FEDS FAIRVIEW EDUCATIONAL SERVICES LTD

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Steering and Suspension

PRACTICE PAPER ONLY

Test Paper One / Time allowed 90 mins

To be completed by the student

Student Name _____ **Date** __ / __ /2020

School/Provider _____

To be completed by the School Invigilator/Coordinator/Tutor

I confirm that this assessment was completed by the student named above as a closed book exercise under exam conditions

Invigilator Name_____

Invigilator Sign_____

Assessed By _____ **Date** __ /__ / 2020

Assessor's Stamp

Assessors Note: Materials relate to unit standard 21721-30566

PRACTICE ASSESSMENT INSTRUCTIONS

PLEASE MAKE SURE TO READ AND SIGN THIS SECTION

ASSESSMENT INSTRUCTIONS

- Before starting this assessment you should have achieved a mark of at least 80% for your workbook.
- Use a black or blue ball point pen. (do not use pencil)
- Write your full name on the cover page.
- This is a closed book assessment, so you cannot bring any reference material in, or seek help from anyone else.
- You need to answer all the questions.
- Read the questions carefully, and give detailed answers when asked to.
- You must complete the assessment under exam conditions.
- To achieve the unit standard you must show competency for each outcome.

Complete the following by circling Yes or No as appropriate:

Are you ready to be assessed? **Yes** **No**

Have the assessment instructions these been explained to you? **Yes** **No**

Do you understand the assessment instructions? **Yes** **No**

Have you all the materials/resources that you need for this assessment? **Yes** **No**

Please sign to acknowledge that you have read these instructions and are ready to be assessed.

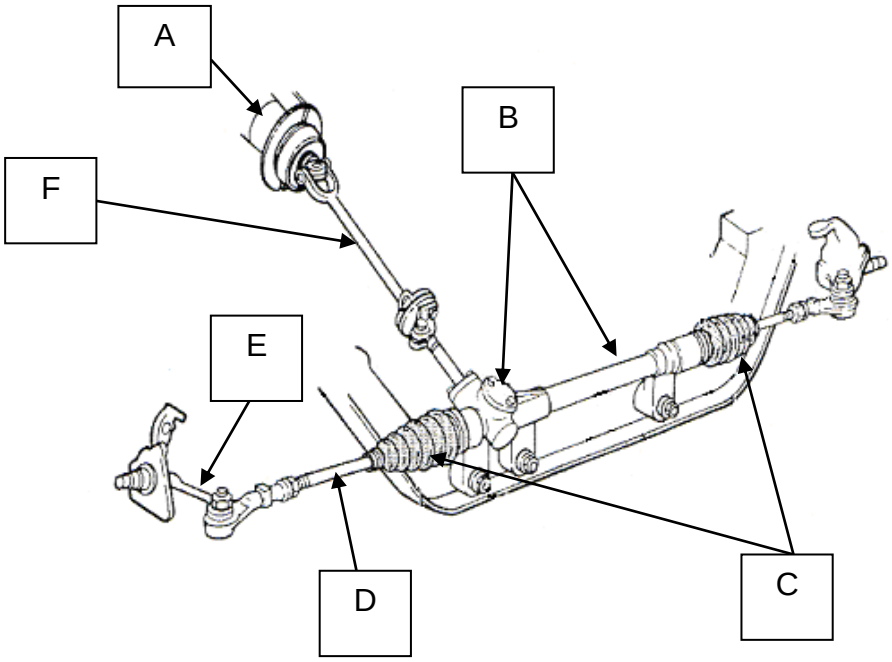
Student Signature: _____ **Date:** _____

You must complete the assessment instructions on Page 2 before starting this assessment!

ELEMENT ONE

Demonstrate knowledge of vehicle steering systems.

1a. Identify the components labelled A-F.



