BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem Examination

Course Code: AUT1101 **Time: 2 Hour**

Course Name: Automotive Powertrain, Chassis and Suspension **Max. Marks: 50**

Instruction:

1. Answer all questions from section – A, each question carries one mark.
2. Attempt all questions from section – B, each question carries four marks.
3. Answer all questions from section – C, each question carries six marks.

Section – A

01X10 = 10 Marks

Q1. Transfer case is located next to the gearbox in:

a) Front wheel drive
b) Rear wheel drive
c) Four-wheel drive
d) None of the above

Q2. Which of the following provides a smooth means of engagement and disengagement between the engine and the rest of the transmission?

a) Clutch
b) Gear Box
c) Axel
d) Differential

Q3. The engine part in which carburation takes place is:

a) Radiator
b) Carburetor
c) Cylinder
d) Crank case

Q4. In spark ignited engines, the fuel tank is placed:

a) Above the level of carburetor
b) Below the cylinder
c) Below the level of carburetor
d) In the carburetor

Q5. What is the degree of crank rotation during the completion of a four-stroke cycle?

a) 180°
b) 360°
c) 270°
d) 720°

Q6. Which component of the carburetor is used to produce low pressure in the throat of the carburetor?

a) Throttle
b) Choke
c) Main Jet
d) Venturi Tube

Q7. The efficiency of an Otto cycle is increased by increasing?

a) Pressure ratio
b) Compression ratio
c) Temperature Ratio
d) None of the above

Q8. The constant volume cycle is also called:

a) Carnot Cycle
b) Otto Cycle
c) Diesel Cycle
d) None of the above

Q9. In which type of cooling system fins are used on cylinder head?

a) Oil cooling
b) Water cooling
c) Liquid cooling
d) Air cooling

Q10. What is the property of a lubricating system?

a) Boiling temperature should be low
b) Should develop foam
c) Oil viscosity should not be same in hot and cold conditions
d) Oil viscosity should suit the operating conditions

Section – B

04X04 = 16 Marks

Q11. Explain working of carburetor and its types.

Q12. Write a short note on Clutch and its types.

Q13. Draw PV and TS diagram of diesel cycle.

Q14. What is the role and responsibilities of an automotive technician?

Section – C

06X04 = 24 Marks

Q15. Explain working of Cooling system of an Automobile and its functions.

Q16. What do you understand by MPFI system? Explain.

Q17. Explain working of Synchromesh gearbox.

Q18. Write a note on Otto cycle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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Set A Ans

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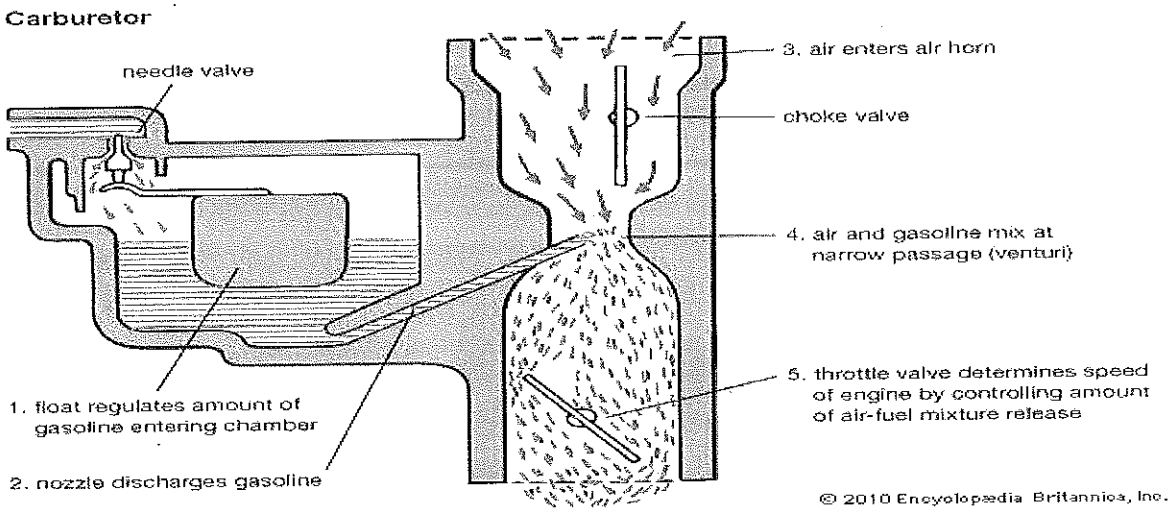
Section – B

04X04 = 16 Marks

Q11. Explain working of carburetor and its types.

Ans:



A carburetor is a device which helps in mixing fuel and air together for facilitating internal combustion inside an internal combustion engine. This device passes the mixture of fuel and air to the intake manifold (a device delivering air/fuel mixture to the cylinders) of an internal combustion engine.

In a carburetor, there are two spinning valves which are present just above and below the venturi. The top valve which is known as the choke is responsible to handle or regulate the amount of air that should flow inside the carburetor. When the valve is closed, less amount of air can pass in and as a result, the venturi will suck in more fuel providing a mixture rich in fuel to the engine. This thing is specifically helpful when the engine has just started or the car is cold and needs some time to get heated up. The second valve present in the carburetor is the throttle. When the throttle is wide open, more amount of air passes through the carburetor as a result of which the carburetor can drag more fuel from the pipe to the sides resulting the engine to release more energy and power enabling the car to go faster.

Types of Carburetor:

According to the direction of air flow.

- Down draft
- Updraft
- Sidedraft

According to the arrangement of float chamber

- Eccentric
- Concentric

According to the number of units

- Single
- Double
- Four-barrel

Q12. Write a short note on Clutch and its types.

Ans: A clutch is a mechanical device which engages and disengages the transmission especially from driving shaft to driven shaft.

Principal of clutch: It operates on the principle of friction. When two surfaces are brought in contact and are held against each other due to friction between them, they can be used to transmit power. If one is rotated, then other also rotates. One surface is connected to engine and other to the transmission system of automobile. Thus, clutch is nothing but a combination of two friction surfaces.

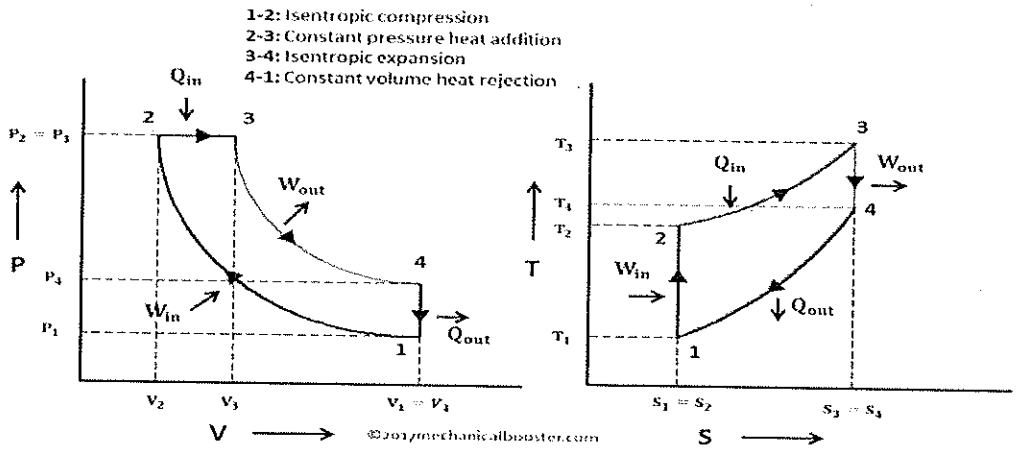
Types of Clutches:

1. Cone clutch
2. Single plate clutch
3. Multiplate clutch
4. Semi-centrifugal clutch
5. Centrifugal clutch
6. Cone clutch

Q13. Draw PV and TS diagram of diesel cycle.

Ans:

PV and TS diagram of Diesel cycle:



P-V and T-S Diagram of Diesel Cycle

Q14. What is the role and responsibilities of an automotive technician?

Ans:

- Discuss the job card to clearly understand the service and repair requirements
- List the various sources of information to assess service/repair requirements
- Discuss how to gauge misfits or issues in the previous repair
- Identify the parameters for inspection/routine service/non-routine repair work
- Discuss the checklist for tasks to be performed for routine or non-routine service/repair
- Explain the specifications w.r.t. quality and type of material/consumables/components required for routine service
- Discuss the importance of using appropriate spare parts and other material for service/maintenance such as grade of oil, lubricants, grease, etc.
- Discuss the symptoms of wear and tear w.r.t. components needing replacement such as filters, belts, wipers, etc.
- Identify different methods for disposing off waste material such as waste oil, scrap, etc.
- List the necessary precautions so as to avoid any kind of damage to aggregates/vehicle
- Identify the defects/malfunctions in the tools/equipment and leftover consumables/parts to be reported further for rectification
- Determine any other repair requirements to be escalated further for inspection
- List the records/documents to be maintained w.r.t service/repair work

Section – C

06X04 = 24 Marks

Q15. Explain working of Cooling system of an Automobile and its functions.

Ans: A car engine cooling system not only keeps the engine of the vehicle cool but also stabilizes its temperature to fulfill the requirements for the working of the engine. The cooling system components have a radiator to dissolve the heat. Airflow for radiator cooling is ensured by a fan or fans.

The required operating temperature is reached with the help of a water pump (or coolant pump). The coolants flow into the engine, tubes, and other components. After that a thermostat valve is opened. Maximum vehicles now use an expansion tank that enables the coolant to- expand, exit (when the cooling circuit is heated) and reverse (when the car is turned off and the engine cools).

Functions of a cooling system:

1. Removes excess heat from the engine.
2. Maintains a constant engine temperature.
3. Increases temperature of a cold engine quickly.
4. Warms the passenger compartment.

Q16. What do you understand by MPFI system? Explain.

Ans: The MPFI is a system or method of injecting fuel into internal combustion engine through multi ports situated on intake valve of each cylinder. It delivers an exact quantity of fuel in each cylinder at the right time.

D MPFI system:

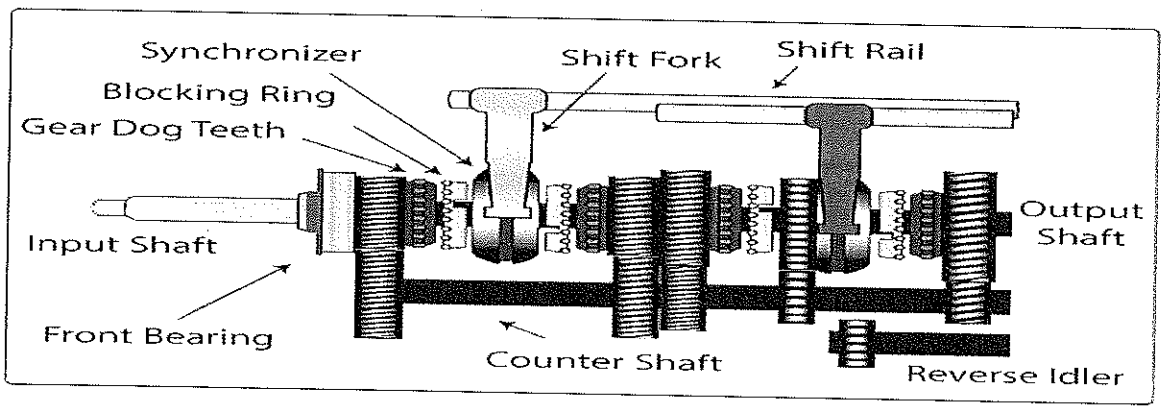
- It is the manifold fuel injection system.
- In this type the vacuum in the intake manifold is first sensed. Further it senses the volume of air by its density.
- Figure shows the block diagram regarding the functioning of the D MPFI system.
- As the air enters the intake manifold the manifold pressure sensor detects the intake manifold vacuum and sends the information to the ECU.
- The speed sensor also sends the information about the rpm of the engine to the ECU.
- The ECU in turn sends commands to the injector to regulate the amount of gasoline supply for injection.
- When the injector sprays fuel in the intake manifold the gasoline mixes with the air and the mixture enters the cylinder.

L MPFI system:

- In this system the fuel metering is regulated by the engine speed and the amount of air that actually enters the engine. This is called air mass metering or air flow metering.
- This is the block diagram of L MPFI system.
- As the air enters the intake manifold, the air flow sensor measures the amount of air and sends the information to the ECU. Similarly the speed sensor sends information about the speed of the engine to the ECU.
- The ECU process the information received and send appropriate commands to the injector to regulate the amount of gasoline supply for injection.
- When injection takes place, the gasoline mixes the air and mixture enters the cylinder.

Q17. Explain working of Synchromesh gearbox.

