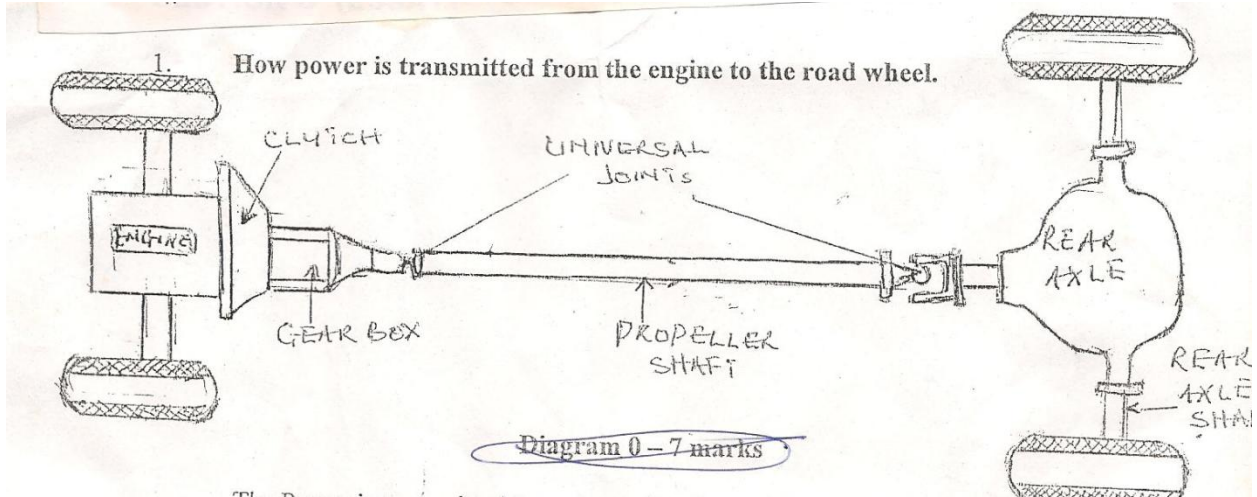


MOTOR VEHICLE MECHANICS.

MAY/JUNE 2009

1. With the aid of diagram, explain how power is transmitted from the engine to the road wheel.

How power is transmitted from the engine to the road wheel



The power is transmitted from the engine through the clutch to the gearbox through the Universal joint to the prop shaft to the rear axle and from there through the half shafts to the road wheels.

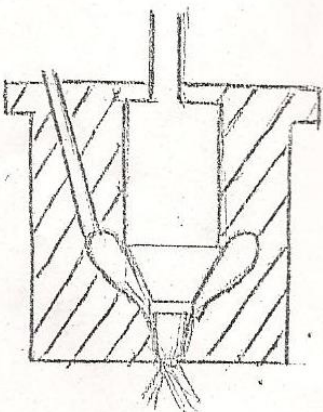
2. (a) Mention TWO types of nozzles.

(b) Show by sketches, their main differences.

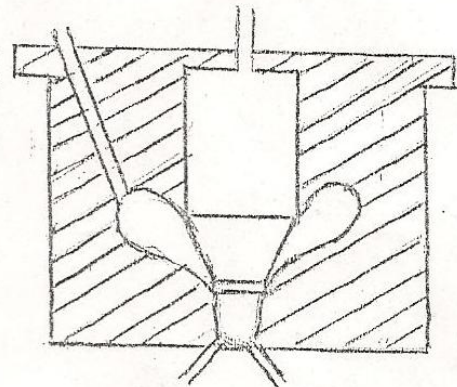
2.(a) TWO TYPES OF NOZZLES ARE:

(i) Single Hole (ii) Multi-hole (iii) Pintle (iv) Pintaux

(b)



Single Hole



Multi-hole

3. QUESTIONS:

- (a) Explain THREE purposes of gearbox in a motor car.
- (b) State TWO causes of a gear lever jumping out gear.

ANSWERS:

(A) THREE PURPOSES OF A GEARBOX

- 1. It enables the vehicle to take off from rest.
- 2. To provide permanent neutral position.
- 3. To enable vehicle run at low speed.
- 4. To enable vehicle run at high speed.
- 5. To enable vehicle climb hills.
- 6. To enable vehicle engage in reverse.
- 7. It varies the speed of the vehicle

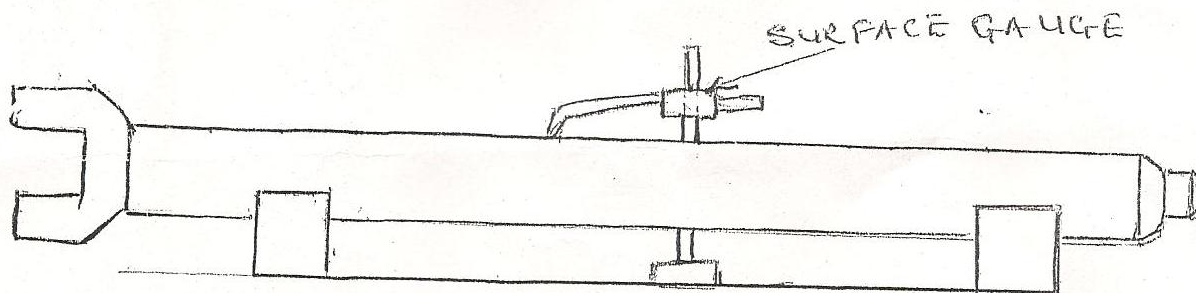
(B) TWO CAUSES OF A GEAR LEVER JUMPING OUT OF GEAR

- (i) Worn Gear teeth.
- (ii) Worn engine/gearbox mounting
- (iii) Bearings worn
- (iv) Weak or broken selector spring

4. QUESTIONS:

- (A) With the aid of sketches describe the procedure for checking the propeller shaft for straightness?