A		D	
B		E	
C		F	

1b. Please circle the correct steering system as shown in the diagram above:

Rack and pinion steering or Re-circulating ball type steering box

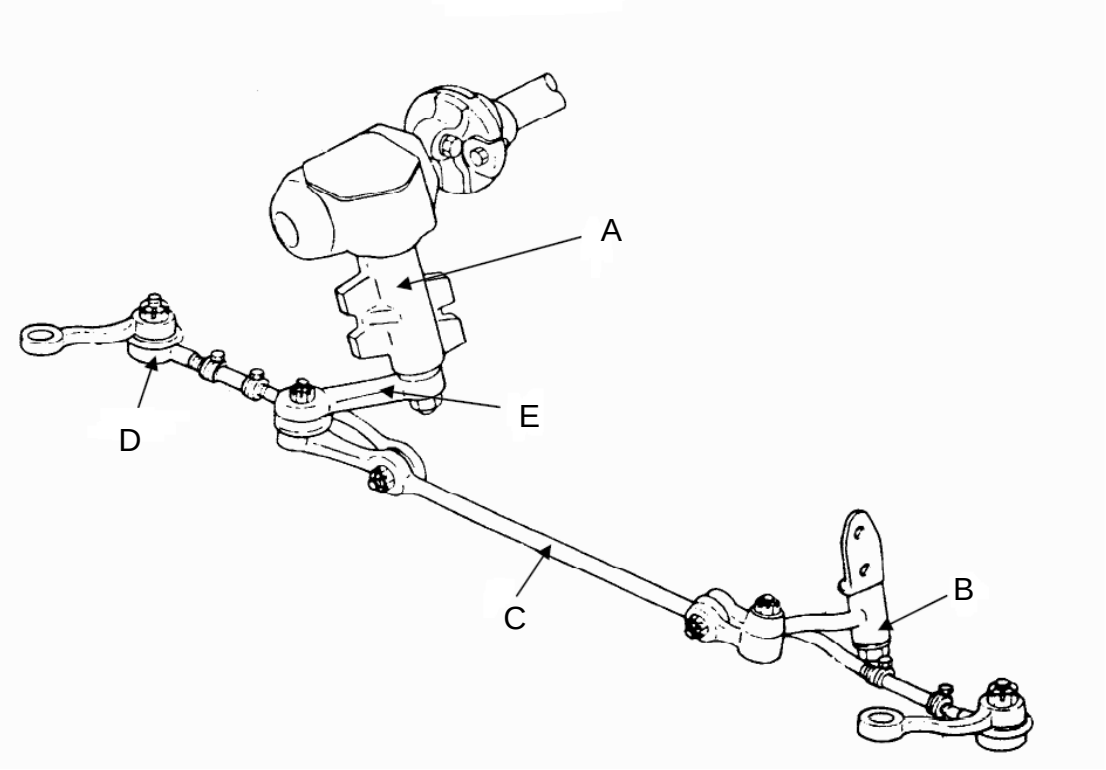
1c. Briefly explain the function of the component labelled A above.

_____

_____

_____

2. Identify the components labelled A-E.



A		**B**	
C		**D**	
E			

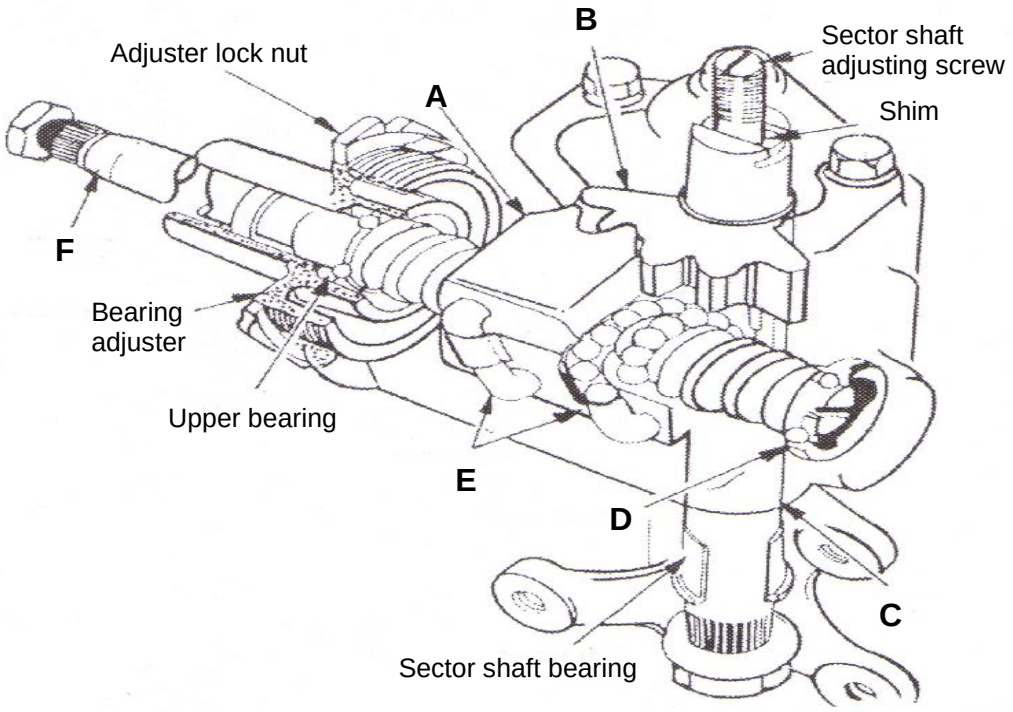
2B. Briefly explain the function of the component labelled C above.