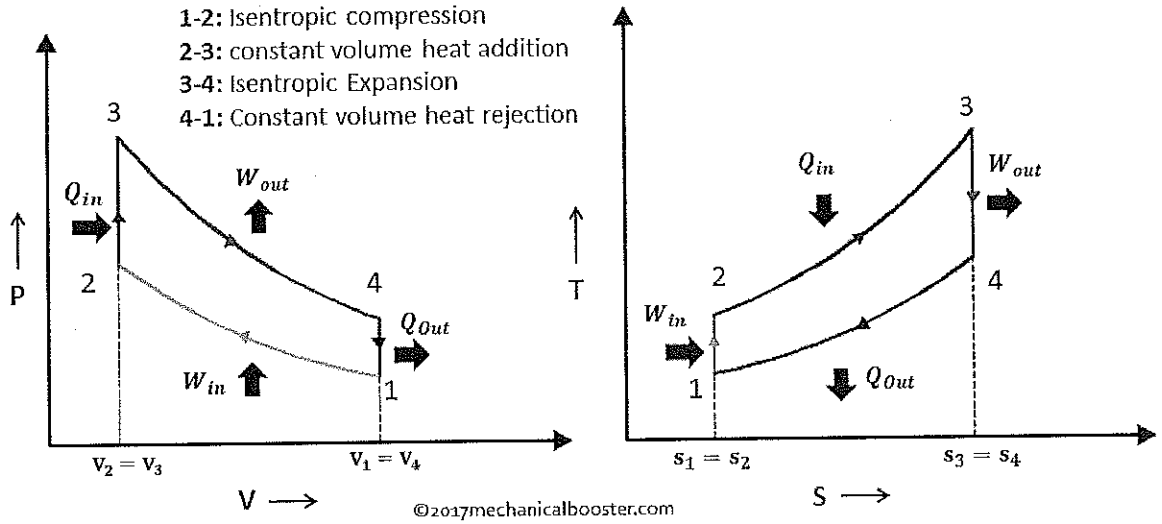
Ans:



- The Latest Version of the Constants Mesh Model Is the Synchromesh Gearbox. It Is a Manually Operated Transmission in Which Transmission Changes Occur Between Rotating Gears at the Same Speed. the Gears Can Roll Freely, or They Can Be Locked on the Layout Shaft in Such a Gearbox.
- Synchromesh Is an Upgrade on the Dog's Hug, Actually. the Synchronizer Is the Main Component of This Speed That Stabilizes the Transmission. a Synchronizer Is a Clutch That Allows Components to Rotate at Different Speeds. the Cones Are Used to Synchronize Friction Motions.
- It Consists of Two Parts, the Centro Cone and the Bolt Ring, Which Are Synchronous. the Cone Is an Array Part, and the Synchronizer Part Is the Ring Part. Once They Spin at the Correct Speed, the Bag Ring Stops the Engaged Gear. as the Ring Enters the Circle, Friction Slows Down or Speeds the Gear Wheel.
- Finally, the Synchronizer and Gear Speeds Will Be Balanced and Rotated at the Same Speed. the Shaft Gears Are Attached to Them, While the Gears of the Shaft Are Free to Rotate.

Q18. Write a note on Otto cycle.

Ans:



P-V and T-S Diagram of Otto Cycle

1. Isentropic compression (compression stroke) – The gas (fuel-air mixture) is compressed adiabatically from state 1 to state 2, as the piston moves from bottom dead center to top dead center. The surroundings do work on the gas, increasing its internal energy (temperature) and compressing it. On the other hand the entropy remains unchanged. The changes in volumes and its the ratio (V_1 / V_2) is known as the compression ratio.

2. Constant volume heat addition (ignition phase) – In this phase (between state 2 and state 3) there is a constant-volume (the piston is at rest) heat transfer to the air from an external source while the piston is at rest at top dead center. This process is intended to represent the ignition of the fuel–air mixture injected into the chamber and the subsequent rapid burning. The pressure rises and the ratio (P_3 / P_2) is known as the "explosion ratio".

3. Isentropic expansion (power stroke) – The gas expands adiabatically from state 3 to state 4, as the piston moves from top dead centre to bottom dead center. The gas does work on the surroundings (piston) and loses an amount of internal energy equal to the work that leaves the system. Again.the entropy remains unchanged. The volume ratio (V_4 / V_3) is known as the isentropic expansion ration, but for Otto cycle, it is equal to the compression ratio.

4. Constant volume heat rejection – In this phase the cycle completes by a constant-volume process in which heat is rejected from the air while the piston is at bottom dead center. The working gas pressure drops instantaneously from point 4 to point 1. The exhaust valve opens at point 4. The exhaust stroke is directly after this decompression. As the piston moves from bottom dead center (point 1) to top dead center (point 0) with the exhaust valve opened, the gaseous mixture is vented to the atmosphere and the process starts anew.

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Q.P. Set B

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Section – A

01X10 = 10 Marks

Q1. Which type of joints are used in Front wheel drive?

a) Universal joint
b) CV joint
c) Ball joint
d) None of the above

Q2. The inside Diameter of the engine cylinder is called?

a) Bore
b) Top dead center
c) Bottom dead center
d) None of the above

Q3. The engine part in which carburation takes place is:

a) Radiator
b) Carburetor
c) Cylinder
d) Crank case

Q4. Crank shaft and piston are connected with connecting road and gudgeon pin

a) True
b) False

Q5. The purpose of a thermostat in an engine cooling system is to:

a) Prevent the coolant from boiling
b) Allow the engine to warm up quick
c) Pressurize the system to increase boiling point
d) Indicate to the driver, the coolant temperature

Q6. Viscosity Index is a measure of change in viscosity with change in:

a) Temperature
b) Pressure
c) Volume
d) All of the above

Q7. In which gearbox all gears are always in contact?

a) Sliding mesh gearbox
b) Constant mesh gearbox
c) Epicyclical gearbox
d) None of the above

Q8. The inertia of the rotating part of the clutch should be:

a) Minimum
b) Maximum
c) Zero
d) None of the above

Q9. In D MPFI system, the fuel metering is regulated by the engine speed and the amount of the air that actually enters the engine?

a) True
b) False

Q10. Which type of gearbox has dog clutches?

a) Sliding mesh gearbox
b) Constant mesh gearbox
c) Epicyclical gearbox
d) None of the above

Section – B

04X04 = 16 Marks

Q11.Write a short note on 4-wheel drive.

Q12. Explain various components of a fuel system?

Q13. Draw PV and TS diagram of Otto cycle.

Q14. Explain various components of a cooling system.

Section – C

06X04 = 24 Marks

Q15. Explain working of 4 stroke petrol engine.

Q16. Explain Gravity, Pressure, Vacuum, Pump fuel feed system.

Q17. Explain working of Constant mesh gearbox.

Q18. Write a note on diesel cycle.

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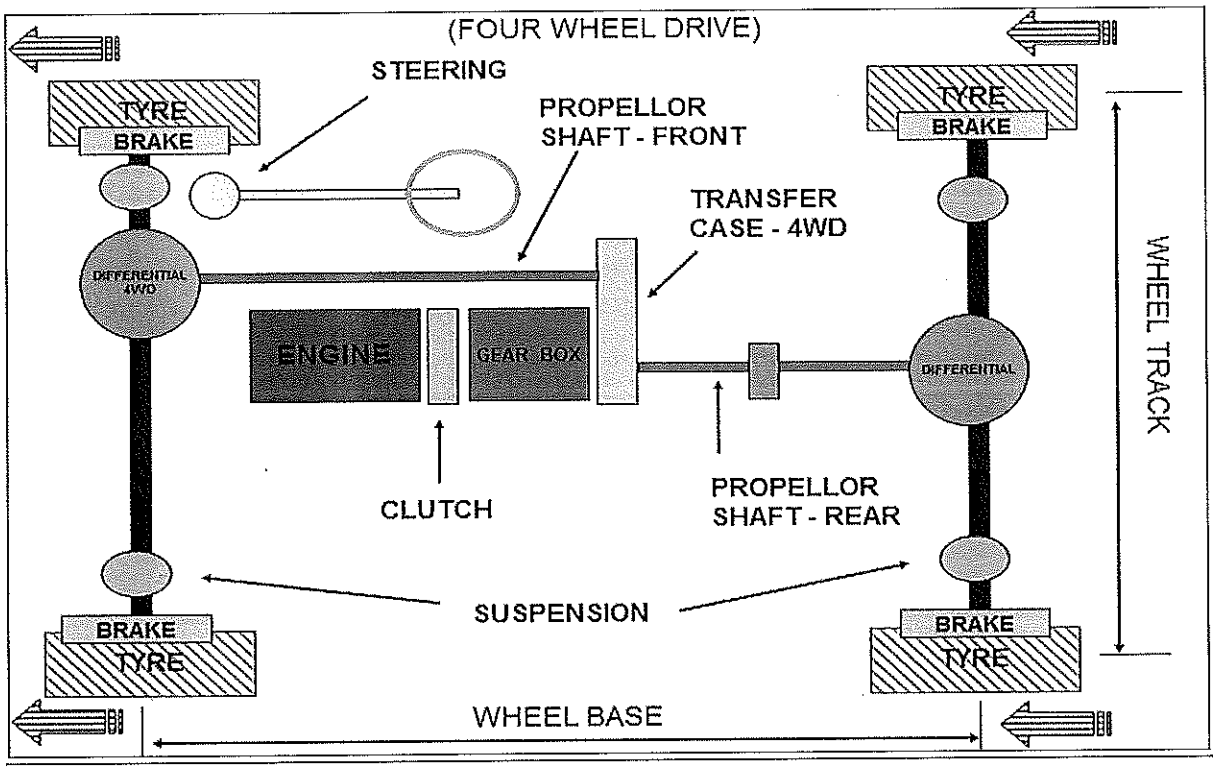
d) None of the above

Q11.Write a short note on 4-wheel drive.

Ans: Four-wheel drive, also called 4x4 ("four by four") or 4WD, refers to a two-axle vehicle drivetrain capable of providing torque to all of its wheels simultaneously. It may be full-time or on-demand, and is typically linked via a transfer case providing an additional output drive shaft and, in many instances, additional gear ranges.

A four-wheel drive vehicle with torque supplied to both axles is described as "all-wheel drive" (AWD). However, "four-wheel drive" typically refers to a set of specific components and functions, and intended off-road application, which generally complies with modern use of the terminology.



Q12. Explain various components of a fuel system?

Ans: The components are as follows:

Fuel Tank:

- To store the fuel in the fuel tank
- To supply the fuel to the engine to the required amount and in proper condition.
- To indicate to the driver, the fuel level in the fuel tank.

Fuel Pump:

- Fuel pump is used to feed the fuel from the fuel tank to the carburetor.
- The pump is driven either by the camshaft or electrically.
- In this system the fuel tank is placed at any suitable position in the vehicle.

Fuel Filter:

- A fuel filter is a filter in a fuel line that screens out dirt and dust particles from the fuel, and is normally made into cartridges containing a filter paperr.

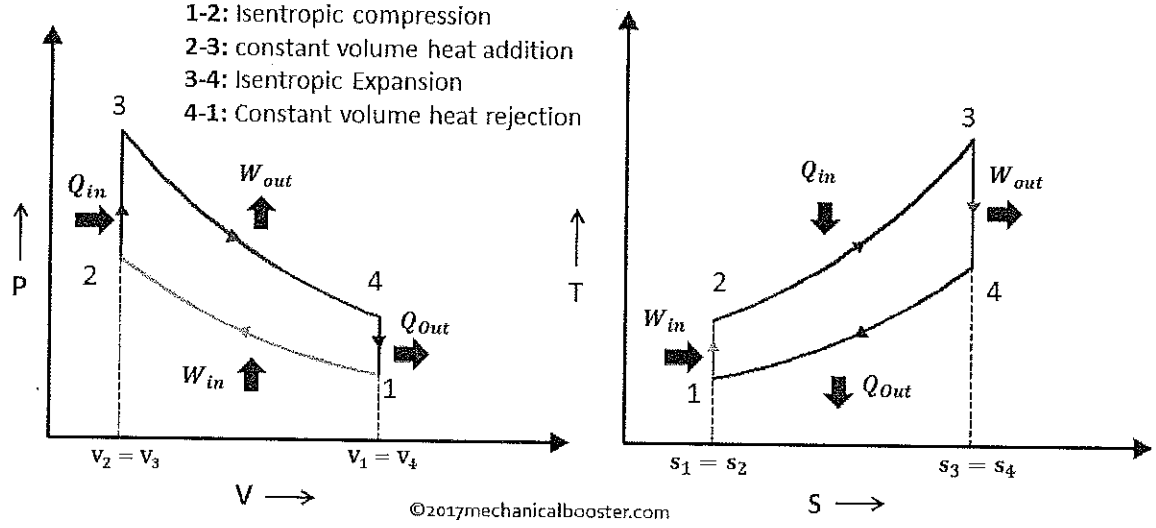
Carburetor: A carburetor is a device which helps in mixing fuel and air together for facilitating internal combustion inside an internal combustion engine. This device passes the mixture of fuel and air to the intake manifold (a device delivering air/fuel mixture to the cylinders) of an internal combustion engine.

Intake Manifold: The intake manifold ensures that the air coming into the engine is evenly distributed to all the cylinders

- Fuel lines or tubes necessary for connections
- Gauge to indicate the fuel in the fuel tank

Q13. Draw PV and TS diagram of Otto cycle.

Ans:



P-V and T-S Diagram of Otto Cycle

Q14. Explain various components of a cooling system.

Ans:

1. Radiator

Radiator is an iron-shaped composers used to cool coolant. The working principle of the radiator is to move the temperature from water to free air.

In a radiator will be encountered some parts like

- Upper tank, is a tank to hold hot water or coolant from the engine.
- Lower tank, is a tank to hold coolant that has been cooled and ready to be sent back to the engine.
- The radiator core, is a flat-shaped channel that connects upper tank and lower tank space. The number of cores determines how much cooling power a radiator can carry.

The radiator fin, is a thin zinc formed between several cores on the radiator surface. This fins are used as heat receivers from cores while releasing heat into the air that passes through them.

2. The Radiator Cap

The radiator cap serves as the cover of the upper tank radiator while keeping the air pressure inside the cooling system

3. Radiator hoses

The function of radiator hoses are to supply radiator coolant from the engine to the radiator and back to the engine.

4. Thermostat

Thermostat is a part that have function like valve. This valve will close and open the port between water jacket and high temperature radiator hose. It works to speed up the engine to get the working temperature.

