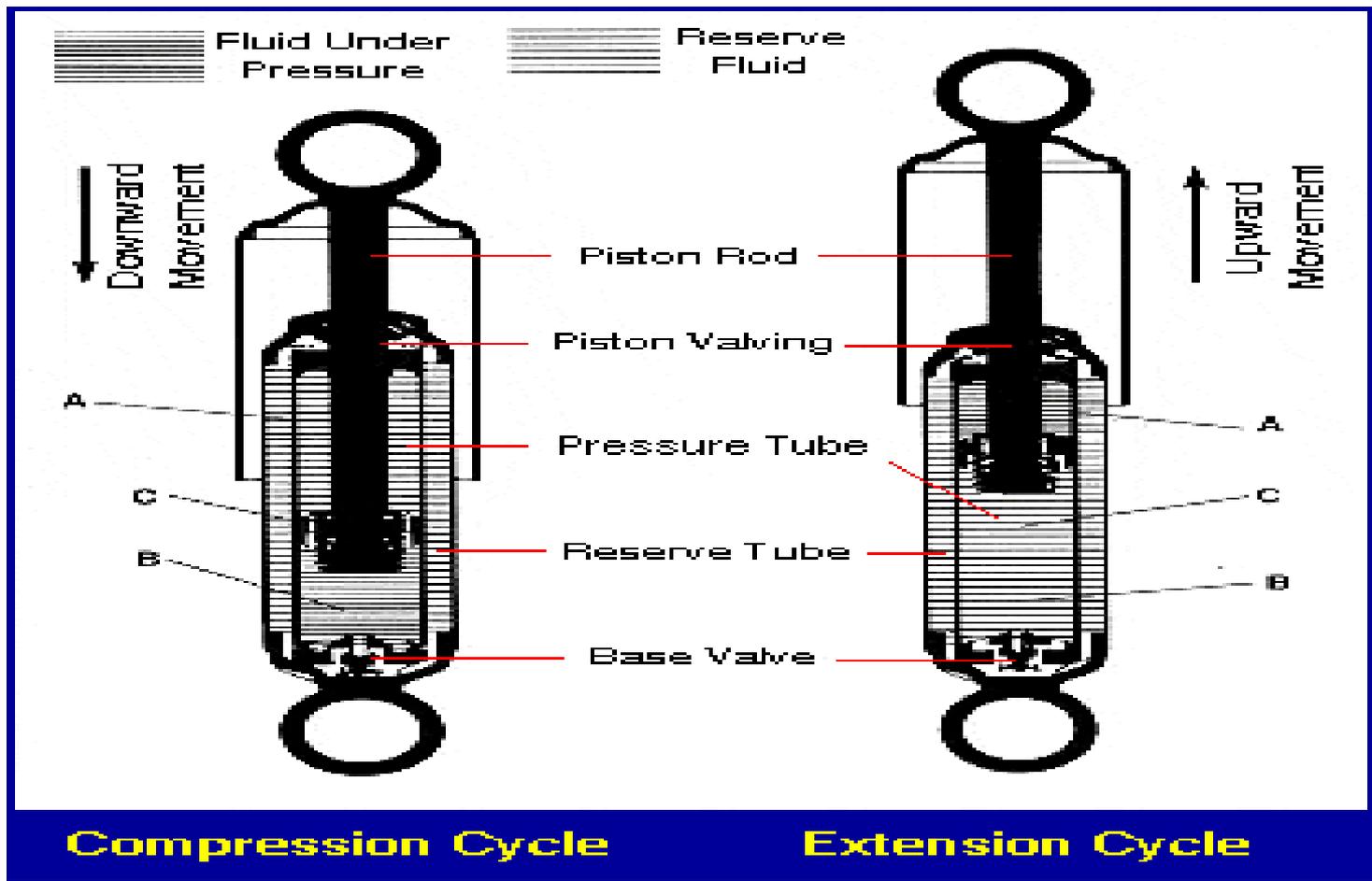


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1.6 Describe construction and operation of shock absorber and springs used in automobile suspension systems.