_____

_____

_____

3. Identify the components labelled A-E.



A		**B**	
C		**D**	
E		**F**	

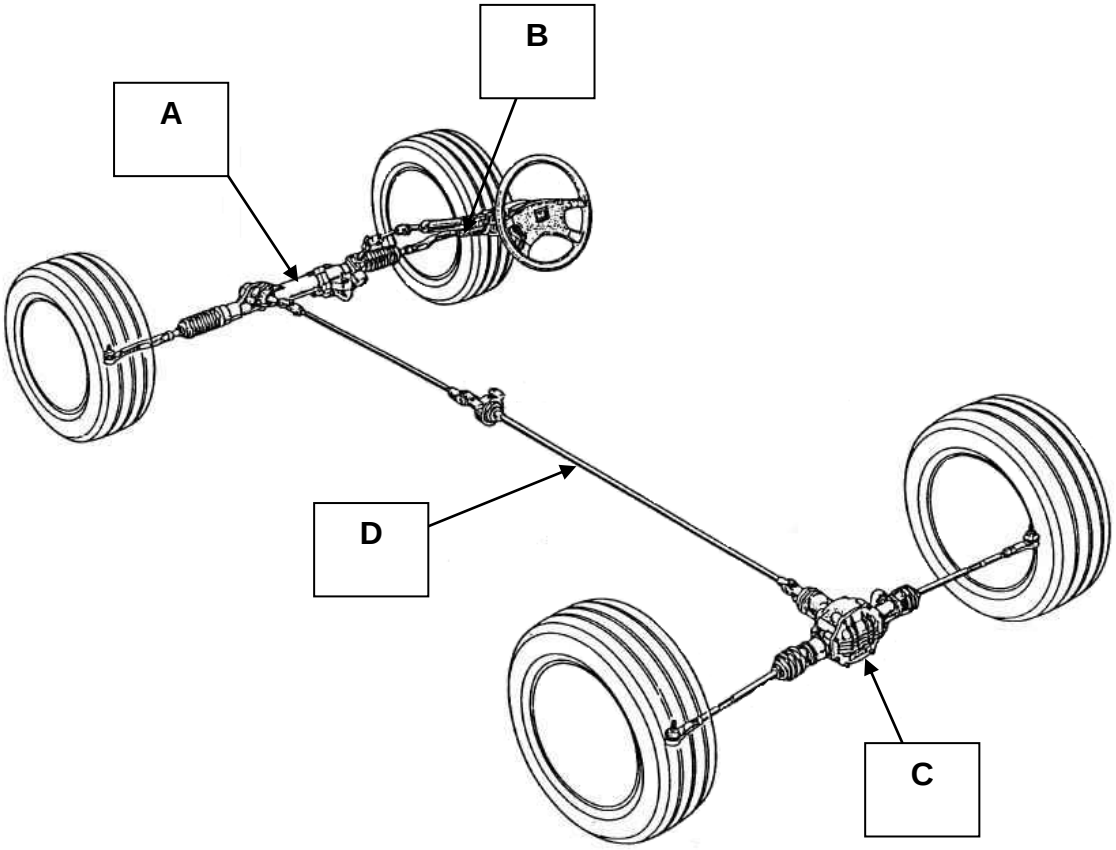
3B. Briefly explain the function of the component labelled E above.