Thermostat works with close and opening the chanel of water jacket to the output chanel in the radiator hose. When the engine temperature is low, thermostat is fully closed.

5. Water jacket

Water shell or more familiarly known as water jacket serves as a place to absorb engine heat evenly. The name of the water jacket is just a term that leads to the water channel around the engine.

6. Cooling fan

The cooling fan works to take down the radiator temperatures.

7. Water pump

The water pump is only having one function, i.e. to circulate the coolant in order to move inside the cooling channel. The water pump is generally located inside the water jacket, when the thermostat closes this pump will cause a water flow in the water jacket that helps flatten the engine heat.

Section – C

06X04 = 24 Marks

Q15. Explain working of 4 stroke petrol engine.

Ans: As the name suggest the Four Stroke Petrol Engine uses a cycle of four strokes and petrol as the fuel.

The steps involved are as follows:

1) Intake Stroke: I this stroke the intake of fuel takes place. When the engine starts, the piston descends to the cylinder's bottom (BDC) from the top (TDC). Thus the pressure inside the cylinder reduces. Now the intake valve opens and the fuel and air mixture enters the cylinder.

2) Compression Stroke: This stroke is known as compression stroke because the compression of the fuel mixture takes place at this stage. When the intake valve closes (exhaust valve is already closed), the piston forced back to the top of the cylinder (TDC) and the fuel mixture gets compressed. The compression is around 1/8th of the original volume. An engine is considered more efficient if its compression ratio is higher.
3) Combustion/Power Stroke: Now in case of petrol engine when the fuel mixture compresses to the maximum value the spark plug produces spark which ignites the fuel mixture. The combustion leads to the production of high pressure gases. Due to this tremendous force the piston is driven back to the bottom of the cylinder (BDC). As the piston moves downwards, the crankshaft rotates which rotates the wheels of the vehicle.
4) Exhaust Stroke: As the piston moves to the bottom the exhaust valve opens up and due to the momentum gained by the wheel the piston is pushed back to the top (TDC) of the cylinder. The gases due to combustion are hence expelled out of the cylinder into the atmosphere through the exhaust valve.

The exhaust valve closes after the exhaust stroke and again the intake valve opens and the four strokes are repeated.

Q16. Explain Gravity, Pressure, Vacuum, Pump fuel feed system.

Ans: Gravity Fuel Feed System:

- *Fuel tank* is maintained at a place *higher than* that of the *carburettor.*
- Fuel flows due to the *gravitational force.*
- System does *not require* any *fuel pump.*
- It *is cheap* and *simple system.*
- *Fuel tank is directly connected to the carburettor.*

Pressure Fuel Feed System:

- A *pressure sealed tank* is used.
- The *pressure is created* in the tank by means of a *separate air pump.*

- For starting, the *pump is primed by cam* which produces *pressure in the tank* and the *fuel flows to the carburettor.*
- In this system the tank is *placed above or below* the carburettor.

Vacuum Fuel Feed System:

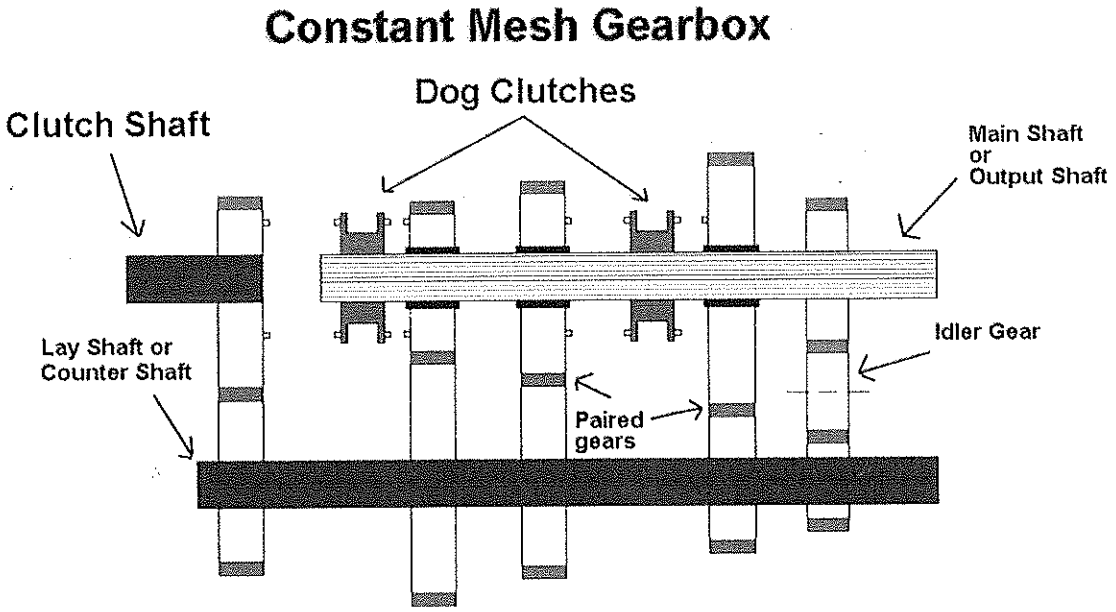
- The engine is used for *sucking the fuel* from the main task to the *auxiliary fuel tank* from where it flows by the *gravity* to the carburettor.

Pump Fuel Feed System:

- *Fuel pump* is used to *feed the fuel* from the fuel tank to the carburettor .
- The pump is driven either by the *camshaft or electrically* .
- In this system *the fuel tank* is placed at *any suitable position* in the vehicle.

Q17. Explain working of Constant mesh gearbox.

Ans:



Constant Mesh Gearbox was invented to overcome the limitations of the sliding mesh gearbox. In this gearbox, all the gears are always in mesh. The gear remains fixed and not slide like the sliding mesh gearbox.
In this gearbox, the sliding mesh was replaced with constantly meshed pairs of gears and the new shifting devices named dog clutches were introduced.

Working of Constant Mesh Gearbox:

- When the dog clutch is engaged with different gears of main shaft different gear ratios are obtained as gears of main shaft are always paired with gears of counter shaft to form different gear ratios.
- If the dog clutch is not in contact with any gear of main shaft the gears of main shaft rotates freely and does not rotates the main shaft as they are connected with main shaft using bearings.
- The main shaft rotates only when one of the dog clutch is engaged with any of the gear of the main shaft.
- Reverse gear is obtained in this gearbox using the same technique that was in sliding gearbox i.e using the idle gear between main shaft gear and counter shaft gear.

Different gear ratios in Constant Mesh Gearbox:

First Gear:
First gear is obtained in constant mesh gearbox when dog clutch gets engage by interference with the largest gear of main shaft which is in constant mesh with smallest gear of main shaft. This gear provides maximum torque and minimum speed to the main shaft.

Second Gear:
Second Gear is obtained when dog clutch gets engage with second largest gear of main shaft which is in a constant mesh with second smallest gear of lay shaft. This gear provides higher speed and lower torque than first gear.

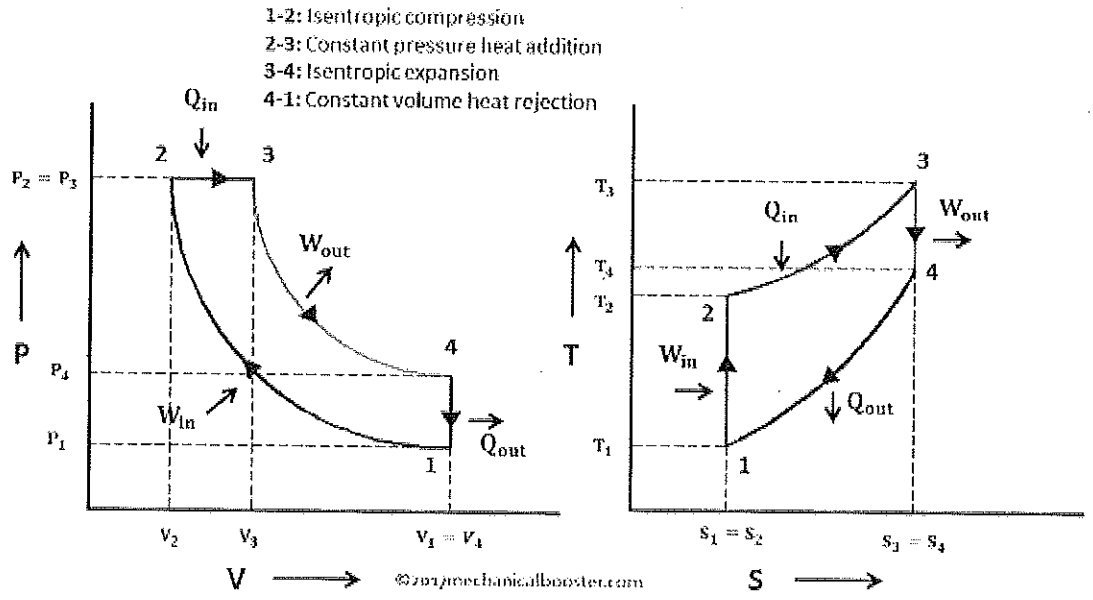
Third Gear:
Third gear is obtained when dog clutch engages with second smallest gear of main shaft which is in constant mesh with second largest gear of lay shaft. This gear more speed and less torque than second gear.

Fourth Gear:
This gear provides the highest or maximum speed in a vehicle using constant mesh gearbox. This gear is obtained when dog clutch engages with smallest gear of main shaft which is in constant mesh with largest gear of lay shaft.

Reverse Gear:
In this gear the vehicle goes in reverse direction. Like sliding mesh gearbox, an idler gear is also used in constant mesh gearbox between the main shaft gear and lay shaft gear to form reverse gear. Reverse gear is obtained when dog clutch engages with gear in main shaft which is paired with idler gear.

Q18. Write a note on diesel cycle.

Ans:



P-V and T-S Diagram of Diesel Cycle

Process 1-2: Isentropic Compression

In this process the piston moves from BDC to TDC and compression of air takes place isentropically. It means that during compression the entropy remains constant and there is no flow of heat out of the cylinder walls (non-conductors) happens. Here the air is

compressed so the pressure increases from P1 to P2, volume decreases from V1 to V2, Temperature increases from T1 to T2 and entropy remains constant (i.e. S1 = S2).

Process 2-3: Constant Pressure Heat Addition

In this process the, the hot body is kept in contact with the cylinder and heat addition to the air takes place at constant pressure. During this process, the piston rest for a moment at TDC. The pressure remains constant (i.e. P2 = P3), volume increases from V2 to V3, temperature increases from T2 to T3, entropy increases from S2 to S3.

Process 3-4: Isentropic Expansion

In this process, after heat addition, the expansion of air takes place isentropically and work is obtained from the system. The piston moves downward during this process and reaches to BDC. The pressure falls from P3 to P4, Volume increases from V3 to V4, the temperature falls from T3 to T4 and entropy remains constant (i.e. S3=S4).

Process 4-1: Constant Volume Heat Rejection

In this process, the piston rest at BDC for a moment and the cold body is brought in contact with the cylinder and the heat rejection takes place at constant volume. The pressure decreases from P4 to P1, temperature decreases from T4 to T1, entropy decreases from S4 to S1 and volume remains constant (i.e. V4 = V1).

A

Q.P. Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skill

Session: 2021-22 (Winter Semester)

B. Voc., 1th Semester

End-Sem Examination

Course Code : AUT1102 **Time : 2 Hour**

Course Name: Automotive wheel care and steering system **Max. Marks : 50**

Instructions:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries Four mark.
3. Answer all questions from section C, each question carries Six mark.

Section – A

10X01 = 10 Marks

1. Where we will find the toe Negative angle in Vehicle: -
   a. F1 cars
   b. Commercial cars
   c. Domestic cars
   d. None of the above
2. What safety Equipment is used to protect Hands from Severe cuts: -
   a. Cotton gloves
   b. Leather gloves
   c. PU coated Gloves.
   d. None of the above.
3. Which component is used to join Suspension column and anti-rolling bar?
   a. Linkage Rod
   b. Swing arm
   c. Ball joint
   d. None of the above
4. What is the use of universal joint in steering column?
   a. For Aesthetics.
   b. For higher efficiency.
   c. For prevention from accident.
   d. All of the above.
5. Why Symmetric treads are made on the tire?
   a. For grip
   b. For Smooth running
   c. Road terrain
   d. Option A, B, and C
6. What does "Seiton" means in 5s?
   a. learing.
   b. Set in order.
   c. standardize.
   d. None of the above
7. What does "R" Stands for in tire nomenclature?
   a. Radial
   b. Radius
   c. Range
   d. All of the above

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

8. Which mechanism is used for bead breaking in tire changer machine?
   a. Electrical.
   b. Mechanical.
   c. Pneumatic.
   d. None of these.

9. What is the full form of TWI?
   a. Tread wear indicator.
   b. Tire wear indicator.
   c. Tread worn indicator.
   d. Tire worn indicator.

10. Which angle cannot be adjusted with the help of alignment?
   a. Caster
   b. Camber
   c. Toe angle
   d. None of the above

Section – B

04X04 = 16 Marks

1. What are the components use in steering column? Draw a diagram of steering system.
2. How we interchange the tires according to run of vehicle? Explain with labelled diagram.
3. Name two types of steering system. Explain them with labelled diagram.
4. What are the differences between Flat tire and Radial Tire?

Section – C

04X06 = 24 Marks

1. Explain the physics behind Pascal's law? Draw diagram.
2. Explain the working principle of hydraulic steering system with diagram.
3. Explain castor, camber and toe angle?
4. Why toe rod is adjustable in steering mechanism? What will happen if toe rod has no adjustable limits?