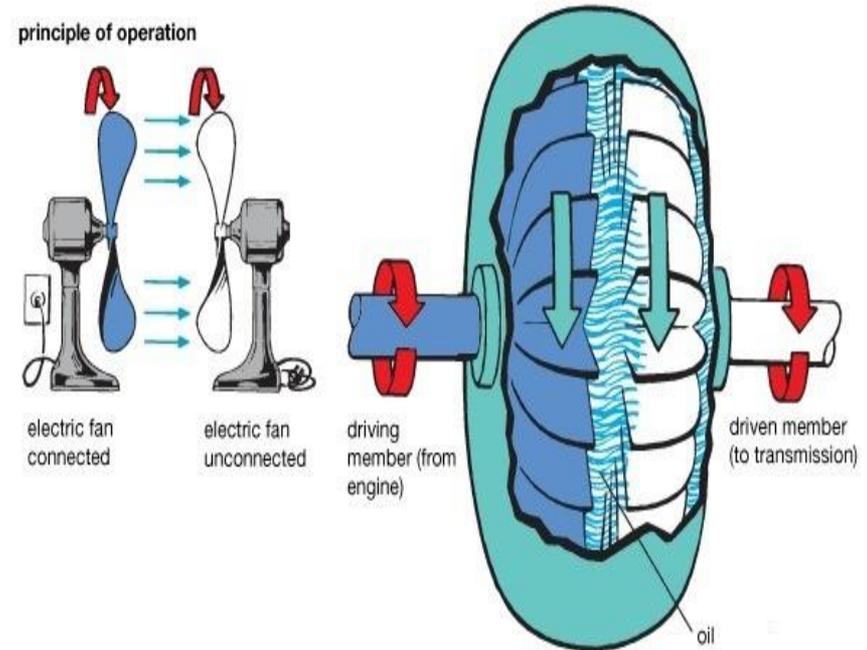
1.6 Describe construction and operation of shock absorber and springs used in automobile suspension systems.



Automatic Transmission Gear Box

5.1 Define fluid coupling & torque converter.

A **fluid coupling** or **hydraulic coupling** is a hydrodynamic or 'hydrokinetic' device used to transmit rotating mechanical power.^[1] It has been used in automobile transmissions as an alternative to a mechanical clutch. It also has widespread application in marine and industrial machine drives, where variable speed operation and controlled start-up without shock loading of the power transmission system is essential. Hydrokinetic drives, such as this, should be distinguished from hydrostatic drives, such as hydraulic pump and motor combinations

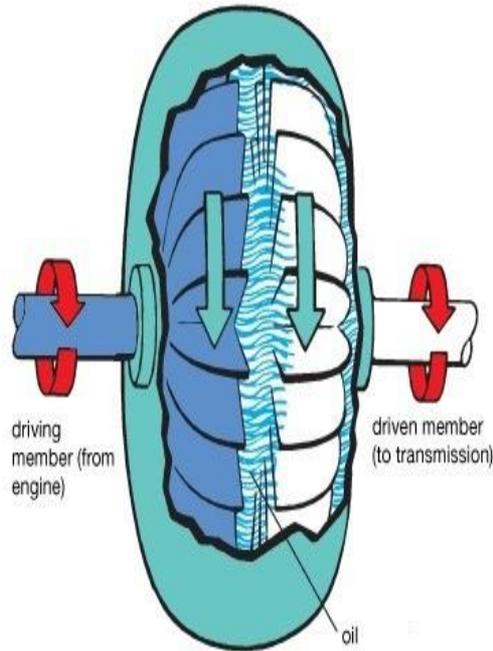
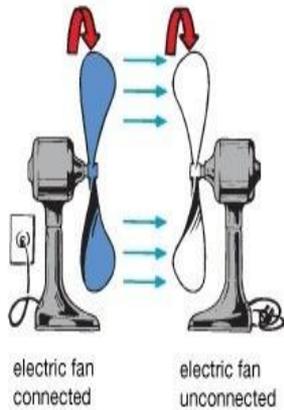