_____

_____

_____

4. Identify the components labelled A-D.



A		**B**	
C		**D**	

5. Briefly outline the main functions of vehicle steering systems.

_____

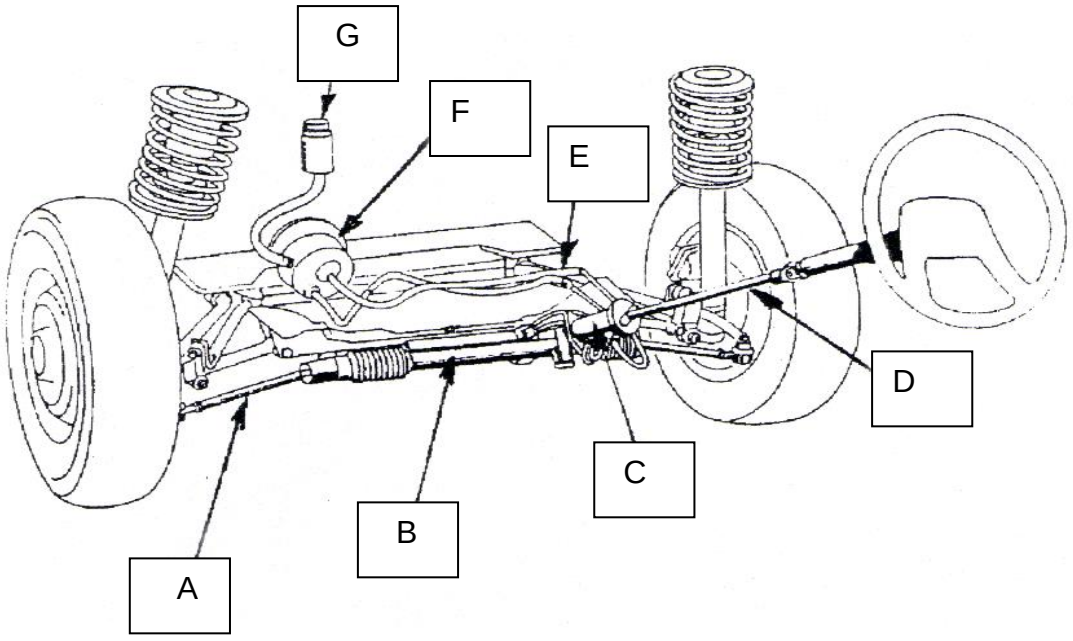
_____

_____

_____

_____

6. Identify the components labelled A-G.



A		**B**	
C		**D**	
E		**F**	
G			

7. What is the main advantage of power steering systems?

_____

_____

_____

_____

_____

8. Match up the steering component with its function: For example

A – Drag link = 8 – Connects the tie rods. Tie rod arms, stub axle and wheels in parallel.

A	Drag link	**A8**	1	A ball joint that swivels to move the spindle
B	Idler arm		2	Transfers the turning force of the steering wheel to the intermediate shaft and rack and pinion steering assembly
C	Pitman arm		3	Mounts the wheel bearings, hub, disc and road wheels and transfers steering action to the hubs and wheels
D	Power steering pump		4	Connects the drag link to a fixed idler arm support
E	Spindle		5	Transfers the rotational motion of the steering box to the lateral movement of the drag link
F	Steering column		6	Turns the stub axle
G	Stub axle (RWD)		7	Supplies oil under pressure to boost the turning effort exerted by the driver.
H	Tie rod arm		**8**	Connects the tie rods. Tie rod arms, stub axle and wheels in parallel.
I	Tie rod end		9	Connects the steering rack to the tie rod end