A.K. Set-A

Registration No.: .....

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School of Automotive Skill

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Section – A

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10. Which angle cannot be adjusted with the help of alignment?

a. Caster
b. Camber
c. Toe angle
d. None of the above

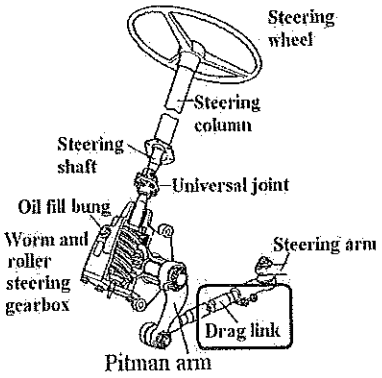
Section – B

04X04 = 16 Marks

1. What are the components use in steering column? Draw a diagram of steering system.

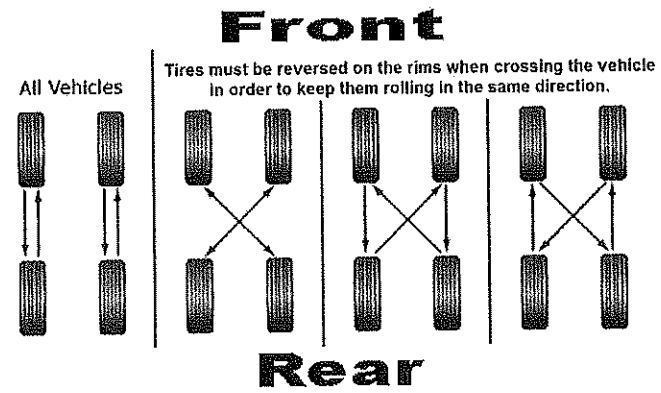
Ans. Steering Wheel.

- Steering Column & Shaft.
- Universal Joint.
- Steering Gear Box.
- Steering Pump.
- Linkage (Tie Rod).
- Rubber Bush.



2. How we interchange the tires according to run of vehicle? Explain with labelled diagram.

Ans.



3. Name two types of steering system. Explain them with labelled diagram.

Ans. Two types of steering system are as follows:

1. Hydraulic steering system

   There are a couple of key components in power steering in addition to the rack-and-pinion or recirculating-ball mechanism.

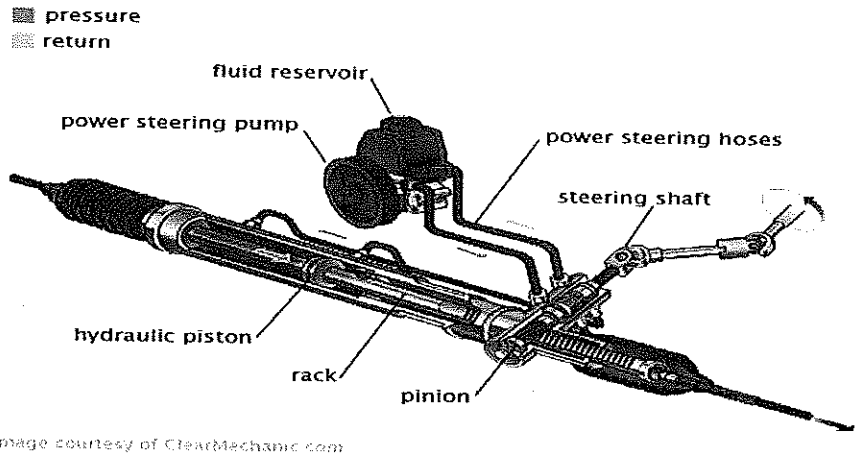


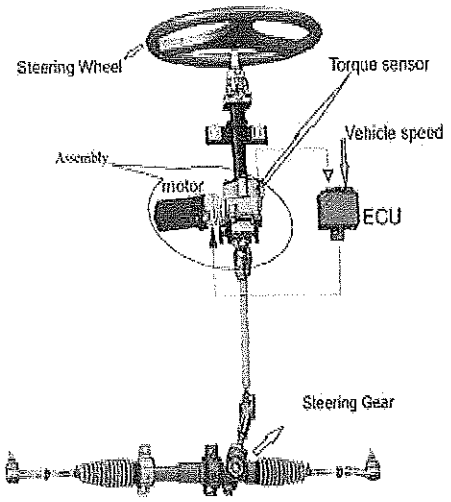
Image courtesy of ClearMechanic.com

In this system fluid pressure from the pump is used to push against a piston. When the wheel is turned, pressure flows to one side and the piston moves. The piston is attached to the steering gears. Hydraulic pressure does the work, and the driver controls the direction by turning the steering wheel.

2. Electric steering system

   A hybrid type of electronic power steering has been in place for some time now, but that included the use of an electric motor to drive a hydraulic pump.

   The new version of EPS is all electronic. The system works by incorporating information with the EPS control unit, EPS motor, reduction gear and torque sensor.



4. What are the differences between Flat tire and Radial Tire?

Ans. **Run-flat tyre:**

Run flat tyres are designed in such a way to remain operational in the event of a puncture or a severe loss of air pressure allowing you to make it to safety, be that so you can return home or to your nearest tyre fitter.

Run flat tyres also reduce the risk of tyre blow outs which could be dangerous and a risk to the safety of the driver and other road users if they occur at speed.

How run flat tyres work:

Run flat tyres have much thicker, reinforced sidewalls which means they can be driven on for a short time after picking up a puncture. The tyre can temporarily maintain its shape and strength even in the event of a total loss of air pressure.

Run flat tyres have obvious safety benefits as the tyre is still able to be driven on in the event of a puncture allowing you, the driver, to stay in control of the vehicle. This isn't to say run flat tyres do not need air and in the unfortunate event of a puncture you should seek help as soon as possible. It is advised that you should travel no more than 50 miles on a punctured run flat tyre.

Radial:

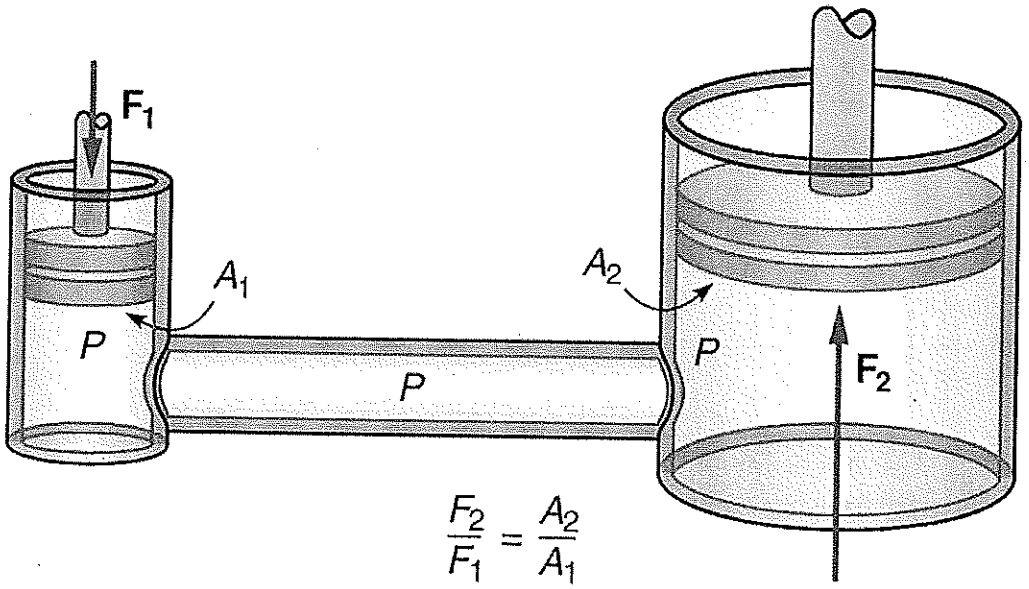
Radial tyres are marked with the letter R. Radial tyres are constructed with the cord plies positioned at a 90-degree angle to the direction of travel to give the tyre additional strength. Almost every new tyre manufactured today is a radial tyre.

Section – C

04X06 = 24 Marks

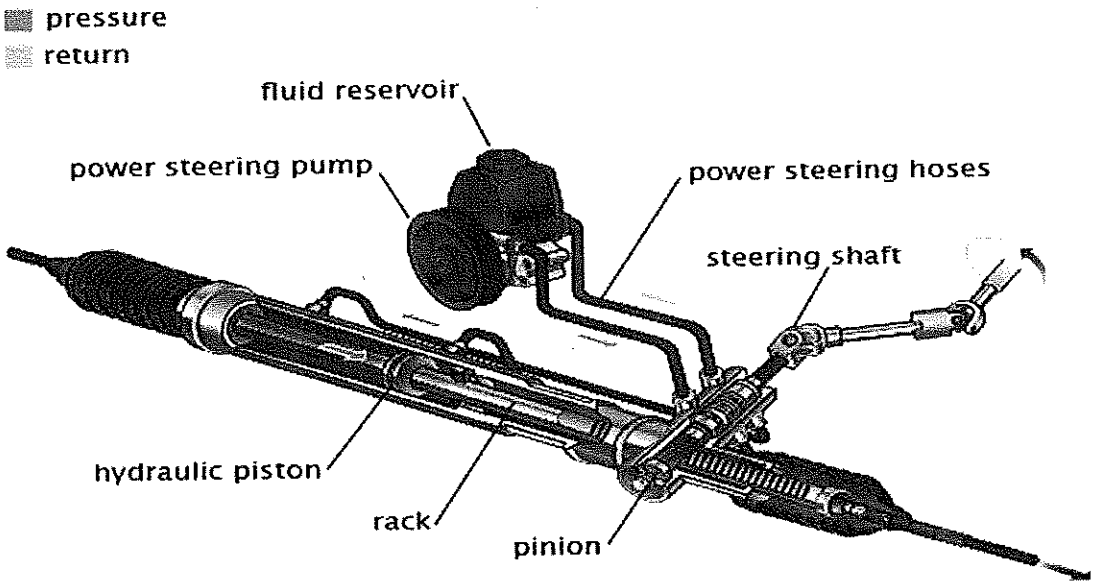
1. Explain the physics behind Pascal's law? Draw diagram.

Ans. Pascal's law is the basis of hydraulic drive systems. As the pressure in the system is the same, the force that the fluid gives to the surroundings is therefore equal to pressure × area. In such a way, a small piston feels a small force and a large piston feels a large force.

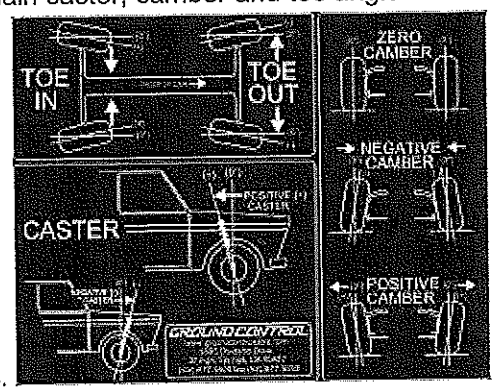


2. Explain the working principle of hydraulic steering system with diagram.

Ans. . Hydraulic power steering systems work by using a hydraulic system to multiply force applied to the steering wheel inputs to the vehicle's steered (usually front) road wheels. A double-acting hydraulic cylinder applies a force to the steering gear, which in turn steers the roadwheels.



3. Explain castor, camber and toe angle?

Ans. 

4. Why toe rod is adjustable in steering mechanism? What will happen if toe rod has no adjustable limits?

Ans. The most common steering designs use an inner tie rod attached to the steering gear and an outer tie rod that connects the inner tie rod to the wheel assembly. The length of **thread that attaches the inner and outer tie rods is adjustable** and is used to set a car's front wheel alignment. Tie rod ends are used **every time you use your steering wheel,** so they can go bad over time due to wear and tear. In some vehicles, they can last for many years, while in other vehicles they may not have to be replaced at all.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set B

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skill

Session: 2021-22 (Winter Semester)

B. Voc., 1st Semester

End-Sem Examination

Course Code : AUT1102 **Time : 2 Hour**

Course Name : Automotive wheel care and steering system **Max. Marks: 50**

Instructions:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries Four mark.
3. Answer all questions from section C, each question carries Six mark.

Section – A

10X01 = 10 Marks

1. What does "R" Stands for R16 in tire nomenclature?
   a. Radial
   b. Radius
   c. Range
   d. All of the above
2. Where we will find the toe positive angle in Vehicle: -
   a. F1 cars
   b. Aircraft
   c. Domestic cars
   d. None of the above
3. Which angles can be adjusted with the help of alignment?
   a. Caster
   b. Camber
   c. Lag angle
   d. None of the above
4. What safety Equipment is used to protect Hands from oil infusion: -
   a. Cotton gloves
   b. Leather gloves
   c. PU coated Gloves.
   d. None of the above.
5. What is the use of universal joint in Propeller shaft?
   a. For Aesthetics.
   b. For higher efficiency.
   c. For prevention from accident.
   d. For providing flexibility.
6. What does "Seiri" means in 5s?
   a. learning.
   b. Sort.
   c. standardize.
   d. None of the above
7. Which component is used to join Suspension column and Wheel Rotor?
   a. Linkage Rod
   b. Swing arm
   c. Ball joint
   d. Knuckle
8. Why block treads are wear from lower back?
   a. Soft blocks
   b. Heavy load on tread blocks
   c. Road terrain
   d. Option A, B, and C

9. Which source of energy is used in turn table in tire changer machine?
    a. Electrical.
    b. Mechanical.
    c. Pneumatic.
    d. None of these.