FLUID COUPLING

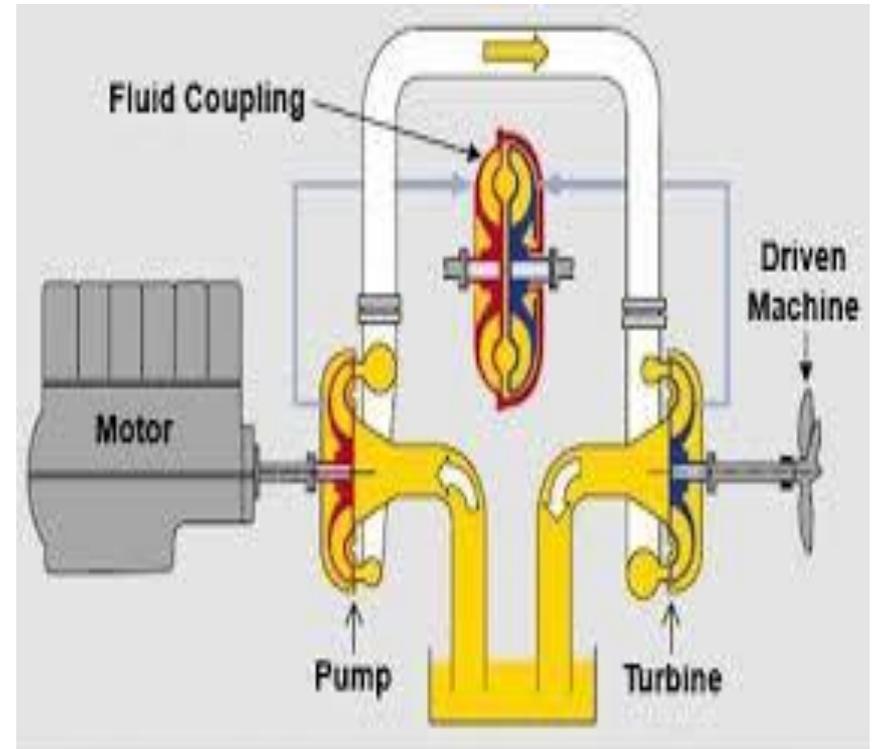
Automatic Transmission Gear Box

5.1 Define fluid coupling & torque converter.

principle of operation



FLUID COUPLING



Power Transmission by Indirect Operating Principle

Automatic Transmission Gear Box

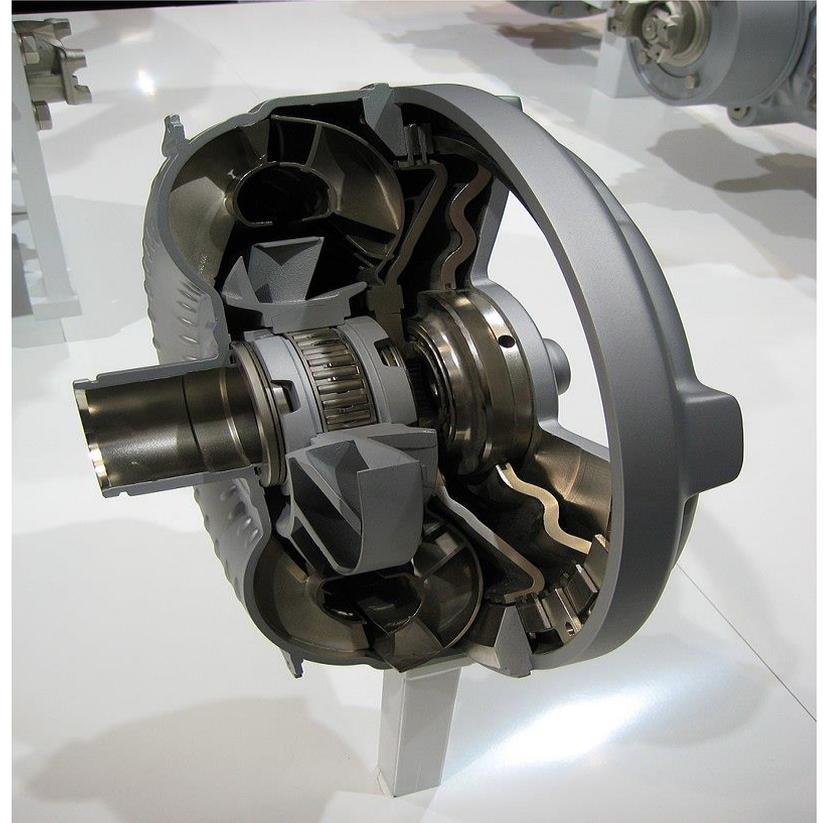
5.1 Define fluid coupling



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5.1 Define Torque converter.

A **torque converter** is a device, usually implemented as a type of [fluid coupling](#), that transfers rotating power from a [prime mover](#), like an [internal combustion engine](#), to a rotating driven load. In a vehicle with an [automatic transmission](#), the torque converter connects the prime mover to the automatic gear train, which then drives the load. It is thus usually located between the engine's [flexplate](#) and the transmission. The equivalent device in a manual transmission is the mechanical [clutch](#).