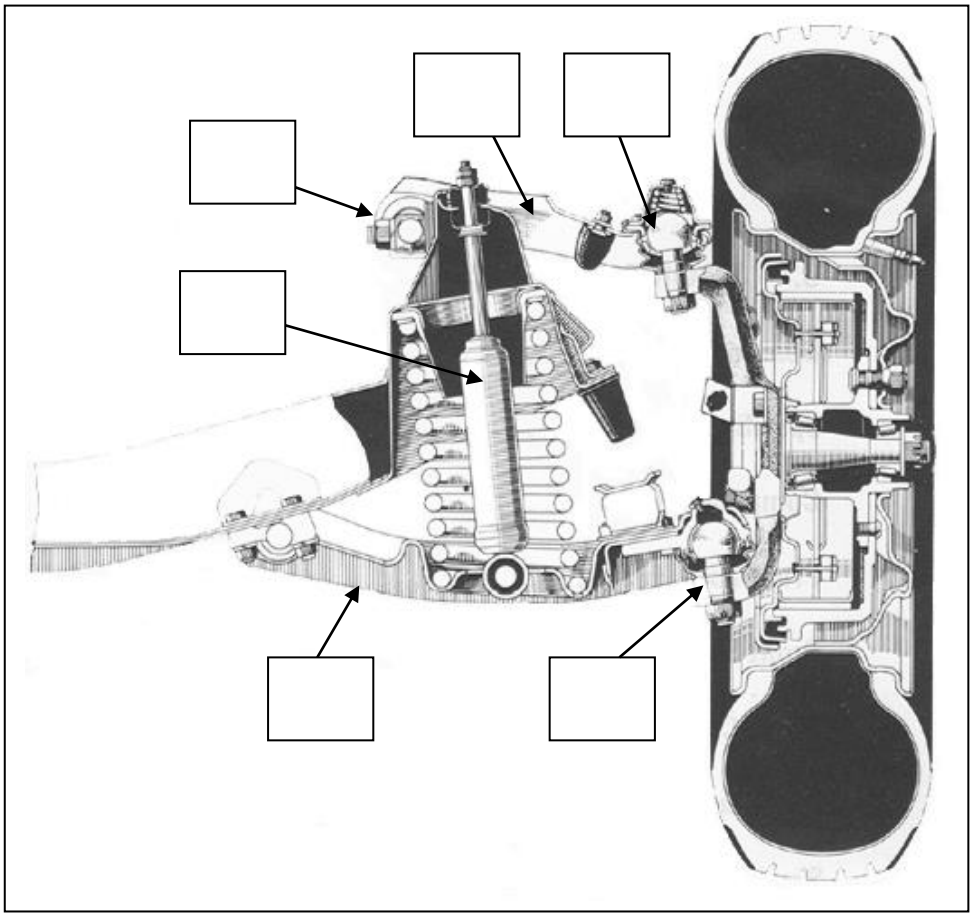
9. Match up the safety and technological steering system enhancement with its description.

A	Automatic steering		1	An inflatable pillow that acts as a safety device on the steering wheel. Can be removed easily.
B	Brake steering		2	Designed to collapse on impact, reducing the risk of driver injury in the event of an accident.
C	Collapsible column		3	Uses a GPS to automatically steer a tractor or other agricultural type vehicle along consistently straight or curved rows.
D	Cushion steering wheel		4	A system used as a back up to the steer by wire system.
E	Electronic stability and feel control		5	Used to steer heavy earthmoving equipment such as bulldozers and diggers.
F	Failsafe		6	A system that removes the need for mechanical steering components.
G	Rear wheel steering		7	A system that is designed to improve a vehicles handling and feel, especially where the driver may lose control.
H	Steer-by-wire systems		8	Used commonly on forklifts that have a weight bearing front rigid type axle.

ELEMENT TWO
Demonstrate knowledge of vehicle suspension systems.

1. Refer to the list provided to match each suspension component with its correct location in the diagram below. Write the appropriate letter in the box next to its arrow.

A.	Lower suspension arm	B.	Shock absorber
C.	Upper ball joint	D.	Lower ball joint
E.	Upper suspension arm	F	Upper suspension arm pivot



Name the suspension system shown above and briefly describe how it works.