10. How TWI is named in Tire Nomenclature?
    a. Tread wear indicator.
    b. Tire wear indicator.
    c. Tread worn indicator.
    d. Tire worn indicator

Section – B

04X04 = 16 Marks

1. What are the components use in steering Mechanism? Draw a diagram of steering system.
2. Why tire interchange is required in Vehicle? Explain the defects occur in tire if interchanging not done.
3. Describe Hydraulic and Electric steering system with the help of labelled diagram.
4. What are the differences between Tread tire and Treadles Tire (slick tire)?

Section – C

04X06 = 24 Marks

1. Explain the physics working in Hydraulic steering system? Draw diagram.
2. Explain the Role of Balancing in vehicle.
3. Explain All the Alignment Angle with Diagram?
4. Why Rack and pinion is directly connected to toe rod? What will happen if toe rod has no adjustable limits?

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School of Automotive Skill

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   a. Soft blocks
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   d. Option A, B, and C

S.d.B

Registration No.: .....

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Section – B

04X04 = 16 Marks

1. What are the components use in steering Mechanism? Draw a diagram of steering system.
Ans. Steering Wheel.

- Steering Column & Shaft.
- Steering lock nut
- Rack and pinion
- Steering pump
- Hydraulic fluid
- Ball joints
- Rubber dampers
- Universal Joint.
- Steering Gear Box.
- Steering Pump.
- Linkage (Tie Rod).
- Rubber Bush.

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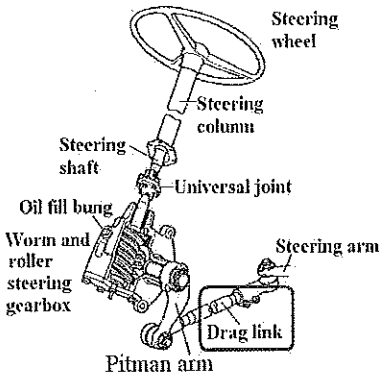

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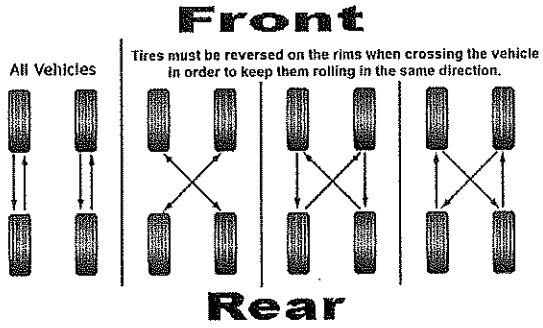
Ans.



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Ans. Two types of steering system are as follows:

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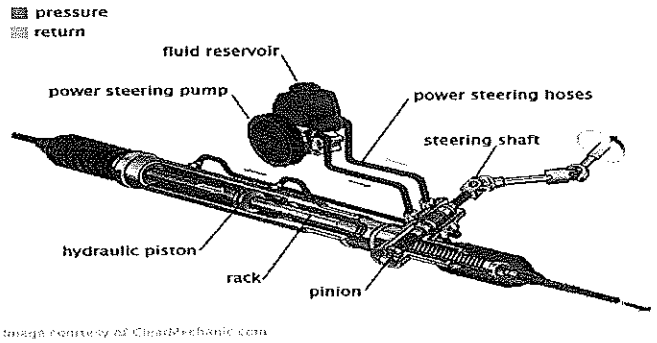

   In this system fluid pressure from the pump is used to push against a piston. When the wheel is turned, pressure flows to one side and the piston moves. The piston is attached to the steering gears. Hydraulic pressure does the work, and the driver controls the direction by turning the steering wheel.

2. Electric steering system

   A hybrid type of electronic power steering has been in place for some time now, but that included the use of an electric motor to drive a hydraulic pump.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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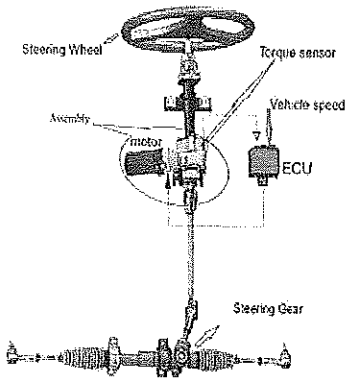


4. What are the differences between Tread tire and Treadles Tire (slick tire)?

Ans. On a treaded tire, those "tread voids" give the tire room to warp and, because the rubber "springs back" with less energy as it leaves the road, you're losing efficiency to rolling resistance. Slick tires deform less due to their lack of treads, and so you experience less rolling resistance as well

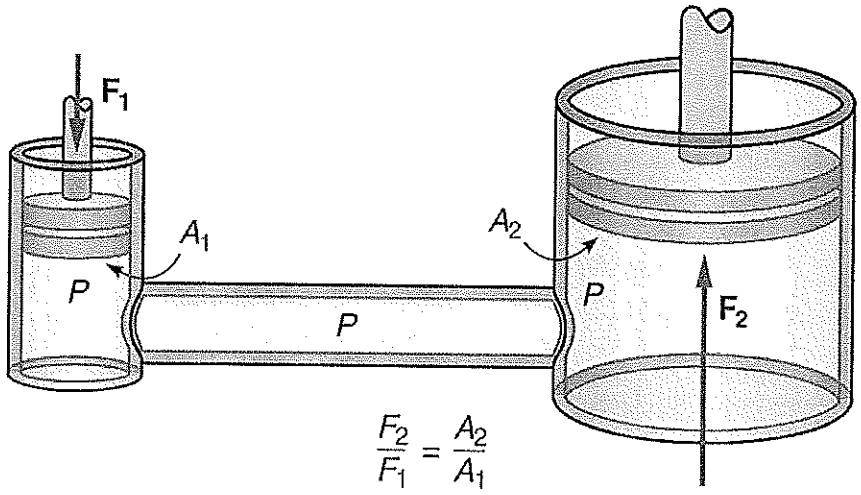
Slick tyres can provide far more traction than grooved tyres on dry roads, but typically have far less traction than grooved tyres under wet conditions. Wet roads severely diminish the traction because of aquaplaning due to water trapped between the tyre contact area and the road surface.

Section – C

04X06 = 24 Marks

1. Explain the physics working in Hydraulic steering system? Draw diagram.

Ans. Pascal's law is the basis of hydraulic drive systems. As the pressure in the system is the same, the force that the fluid gives to the surroundings is therefore equal to pressure × area. In such a way, a small piston feels a small force and a large piston feels a large force.

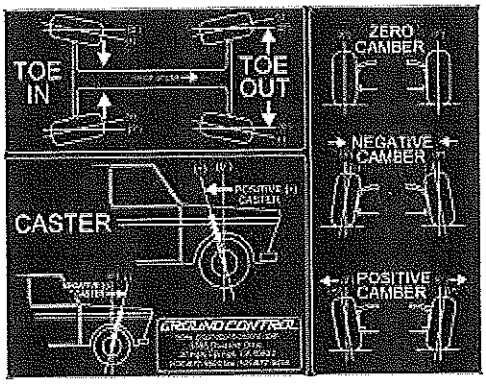


2. Explain the Role of Balancing in vehicle.

Ans. When all areas of the wheel-tire unit are as equal in weight as possible, the tire will roll smoothly. This helps it wear evenly, for longest life. Balancing also contributes to ride comfort: Imbalanced tires will wobble or hop up and down, which causes vibration. often confused with

wheel alignment, tire balancing is important for assuring the best performance from a vehicle, and for gaining the longest service life from tires. Tire balancing provides a smooth ride and assures even tire wear by properly adjusting the tire weight distribution around the vehicle.

3. Explain All the Alignment Angle with Diagram?
   Ans.



4. Why Rack and pinion is directly connected to toe rod? What will happen if toe rod has no adjustable limits?
   Ans. The most common steering designs use an inner tie rod attached to the steering gear and an outer tie rod that connects the inner tie rod to the wheel assembly. The length of thread that attaches the inner and outer tie rods is adjustable and is used to set a car's front wheel alignment. Tie rod ends are used every time you use your steering wheel, so they can go bad over time due to wear and tear. In some vehicles, they can last for many years, while in other vehicles they may not have to be replaced at all.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

OP - Set A

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: AUT1103 **Time: 2 Hours**

Course Name: Automotive Body Repairs **Max. Marks: 50**

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

10X01 = 10 Marks

Q.1. Out of the following option which one is not a body panel?
a. Door
b. Wheel
c. Fender
d. Bumper

Q.2. Which of the following is not a shearing process?
a. Punching
b. Drawing
c. Blanking
d. Parting

Q.3. The velocity of plasma stream during plasma cutting operation is close to
a. 200m/s
b. 400m/s
c. 600m/s
d. 800m/s

Q.4. The non-consumable electrode is used in which of the following welding process?
a. MMAW
b. MIG
c. TIG
d. MAG

Q.5. Which one is not shielding gas-type welding?
a. MMAW
b. TIG
c. MIG
d. MAG

Q.6. Solder is an alloy of
a. Brass and Copper
b. Aluminium and Zinc
c. Tin and Lead
d. Aluminium and Brass

Q.7. What is the color code of the prohibition sign?
a. Red
b. Yellow
c. Black
d. Blue

Q.8. Which of the car does not have a D pillar?
a. Saloon
b. Wagon
c. Estate
d. MPV

Q.9. Two-door car that generally has either 2 seats or 4 seats in a 2+2 configuration is known as

a. Convertible
b. Cabriolet
c. Coupe
d. Wagon

Q.10. The front section of the car is also known as

a. Dog house
b. Cat house
c. Greenhouse
d. None of the above

Section – B

04X04 = 16 Marks

Q.11. .What do you understand about the paint-less dent repair system?
Q.12. Explain the working principle of MMAW along with its application?
Q.13. What are the various types of car body sections? Name three parts that fall in each body section.
Q.14. What is Plasma Cutting? Explain components of plasma cutting.

Section – C

04X06 = 24 Marks

Q.15. Write a short note on the following:
a. 5S theory
b. Brazing
c. Bending
Q.16. Define Dent and briefly explain various types of dents.
Q.17. Explain the working TIG with a suitable diagram.
Q.18. Explain any four shearing processes.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

A.K. Set A

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: AUT1103 **Time: 2 Hours**

Course Name: Automotive Body Repairs **Max. Marks: 50**

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

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a. Dog house
b. Cat house
c. Green house
d. None of the above

Section – B

04X04 = 16 Marks

Q.11. What do you understand about the paint less dent repair system?

Ans.
During PDR, specialist tools are used to press and massage the damaged panel from behind. As a result, the dented metal is pushed out, to restore its original shape without needing paint. This repairs the bodywork while maintaining the manufacturer's paintwork finish.

Q.12. Explain the working of principle of MMAW along with its application?
Ans.

- When the Current flows through the cables from the power source (AC/DC), the circuit is completed when the electrode tip comes in contact with the surface of the work piece.
- The heat is simply generated at the meeting point between the electrode and the work pieces (arc).
- This arc melts the base metal and the core wire of the electrode to form weld pool.

Q.13. What are the various types of car body section? Name three parts falls in each body section.
Ans. Car body section are divided into major three section:

- Front section- Front section includes everything between front bumper and fire wall. Also called nose section, front clip, "doghouse"
- Mid-section- Center section or Mid-section includes body parts that form passenger compartment. Also called a "greenhouse"
- Rear section- Rear section also called tail section, rear clip, "cathouse"

Q.14. What is Plasma cutting? Explain components of plasma cutting.

- Ans. Plasma arc cutting is a process resulting from ionizing a column of gas (argon, nitrogen, helium, air, hydrogen or their mixture) with extreme heat of an electric arc.
- The ionized gas along with the arc is forced through a very small nozzle orifice, resulting into a plasma stream of high velocity (up to 600 m/sec) and high temperature (up to 20000° k).
- When this high speed is reached, high temperature plasma stream and electric arc strike the workpiece, and ion in the plasma recombine into gas atoms and liberate a great amount of latent heat.
- This heat melts the workpiece, vaporizes part of the material and the balance is blasted away in the form of molten metal through the heat.

Section – C

04X06 = 24 Marks

Q.15. Write a short note on the following:

a. 5S theory
b. Brazing
c. Bending

Ans.

A.

5S is defined as a methodology that results in a workplace that is clean, uncluttered, safe, and well organized to help reduce waste and optimize productivity. It's designed to help build a quality work environment, both physically and mentally.

Seiketsu: standardize

Seiri: organize

Seiton: orderliness

Seiso: cleanliness

B.

- Brazing is when a filler metal or alloy is heated to its melting temperature above 450 °C.
- In this case only filler metal melts, there is no melting of workpiece metal.
- But this process needs preheating of base metal.

C.

To curve out of a straight line or position The road bends to the left. tree limbs bending under the weight of the snow bent down to pick up a piece of paper bending double with pain specifically: to incline the body in token of submission bend to the queen. 2: to apply oneself vigorously bending to their work.

Q.16. Define Dent and briefly explain various types of dents.

- Ans. **Car Dings** – caused by smaller objects and are easy to repair as long as no damage to the vehicles paint has occurred.
- **Round Dents** – caused from hailstones or a similarly round object (football, baseball, basketball, etc.) hitting the car and causing a dimple on the door, bumper, roof or hood.
- **Crease Type Dents** – Crease dents usually bends and tears the car's metal. When an automobile acquires a crease type dent, it is possible to lose the metal memory making it hard to repair back to original shape.

Q.17. Explain the working TIG with a suitable diagram.