ANSWER:



Check the propeller shaft for straightness. To check the propeller shaft for straightness, rest the shaft in vee-blocks, set the hooked end of the scribe of a surface gauge to a point on the shaft and traverse the gauge on a surface plate or a good flat surface. Rotate the shaft through 90° and repeat.

Or

- (B) Checking the straightness of a prop shaft.

DESCRIPTION:

To check for straightness of a propeller shaft, a surface plate is used. Blue powder is smeared on it. The shaft is now rolled on the surface plate to determine the bent area of the shaft.

It will be discovered that where the shaft does not touch the blue powder is the bent area.

NOTE

An alternative to using surface plate is the use of a lathe machine to test the straightness of the propeller shaft. This is done by fixing the propeller shaft on a lathe and start the lathe. One would observe the rotation of the shaft whether it is flinging here and there as it rotates.

5. QUESTIONS:

- (a) Explain the working principle of multi-drive axle
- (b) State TWO advantages of multi-drive axle

ANSWER:

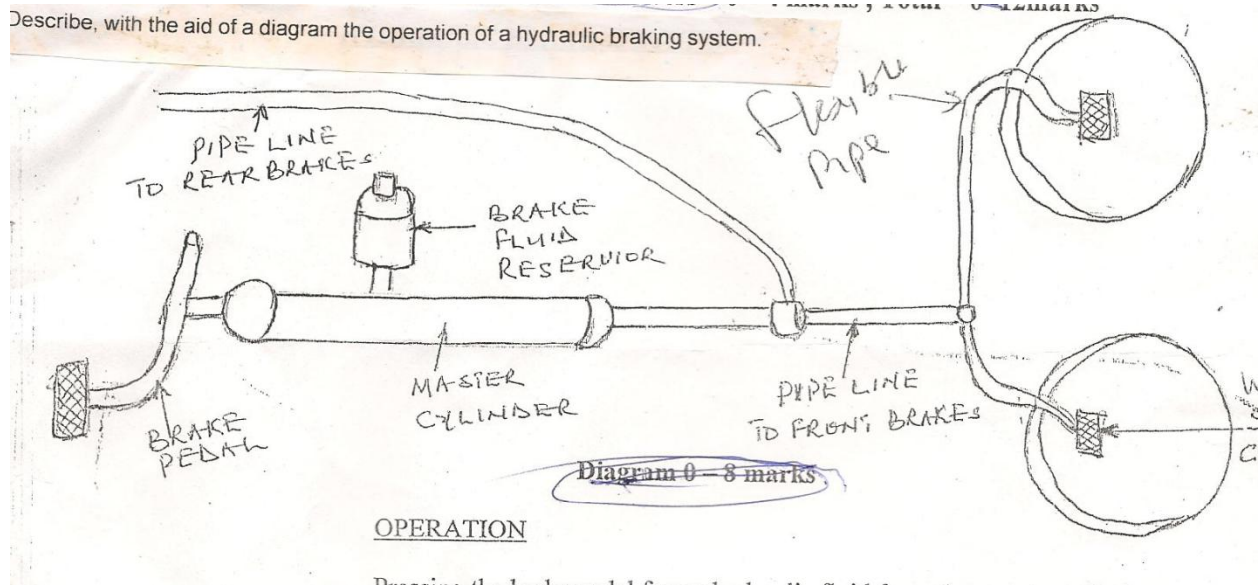
- (a) The working principal of a multi-drive axle is that the centre of turn lies on a line midway between the rears axles of the foremost axle are swiveled through the smaller angles than those of the second axle. This is possible by the action of a double drop arm system with an interconnecting drag link. When the car is fully laden, however, the wheels are canted inwards at the top and the over steering characteristics becomes reversed, the car now tending to under steer.
- (b) (i) Ensure regular topping of hydraulic fluid
(ii) Hydraulic rubber should not be allowed to cut.
(iii) Use the correct steering oil.
(iv) Ensure that the system is prevented from dust or dirt.

NOTE:-

- (5B)(i) It enables firm grip on the ground
 - (ii) It enables the vehicle to carry heavy loads.
 - (iii) It enables the vehicle to be driven on a swampy soil without slipping
 - (iv) It ensures even distribution of the torque to the road wheels.
 - (v) It increases the torque at the driving wheels.
- (b) TWO ADVANTAGES OF MULTI-DRIVE AXLE
 - (i) Quicker steering especially at high speeds.
 - (ii) Reduction of wheel wobble
 - (iii) Reduction in the effort to be made by the driver
 - (v) Reduction in the number of turns of the steering wheel from lock to lock

6. Describe with the aid of a diagram the operation of a hydraulic braking system

Describe, with the aid of a diagram the operation of a hydraulic braking system.



OPERATION

Pressing the brake pedal forces hydraulic fluid from the master cylinder through pipe lines to the wheel cylinders and then acting on the road wheels through the brake lining to the brake drums.

7. QUESTIONS:-

- (a) Explain the term "over steering"
- (b) State FOUR necessary maintenances to be carried out on the hydraulic Steering system.

ANSWER:

- (a) OVER STEERING: When a car is highly loaded, the wheels are canted outwards at the top and when in this condition the suspension renders the car very sensitive to steering movements; usually swing-axle cars have a pronounced amount of over steer when lightly loaded so that it is necessary to unwind the steering wheel when cornering quickly.