Name: _____

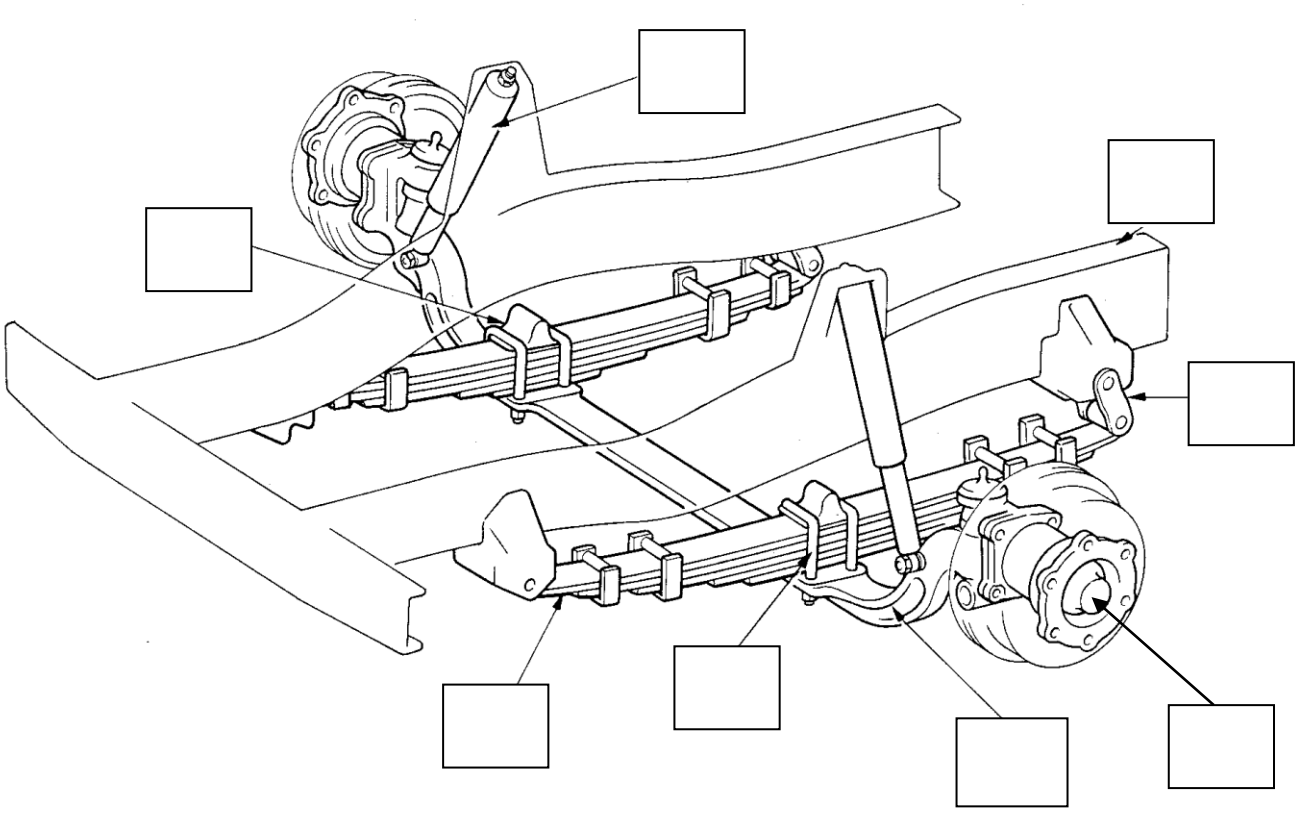
Description: _____

_____

_____

2. Refer to the list provided to match each suspension component with its correct location in the diagram below. Write the appropriate letter in the box next to its arrow.

A.	Chassis rail	B.	Leaf spring
C.	Shock absorber	D.	Spring U bolt
E.	Spring shackle	F.	Axle beam
G.	Bump stop	H.	Wheel hub



Name the suspension system shown above and briefly describe how it works.