- Ans. Tungsten Inert Gas Welding (TIG Welding), also known as Gas Tungsten Arc Welding(GTAW).
- It is an Arc welding method that uses a non-consumable tungsten electrode to weld two or more work pieces.
- It is very much similar to Metal Inert Gas(MIG) Welding.
- Commonly used to weld thin sections of stainless steel and non-ferrous metals such as aluminum, magnesium, and copper alloys.

Q.18. Explain any four shearing process?

Ans.
Shearing is the process of separating the sheet metal into two or more pieces, normally by cutting along a line. Commonly used to cut into rectangular shapes but can produce other shaped parts.

Blanking & Fine Blanking Operation
Blanking is the process of cutting out a predefined shape from the sheet metal; the part that is punched out is known as the blank and is the required product, the metal left behind is waste. Fine blanking is similar but provides more accuracy, with smooth edges and no distortion by applying clamping force and using small and close tolerances.

Punching Operation
Punching is the same process as blanking, but the required product is the metal left behind, rather than the part that is punched out. It uses the same punching press and punch and die operation, it is just the opposing desired product.

Piercing Operation
Piercing is the process of cutting small, cylindrical holes in the sheet metal whilst removing very little quantity of material. This is done by using a bullet shaped punch during the punch and die operation.

Perforating Operation
Perforation is a similar process to piercing, but the holes are not usually round in shape. Perforating commonly consists of more than one hole that has been punched in a pattern.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester) QP Set B

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: AUT1103 **Time: 2 Hours**

Course Name: Automotive Body Repairs **Max. Marks: 50**

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

10X01 = 10 Marks

Q.1. The number of body panels in a car is....
a. 10
b. 11
c. 13
d. 12

Q.2. Which of the following is a forming process?
a. Punching
b. Stretching
c. Blanking
d. Parting

Q.3. Which one is not a body type?
a. Convertible
b. Cabriolet
c. Coupe
d. Monocoque

Q.4. The Middle section of the car is also known as
a. Dog house
b. Cat house
c. Greenhouse
d. None of the above

Q.5. What is the color code of the warning sign?
a. Blue
b. Green
c. Yellow
d. Red

Q.6. The full form of ATV is...
a. All transfer vehicles
b. All-terrain vehicle
c. Active transfer vehicle
d. Active terrain vehicle

Q.7. In which of the following operation the sheet is sheared into two or more pieces.
a. Slitting
b. Lancing
c. Parting
d. Forming

Q.8. The non-consumable electrode is used in which of the following welding process?
a. MIW
b. MMAW
c. TIG
d. MAG

Q.9. Which one is not related to Soldering?

a. Solder
b. Flux
c. Shielding gas
d. None of the above

Q.10. Which of the following is not used as filler material in brazing?

a. Copper
b. Magnesium
c. Lead
d. None of the above

Section – B

04X04 = 16 Marks

Q.11. Explain backbone and Monocoque chassis and enlist the difference between them.
Q.12. What are the advantages of MIG welding?
Q.13. Explain soldering and brazing.
Q.14. What are the various types of car body sections? Name three parts that fall in each body section.

Section – C

04X06 = 24 Marks

Q.15. Write a short note on the following:
a. Blanking
b. Perforating
c. Parting
Q.16. Define TIG and briefly explain the working of TIG.
Q.17. Explain the working principle of the plasma cutter with a suitable diagram.
Q.18. Briefly explain the following processes concerning sheet metal working:
a. Shearing process
b. Forming process
c. Finishing process

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

A.V. Set B

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: AUT1103 **Time: 2 Hours**

Course Name: Automotive Body Repair **Max. Marks: 50**

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

10X01 = 10 Marks

Q.1. The number of body panels in a car is....
a. 10
b. 11
c. 13
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Q.2. Which of the following is a forming process?
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c. Blanking
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c. Shielding gas
d. None of the above

Q.10. Which of the following is not used as filler material in brazing?

a. Copper
b. Magnesium
c. Lead
d. Silver

Section – B

04X04 = 16 Marks

Q.11. Explain backbone and Monocoque chassis and enlist the difference between them.

- Monocoque Chassis is a one-piece structure that prescribes the overall shape of a vehicle.
- This type of automotive chassis is manufactured by welding floor pan and other pieces together

Q.12. What are the advantages of MIG welding?

- Ans. Higher welding speeds
- Greater deposition rates
- Less post welding cleaning (e.g. no slag to chip off weld)
- Better weld pool visibility

The process is easily automated

Q.13. Explain soldering and brazing.

- Ans. Soldering is normally done by melting the solder with a soldering iron and applying it to the two metals that are going to be joined together.
- The filler metal used in the process is called solder.
- Soldering is done temperature below 450°C

Q.14. What are the various types of car body section? Name three parts falls in each body section.

Ans. Car body section are divided into major three section:

- Front section- Front section includes everything between front bumper and fire wall. Also called nose section, front clip, "doghouse"
- Mid section- Center section or Mid section includes body parts that form passenger compartment. Also called a "greenhouse"
- Rear section- Rear section also called tail section, rear clip, "cathouse"

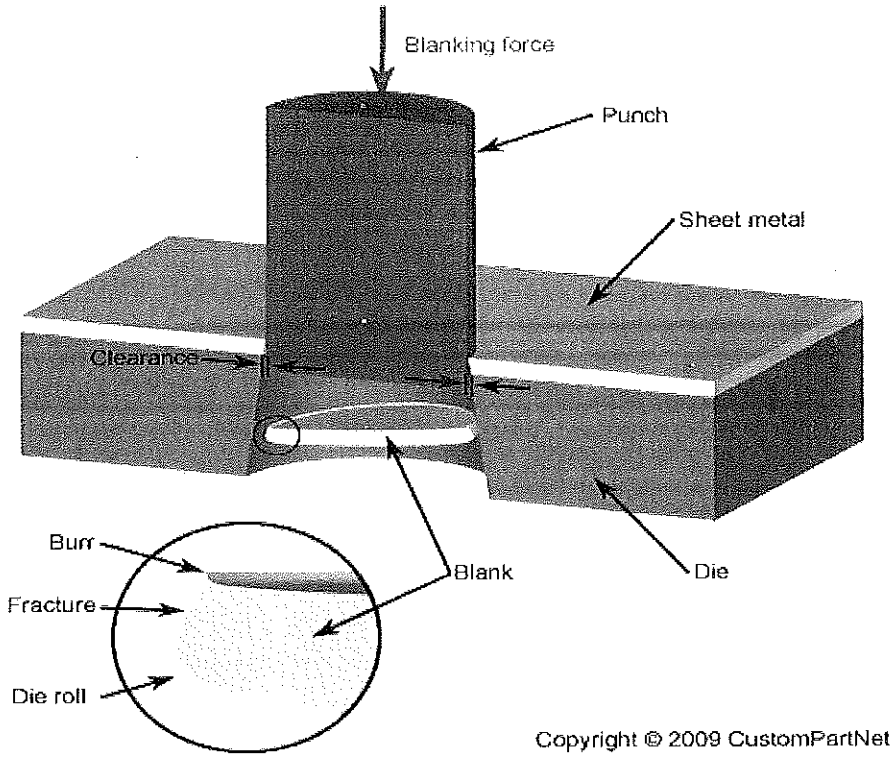
Section – C

04X06 = 24 Marks

Q.15. Write a short note on the following:

a. Blanking
b. Perforating
c. Parting

- Ans. Shearing process using a die and punch where the exterior portion of the shearing operation is to be discarded.



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- Ans. Plasma arc cutting is a process resulting from ionizing a column of gas (argon, nitrogen, helium, air, hydrogen or their mixture) with extreme heat of an electric arc.
- The ionized gas along with the arc is forced through a very small nozzle orifice, resulting into a plasma stream of high velocity (up to 600 m/sec) and high temperature (up to 20000° k).
- When this high speed is reached, high temperature plasma stream and electric arc strike the workpiece, and ion in the plasma recombine into gas atoms and liberate a great amount of latent heat.
- This heat melts the workpiece, vaporizes part of the material and the balance is blasted away in the form of molten metal through the heat.

Q.18. Briefly explain the following processes concerning sheet metal working:

a. Shearing process
b. Forming process
c. Finishing process

Ans. Sheet metal processes can be broken down into two major classifications and one minor classification.

1. **Shearing processes** -- processes which apply shearing forces to cut, fracture, or separate the material.

2. **Forming processes** -- processes which cause the metal to undergo desired shape changes without failure, excessive thinning, or cracking. This includes bending and stretching.
3. **Finishing processes** -- processes which are used to improve the final surface characteristics.

Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: AUT1104 **Time: 2 Hours**

Course Name: Automotive Spray Painting **Max. Marks: 50**

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

10X01 = 10 Marks

Q.1 Which internal body organ is affected most from paint material containing organic solvents & 2K hardener?

a. Liver
c. Heart
b. Lungs
d. Stomach

Q.2 What is the changing frequency of Floor Filter of Spray booth ?

a. After 100 hrs.
c. After200-250 hrs.
b. After 200 hrs.
d. None.

Q.3 What is the recommended intensity of light inside the paint booth?

a. 100-200 lux
c. 1000-1500 lux
b. 500-800 lux
d. 1500-2000 lux

Q.4 Which type of paint is environment friendly and also safe for health of paint technician?

a. Waterborne paint
c. 2K paint
b. NC Paint
d. Synthetic paint

Q.5 What is the mixing ratio of body filler and hardener?

a. 100grm: 20grm
c. 100gms: 2mg
b. 100gms: 2gms
d. None of the above

Q.6 Which type of sanding process is recommended by OEM for refinish painting?

a. Dry sanding
c. Both (a) & (b)
b. Wet sanding
d. None of the above

Q.7 Which nozzle size spray-gun is required for clear coat application?

a. 1.2 mm
c. 1.6 mm
b.1.4 mm
d. 1.8 mm

Q.8 Which type of chemical is found in hardener?

a. Isocynate
b. Butane
c. Xylene
d. None of the above

Q.9 What should be the angle of spray-gun with respect to the panel while spraying paint?

a. 15 degree
b. 60 degree
c. 45 degree
d. 90 degree

Q.10 Which colors are known as primary colors?

a. Red, yellow, blue
b. Green, orange, red
c. Blue, violet, green
d. None of the above

Section – B

04X04 = 16 Marks

Q.1 Write any four differences between a primer and a primer-surfacer?

Q.2 Write a short note on:

a. DFT
b. Duel action sander

Q.3 Write the do's and don'ts for paint booth.

Q.4 What is a body filler? What are the different types of body filler?

Section – C

04X06 = 24 Marks

Q.1 Explain different types of hazards associated with an automotive paint shop.

Q.2 What is process of dry sanding? Explain different of types of dry sanding.

Q.3 Explain different types of sanding disc based on application.

Q.4 What is a spray gun? Explain different types of spray guns.

Set A, AK.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

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Section – A

10X01 = 10 Marks

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c. Blue, violet, green
b. Green, orange, red
d. None of the above

Section – B

04X04 = 16 Marks

Q.1 Write any four differences between a primer and a primer-surfacer?

Ans.

1.Primer provides antirust coat where Surfacer provides adhesion.

2.Primer is non sand able where Surfacer is sandable

3.Tinting is not done in primer but can be done in surfacer.

4. Primer covers bare metal where surfacer works as sealer for primer.

Q.2 Write a short note on:

a. DFT

b. Duel action sander

Ans: DFT

- It is a coating thickness gauge used to measure dry film thickness.
- It is most critical measurements because of its impact on the coating process, quality and cost.

Or

- A coating thickness gauge (also referred to as a paint meter) is used to measure dry film thickness. Dry film thickness measurements can be used to evaluate a coating's expected life, the product's appearance and performance, and ensure compliance with a host of International Standards.

Q.3 Write the do's and don'ts for paint booth.

Ans:

Do's:

1. While switch on the paint booth, please ensure that voltage is above 380volts.
2. Keep the paint booth and its surroundings clean.
3. Sanding is not advisable in surrounding of paint booth.

4. Open the main door only for vehicle entry.
5. For all other movements use only service door.
6. Please insure the vehicle and technician dress must be dust free.
7. Switch off the main supply after completion of work.

Don'ts:

1. Don't store paints and accessories inside paint booth.
2. Don't use any cotton waste inside paint booth.
3. Don't spray the paint/test the spray gun on floor filter.
4. Don't throw the west paint material on the floor filter.
5. Don't use compressed air for cleaning the paint booth walls and floor.
6. Don't allow sparks inside the paint booth.
7. Don't open the main door during painting.

Q.4 What is a body filler? What are the different types of body filler?

Ans: Body Filler:

It is a mixture that contains fiberglass resin (polyester) and talc.

1. The resin provides adhesion.
2. The talc makes the material flow smoothly.
3. The main solvent in the filler is styrene.
4. It uses a catalyst to Harden which is MEK (methyl ethyl ketone)

There are three types of putty/body fillers: -

1. Standard
2. Mid-range
3. Premium

Section – C

04X06 = 24 Marks

Q.1 Explain different types of hazards associated with an automotive paint shop.

Ans: Interior Painting Safety Hazards:

- Inadequate ventilation is the first and foremost hazard when painting indoors.
- Take care when placing appropriate warning signs for people place them at a level and in a position where the majority of people can see them easily.

Fire and explosion hazards:

- One of the major safety concerns associated with spray application is the combustible, flammable vapours and mists.
- It is important to ensure that all potential sources of ignition have been removed prior to spraying flammable and combustible products.

Health effects:

- Overexposure to a substance like primer or paint when spraying them means that too much has been breathed in, swallowed or absorbed.
- The possible health effects of overexposure to these products can vary depending on the chemicals they contain.