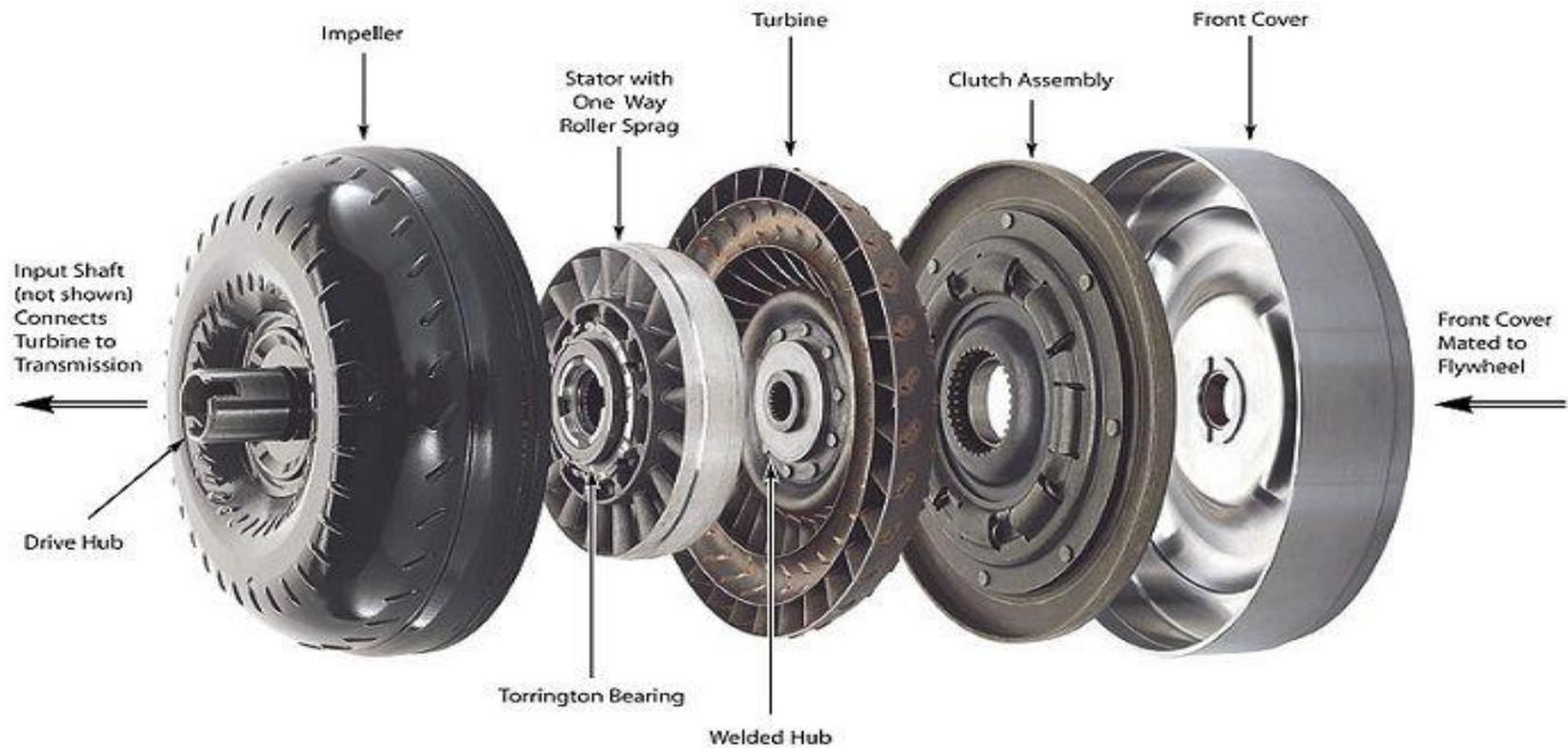


5.1 Define Torque converter.

A torque converter serves to increase transmitted [torque](#) when the output rotational speed is low. In the fluid coupling embodiment, it uses a fluid, driven by the vanes of an input turbine, and directed through the vanes of a fixed stator, to drive an output turbine in such a manner that torque on the output is increased when the output shaft is rotating more slowly than the input shaft, thus providing the equivalent of an adaptive [reduction gear](#). This is a feature beyond what a simple fluid coupling provides, which can match rotational speed but does not multiply torque. Fluid coupling based torque converters also typically include a lock-up function to rigidly couple input and output and avoid the losses associated with transmitting torque by fluid flow when operating conditions permit



5.1 Define Torque converter.



- 1.5 Describe construction and operation of various suspension systems.
- 1.8 Mention the basic suspension movements.
- 1.9 Describe bouncing, pitching and rolling.