Name: _____

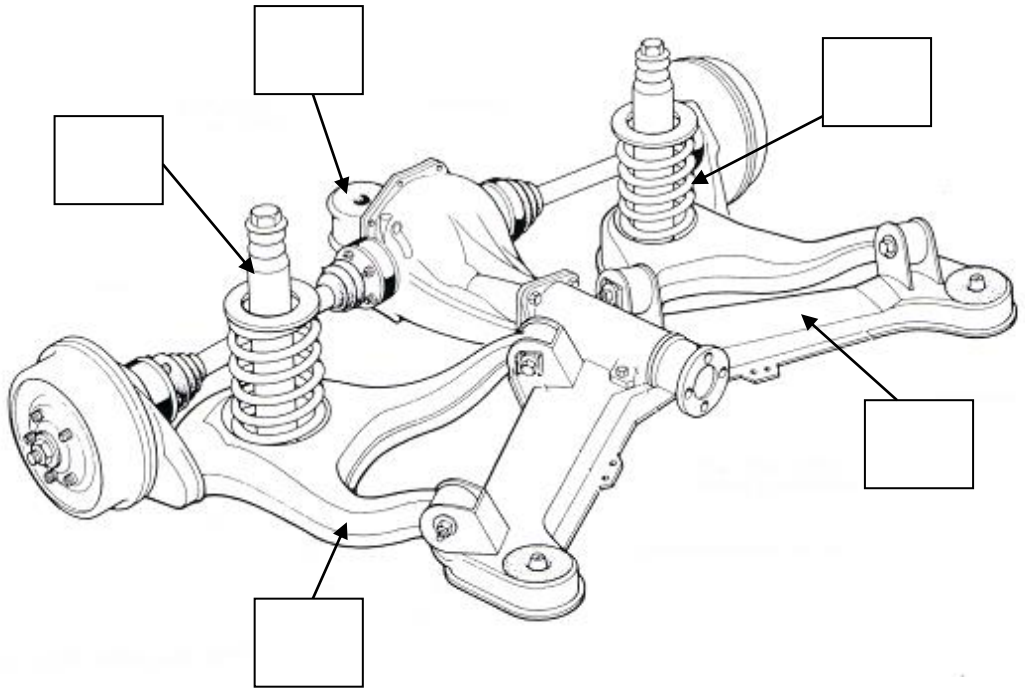
Description: _____

_____

_____

3. Refer to the list provided to match each suspension component with its correct location in the diagram below. Write the appropriate letter in the box next to its arrow.

A.	Trailing arm	B.	Shock absorber
C.	Coil spring	D.	Sub frame
E.	Rubber mounting		



Is this a front or rear suspension set up? Please circle appropriate answer below.

FRONT REAR

Name the suspension system shown above and briefly describe how it works.