The main health effects from exposure to these solvents can include:

1. Eye and skin irritation
2. Respiratory tract irritation;
3. Dermatitis/Skin diseases
4. Drowsiness
5. Vomiting.

Potential sources of ignition include:

1. Open flames (work space heating units)
2. Cutting and welding torches
3. Gas fired heaters
4. Electrical outlets and lighting
5. Static electricity
6. Smoking

Q.2 What is process of dry sanding? Explain different of types of dry sanding.

Ans. Dry sanding is the process and Reduce down the layer by removing with the help of sander.Dry sanding is the process where layer removal takes place without any lubrication part. Dry sanding takes place in different modes which are as follows;-

1. Single acting sanding
2. Dual Acting sanding
3. Hand block sanding
4. Sanding outward to inwards
5. Zig Zag pattern sanding.

Q.3 Explain different types of sanding disc based on application.

Ans:

: P- 80-Grit

In contrast to sandpapers in the 32 to 40-grit range, 80-grit sandpaper is not terribly rough on the surface of vehicle panels. As such, 80-grit can be applied to the hood, roof or door panels of a car or van without leaving rough streaks. However, light streaking will still be present if you apply heavy force. Therefore, the use of 80-grit sandpaper on a vehicle will usually need to be followed by a smooth-out sanding with a higher-grit sandpaper. Ultimately, 80-grit is best used on vehicles that need considerable sanding in select areas, but without the roughness of lower-grit options.

320-Grit

At this point along the wet sandpaper grit chart, the options are ideal for smooth buffering as well as the removal of thick paint. With a 320-grit piece of sandpaper, paint should come off the vehicle with evenly applied strokes of a disc. By the time you work a 320-grit through the paint, the shiny, silvery lustre of the metal should come glaring to the surface. Thanks to the strength of 320-grit sandpaper, it's a good option for cars or vans that have been treated with enamel or other hard coats. A perfect example of how 320-grit sandpaper can work is when you want to turn a blue van red. Before you apply the new paint job, you'll want to sand away the older blue coats. With 320-grit, the blue should come off smoothly and easily. Once all of the panels have been stripped, the surfaces should be smooth enough for a primer coat of the new paint. Alternately, 320-grit could make it really easy to change out the paint on a single panel, such as a scratched door. As such, when people ask what grit sandpaper to use when painting a car, 320-grit is a good choice for large automobiles with thick coats.

400-Grit

When it comes to finishing, the most popular option is 400-grit sandpaper. Before the new coat of paint is applied, 400-grit paper makes prepping smooth and easy. If there are any rough areas spotted along the surface or edges of a given panel, 400-grit could be used to smooth the metal out in a way that lower grits might be incapable of. The best thing about 400-grit sandpaper is that, despite its strength, it's fine enough to handle challenges along an auto-body surface without roughing up the metal. When the question arises about what grit sandpaper is appropriate for a wet sanding primer, 400-grit is sometimes stressed as better for wet sanding than for dry sanding. The reasoning here is that, when dry, 400-grit tends to leave sand on the subject, which can be troublesome as far as finishing work is concerned. Therefore, while 400-grit is one of the most popular grits of sandpaper, it's often used exclusively for wet sanding. As such, 400-grit is one of the most widespread options on the wet sandpaper grit chart.

600-Grit

When it comes to correcting errors in soft layers of paint, 600-grit sandpaper makes the task relatively easy. Likewise, if paint runs out before a panel has been fully covered, the edges of the paint can be sanded smooth with a wet 600. Basically, 600-grit sandpaper is a perfect option when you need to salvage the panels after a paint job has hit a snag. When you consider all the time and money that can slip down the drain when a vehicle-painting project doesn't go as planned, 600-grit sandpaper is a lifesaver because it reduces complications. For example, you might be painting a car with a unique color that has to be specially ordered, but end up with a bad passenger door or roof due to the paint running out when you're 93-percent finished. In an earlier set of circumstances, you might have needed to do the paintjob over again, yet still be at risk of running out along another part of the vehicle. With 600-grit sandpaper, it needn't be as costly or time-consuming, because the raw edges of an unfinished

paint job can be sanded back for a recoat and will therefore be ready by the time a new supply of the same paint arrives.

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A spray gun is a piece of equipment which you use to spray paint under pressure onto a surface.

The spray gun is the most popular type of spray application equipment use

• An spray gun is a tool which uses compressed air to atomise paint and to apply it to a surface.

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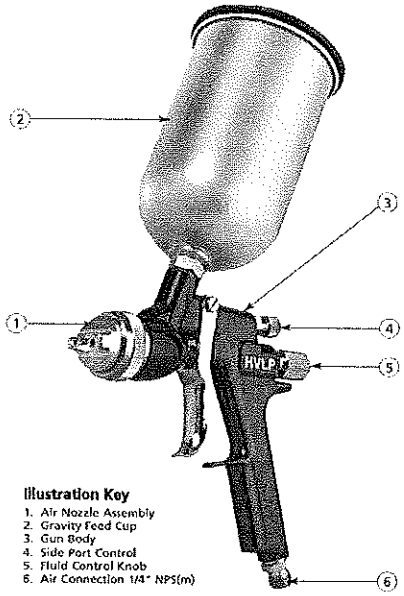

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8. 10 psi.
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19. still continues for few more inches.
20. The stroke is then reversed for the return
21. spray pass.
22. Each spray pass should overlap the
23. preceding one by approx. 50 %.
24. Move the gun at a constant speed while the trigger is pulled, since
25. material flows at a constant rate a 50% overlap should give you
26. uniform coverage.

Set B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Time: 2 Hours

Max. Marks: 50

Course Code: AUT1104

Course Name: Automotive Spray Painting

Instruction:

1. Answer all questions from section A, each question carries one mark.
2. Answer all questions from section B, each question carries four marks.
3. Answer all questions from section C, each question carries six marks.

Section – A

10X01 = 10 Marks

Q.1 Which internal body organ is affected most from VOC (Volatile organic compound)?

a. Liver
b. Lungs
c. Heart
d. Stomach

Q.2 Which light is recommended for final inspection of paint?

a. 100-200 lux
b. Neon Light
c. Sunlight
d. BlueLight

Q.3 Which type of paint is not environment friendly and also not safe for health of paint technician?

a. Synthetic paint
b. NC Paint
c. 2K paint
d. All of the above

Q.4 What is the mixing ratio of Putty and hardener available in SAS workshop?

a. 100grm: 20grm
b. 100gms: 2gms
c. 100gms: 2mg
d. None of the above

Q.5 Which type of sanding process takes place at dealership?

a. Dry sanding
b. Wet sanding
c. Both (a) & (b)
d. None of the above

Q.6 Which nozzle size spray-gun is required for Primer application?

a. 1.2 mm
b. 1.4 mm
c. 1.6 mm
d. 1.8 mm

Q.7 What is the changing frequency of Floor Filter of Spray booth?

a. After 100 hrs.
b. After 200 hrs.
c. After200-250 hrs.
d. None.

Q.8 Which type of chemical is found in hardener?

a. Isocynate
b. Butane
c. Xylene
d. None of the above

Q.9 What should be more helpful for sanding at curves or profile?

a. Soft Disk
b. Scotch pad
c. Sponge pad
d. P 320 sanding disc

Q.10 Which color is being used for tinting?

a. white
b. Grey
c. Black
d. None of the above

Section – B

04X04 = 16 Marks

Q.1 Write any four differences between a Putty and body filler?

Q.2 Write a short note on:

a. DFT
b. Dry guide coat

Q.3 Write the do's and don'ts for paint booth.

Q.4 What is Putty? What are the different types of Putty?

Section – C

04X06 = 24 Marks

Q.1 Explain different types of hazards associated with an automotive paint shop.

Q.2 What is process of Putty Application? Explain different of types of dry sanding.

Q.3 Explain different types of sanding Paper based on application.

Q.4 What is a High volume low pressure spray gun? Explain different types of spray guns.

Set B, AK.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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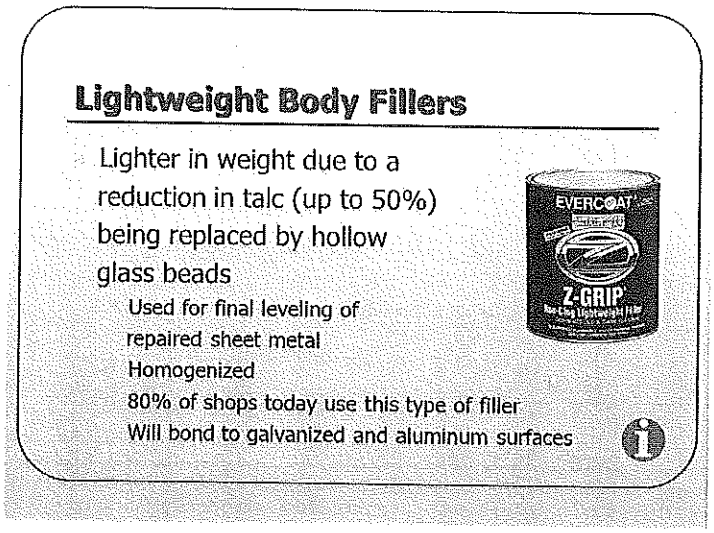

Q.2 Write a short note on:

a. DFT

b. Dry guide coat

Ans: DFT

- It is a coating thickness gauge used to measure dry film thickness.
- It is most critical measurements because of its impact on the coating process, quality and cost.

Or

- Dry guide coat is being done to guide the applicator for uniform sanding and maintaining profile. This profile is being maintained by black powder and some coats are also available in aerosol form

Q.3 Write the do's and don'ts for paint booth.

Ans:

Do's:

1. While switch on the paint booth, please ensure that voltage is above 380volts.
2. Keep the paint booth and its surroundings clean.
3. Sanding is not advisable in surrounding of paint booth.
4. Open the main door only for vehicle entry.
5. For all other movements use only service door.
6. Please insure the vehicle and technician dress must be dust free.
7. Switch off the main supply after completion of work.

Don'ts:

1. Don't store paints and accessories inside paint booth.
2. Don't use any cotton waste inside paint booth.
3. Don't spray the paint/test the spray gun on floor filter.
4. Don't throw the west paint material on the floor filter.
5. Don't use compressed air for cleaning the paint booth walls and floor.
6. Don't allow sparks inside the paint booth.
7. Don't open the main door during painting.

Q.4 What is Putty? What are the different types of Putty?

Ans: Putty:

It is a mixture that contains fiberglass resin (polyester) and talc.

1. The resin provides adhesion.
2. The talc makes the material flow smoothly.
3. The main solvent in the filler is styrene.
4. It uses a catalyst to Harden which is MEK (methyl ethyl ketone)

There are three types of putty/body fillers: -

1. Standard (coarser)
2. Mid-range
3. Premium (Fine)

Section – C

04X06 = 24 Marks

Q.1 Explain different types of hazards associated with an automotive paint shop.

Ans: Interior Painting Safety Hazards:

- Inadequate ventilation is the first and foremost hazard when painting indoors.

- Take care when placing appropriate warning signs for people place them at a level and in a position where the majority of people can see them easily.

Fire and explosion hazards:

- One of the major safety concerns associated with spray application is the combustible, flammable vapours and mists.
- It is important to ensure that all potential sources of ignition have been removed prior to spraying flammable and combustible products.

Health effects:

- Overexposure to a substance like primer or paint when spraying them means that too much has been breathed in, swallowed or absorbed.
- The possible health effects of overexposure to these products can vary depending on the chemicals they contain.

The main health effects from exposure to these solvents can include:

1. Eye and skin irritation
2. Respiratory tract irritation;
3. Dermatitis/Skin diseases
4. Drowsiness
5. Vomiting.

Potential sources of ignition include:

1. Open flames (work space heating units)
2. Cutting and welding torches
3. Gas fired heaters
4. Electrical outlets and lighting
5. Static electricity
6. Smoking

Q.2 What is process of Putty Application? Explain different of types of dry sanding.

Ans. Composition. Fillers and putty are DIY products which are used to remove unevenness from surfaces. The fillers are generally used to fill gaps and holes in walls and wood (often decayed wood). Putty is used to smooth relatively small uneven surfaces caused by screw holes, scratches or coarse materials. Allow the putty to dry 15 minutes at 77 degrees F (25 degrees C). In cooler climates, putty may take 20-30 minutes to dry. 7. Using 3M™ Sandpaper 80 grit, sand and shape the filled area to the contour of the surface.

There are four main wood sander types: belt sanders, random orbital sanders, disc sanders and finishing sanders. Each sander type has its specialized purpose. However, often these purposes overlap and one type of sander can do similar wood finishing work as another.

Q.3 Explain different types of sanding Paper based on application.

Ans: Wet sanding is the process of using an abrasive with water or another liquid to sand down a material. The water or other liquid helps remove any grit particles from the sandpaper left over from dry sanding to ensure a smooth and glossy finish

320-Grit

At this point along the wet sandpaper grit chart, the options are ideal for smooth buffering as well as the removal of thick paint. With a 320-grit piece of sandpaper, paint should come off the vehicle with evenly applied strokes of a disc. By the time you work a 320-grit through the paint, the shiny, silvery lustre of the metal should come glaring to the surface. Thanks to the strength of 320-grit sandpaper, it's a good option for cars or vans that have been treated with enamel or other hard coats. A perfect example of how 320-grit sandpaper can work is when you want to turn a blue van red. Before you apply the new paint job, you'll want to sand away the older blue coats. With 320-grit, the blue should come off smoothly and easily. Once all of the panels have been stripped, the surfaces should be smooth enough for a primer coat of the new paint. Alternately, 320-grit could make it really easy to change out the paint on a single panel, such as a scratched door. As such, when people ask what grit sandpaper to use when painting a car, 320-grit is a good choice for large automobiles with thick coats.