Name: _____

Description: _____

_____

_____

4. Provide a brief explanation of the purpose of each of the following suspension components:

Sway Bars

_____

_____

_____

Torsion Bars

_____

_____

_____

Coil springs

_____

_____

_____

Bump stops

_____

_____

_____

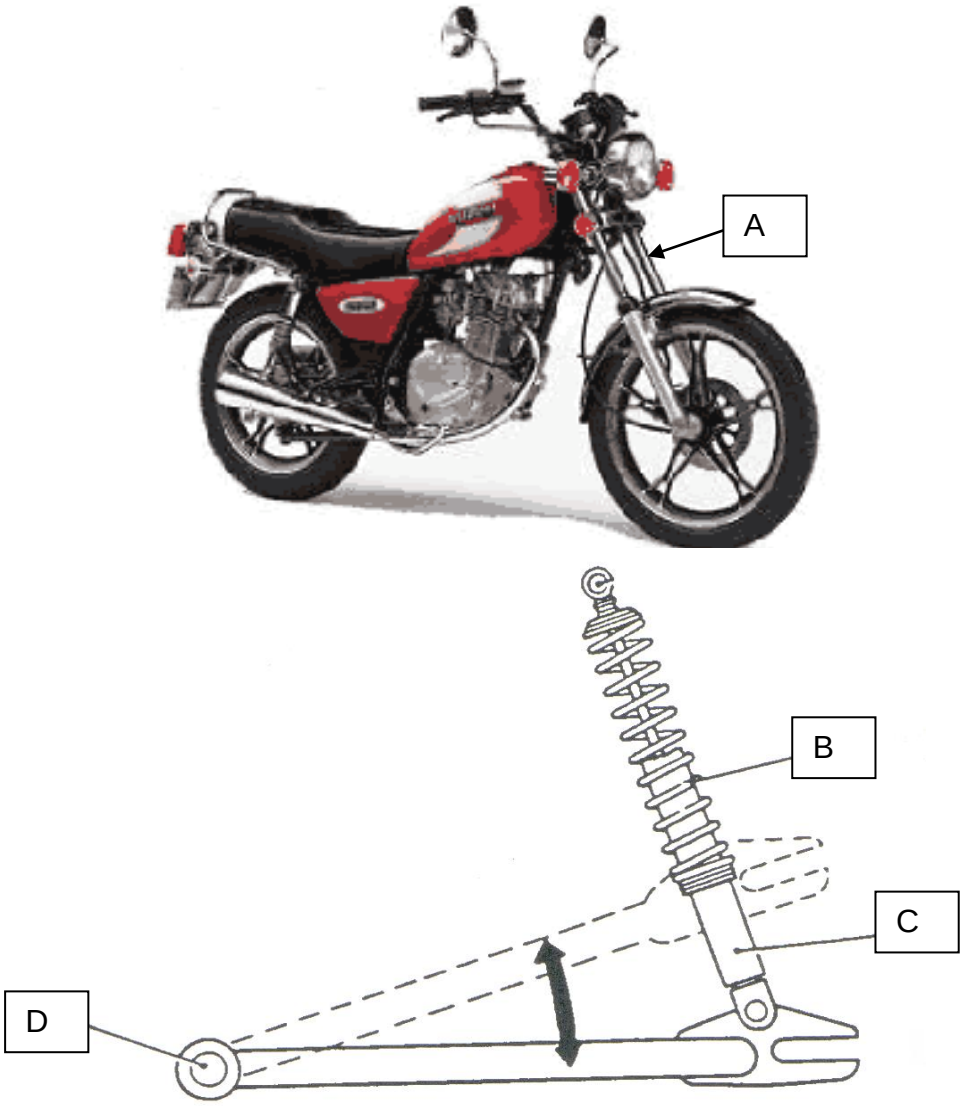
Ball Joints

_____

_____

_____

5. Identify the components labelled A-D



A		**B**	
C		**D**	

6. How do motorcycle manufacturers deal with brake dive?

_____

_____

_____

7. Trucks usually have a non-independent suspension set up, what are the main advantages and disadvantages of this set up?

Advantages

_____

_____

_____

Disadvantages

_____

_____

_____

8. From the clues provided identify the suspension system to its description.

This system uses air pressure through an inflated bag to provide spring action when the wheels travel over a bump.

System: _____

This system adjusts the height of both the rear and front of the vehicle trim to suit varying vehicle loads.

System: _____

This system is fitted to some heavy vehicles as its highly elastic material provides excellent springing qualities.

System: _____

ELEMENT THREE
Demonstrate knowledge of steering and suspension geometry.

1. Match up the wheel alignment term with its description (enter the appropriate number next to its letter)

A	Caster	**A**	1	Measures the distance between the centre of the front wheel and the centre of the rear wheel.
B	Toe out on turns	**B**	2	Measures forward or rearward tilt of the steering axis when viewed from the side. Usually more positive angles for vehicles with power steering.
C	Scrub radius	**C**	3	Describes the moment that the suspension springs back.
D	Rebound	**D**	4	Measures the distance between the centre of the tyre and the point at which the SAI intersects the ground. If not the same from side to side the vehicle will pull strongly.
E	Steering angle inclination	**E**	5	Describes the moment that the suspension compresses.
F	Jounce	**F**	6	Measures the angles that the inside front wheel and inside rear wheels travel when turning. As the outside front wheel has further to travel than the inside wheel, the inside wheel will have a sharper angle.
G	Wheelbase	**G**	7	Angle that measures the steering pivot line when viewed from the front of the vehicle. Angle is known as KPI on heavy vehicles.

2. Match up the wheel alignment term with its description (enter the appropriate number next to its letter)

A	Bump steer	**A**	1	Refers to the relative positions of the front wheels and rear wheels. Ideally the rear wheels should follow the front wheels when travelling in a straight line.
B	Camber	**B**	2	Angle in which the rear wheels are pointing in relation to the centre line of the vehicle.
C	Included angle	**C**	3	Is the tilt of the wheel when viewed from the front of the vehicle. If the tyre appears to tilt inwards at the top the angle is negative.
D	Thrust line and angle	**D**	4	Refers to the direction the wheels are pointing when viewed from above.
E	Toe	**E**	5	Angle that is created when the SAI is added to the camber. If the angle is not the same from side to side a suspension component is likely to be bent.
F	Tracking	**F**	6	Change in toe that causes the vehicle to veer when the tyres loose contact with the road surface.

FINISHED? CHECK THAT YOU HAVE ATTEMPTED ALL QUESTIONS!

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