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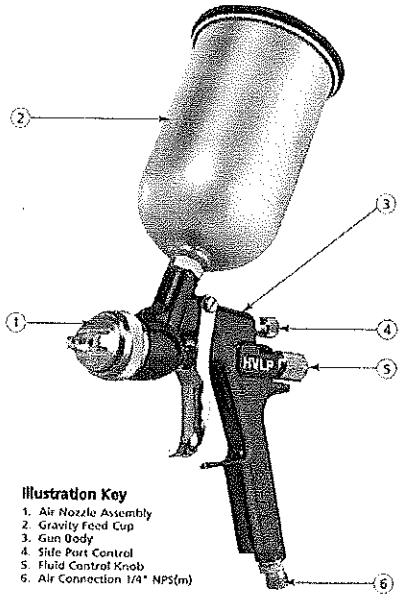

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SET-A. QP

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (winter semester)

B. Voc. Program, Vth Semester,

End-Sem. Examination

Course Code: AUT 1105 **Time: 2 Hours**

Course Name: Automotive Electrical Fundamentals & A.C. **Max. Marks: 20**

Instruction:

1. Non Programmable Scientific Calculators are permitted.
2. Any assumptions made in attempt of questions may be mentioned.
3. All questions are compulsory.

Section – A

10X01 = 10 Marks

1. Heat flow through solids only by?
   (a) Conduction
   (b) Convection
   (c) Radiation
   (d) Does not flow

2. Heat transfer takes place in liquids and gasses is essentially due to?
   (a) Radiation
   (b) Conduction
   (c) Convection
   (d) Conduction as well as convection

3. Batteries are generally connected in?
   (a) Series
   (b) Parallel
   (c) Either series or parallel
   (d) Neither series nor parallel

What is the boiling point of refrigerant R134a?

(a) 20.5 Degree

(b) 20 degree

(c) 26.5 Degree

(d) 27.8 Degree

5. In a refrigeration system, the expansion device is connected between the?

(a) Compressor and condenser

(b) Condenser and receiver

(c) Receiver and evaporator

(d) Evaporator and compressor

6. During a refrigeration cycle, heat is rejected by the refrigerant in a.....?

(a) Condenser

(b) Compressor

(c) Expansion Valve

(d) Evaporator

7. Actuators are used to?

(a) sense an object

(b) activate a chemical

(c) Make a mechanical movement

(d) all the above

8. Electric pressure is also called as?

(a) voltage

(b) resistance

(c) capacitance

(d) energy

9. A sound sensor converts sound levels to _____ output.

(a) Sound

(b) Voltage

(c) Current

(d) Power

10. The output generated by piezoelectric sensor is?
    (a) Mechanical
    (b) Electric charge
    (c) Chemical
    (d) All of the above

Section – B

04X04 = 16 Marks

11. Define thermodynamic system and its types.

12. Define Pressure and temperature.

13. Explain function of compressor.

14. Explain Series and parallel circuit.

Section – C

04X06 = 24 Marks

15. Explain Process of AC Gas filling for vehicle.

16. Explain wheel speed sensor with construction.

17. Explain Various Leak test done in AC system of car.

18. Define Actuators and various types of actuators with examples.

SET-A. A.K.

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   Ans-c

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   (c) Either series or parallel
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   Ans-a

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(c) 26.5 Degree

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Ans-c

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9. A sound sensor converts sound levels to _____ output.

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Ans-b

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(c) Chemical

(d) All of the above

Ans-b

Section – B

04X04 = 16 Marks

11. Define thermodynamic system and its types.

Ans- 1.Open System

2. Closed System

3. Isolated system

12. Define Pressure and temperature.

Ans-pressure, in the physical sciences, the perpendicular force per unit area, or the stress at a point within a confined fluid.

Temperature- the degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale and shown by a thermometer or perceived by touch.

13. Explain function of compressor.

Ans- The function of a compressor is to remove the vapor produced by the evaporator and to deliver it at a required higher pressure. The compressor can be compared to a heart pumping the blood (the refrigerant) inside the body (the compression cycle). In the basic compression cycle, the compressor is positioned between the evaporator and the condenser. Compressors can be installed in either single or multistage configuration, and can be connected to each other in series or in parallel.

Compressor Function

To understand how the compressor works, think about the cooling process for a split-system central air conditioner. The air conditioner pulls heat out of the air in your home, cools it over a set of cold pipes (an evaporator coil), and releases the cool air into your home. The evaporator coil remains cold thanks to a liquid refrigerant that absorbs hot air and changes it to gas. This gas is then transported outside to the condenser coil where the gas again becomes a liquid. From this point, the cycle continues.

How does the compressor fit into the picture? The compressor is responsible for moving the refrigerant between the evaporator and condenser coils, ensuring that the refrigerant changes to gas or liquid as needed. You can think of the compressor as the heart of the air conditioning system and the refrigerant as the blood. To this end, the compressor pumps the refrigerant through the system to keep it alive and running properly.

14. Explain Series and parallel circuit.

Ans- A series circuit is a circuit in which resistors are arranged in a chain, so the current has only one path to take. The current is the same through each resistor. The total resistance of the circuit is found by simply adding up the resistance values of the individual resistors: equivalent resistance of resistors in series : $R = R1 + R2 + R3 + ...$

Parallel- A parallel circuit is a circuit in which the resistors are arranged with their heads connected together, and their tails connected together. The current in a parallel circuit breaks up, with some flowing along each parallel branch and re-combining when the branches meet again. The voltage across each resistor in parallel is the same.

The total resistance of a set of resistors in parallel is found by adding up the reciprocals of the resistance values, and then taking the reciprocal of the total:

equivalent resistance of resistors in parallel: $1 / R = 1 / R1 + 1 / R2 + 1 / R3 + ...$

Section – C

04X06 = 24 Marks

15. Explain Process of AC Gas filling for vehicle.

Ans- Filling AC gas is actually an easy job with the right tools and safety gear. First, on the air conditioner locate the suction line(low side) and the discharge line (high side). These are located behind a window AC and in a split AC in the outdoor unit The suction line is located

above the discharge line and is cool the touch.While the discharge line is warm to the touch. The suction line is used for recharging gas into the AC.

inlet lines for ac gas filling

Unscrew the bolt of the suction line as shown below. Loosen the screw inside with a Torx hex key(as shown in the picture below). This screw acts as a valve, it won't let refrigerant flow in or out till it is closed. Thus, loosening this screw is important for filling AC gas.

unscrewing bolt for ac gas refilling

Then remove the bolt on the left and connect the blue hose of the AC manifold gauge to this port. Connect the yellow hose to the vacuum pump. Remove all the air from the system. This step is very important because any moisture inside the compressor will damage it.

ac manifold gauge for gas refilling

Now, make sure all the valves of the AC manifold gauge are closed. Then, connect the yellow hose to the refrigerant tank. Before opening the tank knob, loosen the yellow hose slightly at the manifold end. Then open the cylinder knob for 1 second and close it. This will remove all the air from inside the pipes. Now, again tighten the yellow hose.

Now, open the low side knob of the manifold for 3-4 seconds and close it. Then turn ON the AC and wait till the compressor kicks in.

Once the compressor starts, again open the low side valve of the manifold. Keep the valve opened for 4 seconds and close it for 2 seconds. Note where the pressure settles on the gauge once the valve is closed. Keep opening and closing the valve till the pressure settles between 60-70 PSI.

Note: The AC refrigerant gas is filled in small amounts at a time because releasing all the gas at once will damage the compress

16. Explain wheel speed sensor with construction.

Ans- • Wheel speed sensors and how we test them have been changing. Currently, two types of wheel speed sensors are in use: magnetic inductive (passive) and magneto resistive (active).

- Passive sensors have been around since the early days of the anti-lock brake system (ABS). These are the sensors that function on the generator principle.
- The sensors work with the toothed tone wheels to monitor and provide the anti-lock brake module (ABM) with wheel speed information. The actuator is a toothed tone wheel that rotates with the individual wheel. Each tooth on the tone wheel acts as an actuator for the wheel speed sensor. As the tone wheel rotates, the teeth go in and out of the proximity of the sensor.

The result is an alternating current (AC) voltage that is generated in the speed sensor coil by magnetic lines of force fluctuating as the tone wheel passes by the magnetic sensor.

17. Explain Various Leak test done in AC system of car.

Ans- UV dye leak test.

Through AC gas filling Machine

18. Define Actuators and various types of actuators with examples.

Ans- An actuator is a device that uses a form of power to convert a control signal into mechanical motion.

Types:

Hydraulic.

Pneumatic.

Electric.

Twisted and coiled polymer (TCP) or supercoiled polymer (SCP).

Thermal or Magnetic.

Mechanical.

SET-B . 0P

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, Vth Semester,

End-Sem. Examination

Course Code: AUT1105 **Time: 2 Hours**

Course Name: Automotive Electrical Fundamental & A.C. **Max. Marks: 50**

Instruction:

1. Answer all questions from section – A, each question carries one mark.
2. Answer all questions from section – B, each question carries four marks.
3. Answer all questions from section – C, each question carries six marks.

Section – A

10X01 = 10 Marks

1. Which is not a type of actuator ?
   a. Hydraulic actuator
   b. Electric actuator
   c. Pneumatic actuator
   d. Relays
2. TCP is a type of an actuator. What does TCP stand for?
   a. Torqued and coiled polymer.
   b. Twisted and coaxial polymer.
   c. Twisted and coiled polymer.
   d. None of the above.
3. Which of the term in the following is not a property of refrigerant R134a?
   a. High heat of vaporization.
   b. Flammable.
   c. Non-corrosive.
   d. Non-toxic.
4. Output of a digital multi-meter is ?
   a. Mechanical
   b. Electrical
   c. Optical
   d. Analog
5. If in series, One bulb blows out, others will?
   a. Glow
   b. Turn off
   c. Blow up
   d. Heat up
6. When the temperature of the surrounding is higher than the temperature of the body, then the heat loss by convection from the body to the surrounding will be?
   a. Positive
   b. Negative
   c. Zero
   d. None of these

7. What is the universally accepted cylinder code for R134a?
   a. Light Green.
   b. Light Yellow.
   c. Light Red.
   d. Light Blue.

8. A parking light takes 0.5A current, its resistance is 24 Ω. What is the voltage of the lamp?
   a. 12 Volts.
   b. 24 Volts.
   c. 10 Volts.
   d. 48 Volts.

9. Bad Odor In AC system, replacement part will be ?
   a. Refrigerant
   b. AC filter
   c. Compressor
   d. Air filter

10. The function of a compressor is to remove the vapor produced by the ..... and to deliver it at a required ..... pressure.
   a. Evaporator, Lower.
   b. Evaporator, Higher.
   c. Expansion Valve, Lower.
   d. Expansion Valve, Higher.

Section – B

04X04 = 16 Marks

11. Define the following:
   a. Ohms Law
   b. Resistance
12. Name any four sensors with their function used in an automotive vehicle.
13. Write the function of Fuses in a circuit.
14. Explain different types of Thermodynamic Systems.

Section – C

04X06 = 24 Marks

15. Explain wheel speed sensor with construction.
16. Explain the following:
   a. Fuse
   b. Multimeter.
   c. Voltage
   d. force
17. Explain the process of AC gas filling in Vehicle.
18. Explain the function of OBD tool in brief.

SET-B. A.K.

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Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, Vth Semester,

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1. Which is not a type of actuator ?
   a. Hydraulic actuator
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   c. Pneumatic actuator
   d. Relays

   Ans d

2. TCP is a type of an actuator. What does TCP stand for?
   a. Torqued and coiled polymer.
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   c. Twisted and coiled polymer.
   d. None of the above.

   Ans b

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   c. Non-corrosive.
   d. Non-toxic.

   Ans-b

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   a. Mechanical
   b. Electrical
   c. Optical
   d. Analog

   Ans-b

5. If in series, One bulb blows out, others will?
   a. Glow
   b. Turn off
   c. Blow up
   d. Heat up

   Ans-b

6. When the temperature of the surrounding is higher than the temperature of the body, then the heat loss by convection from the body to the surrounding will be?

a. Positive
b. Negative
c. Zero
d. None of these

Ans-b

7. What is the universally accepted cylinder code for R134a?

a. Light Green.
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c. Light Red.
d. Light Blue.

Ans-b

8. A parking light takes 0.5A current, its resistance is 24 Ω. What is the voltage of the lamp?

a. 12 Volts.
b. 24 Volts.
c. 10 Volts.
d. 48 Volts.

Ans- a

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a. Evaporator, Lower.
b. Evaporator, Higher.
c. Expansion Valve, Lower.
d. Expansion Valve, Higher.

Section – B

04X04 = 16 Marks

11. Define the following:

a. Ohms Law - Ohm's law states the relationship between electric current and potential difference. The current that flows through most conductors is directly proportional to the voltage applied to it.
b. Resistance- Resistance is a measure of the opposition to current flow in an electrical circuit. Resistance is measured in ohms

12. Name any four sensors with their function used in an automotive vehicle.

Ans- oxygen sensor ,air bag sensor, wheel speed sensor, camshaft position sensor

13. Write the function of Fuses in a circuit.

Ans- The primary use of an electric fuse is to protect electrical equipment from excessive current and to prevent short circuits or mismatched loads. Electrical fuses play the role of miniature circuit breakers. Apart from protecting equipment, they are also used as safety measures to prevent any safety hazards to humans.

14. Explain different types of Thermodynamic Systems.

Ans- Open system

Close system

Isolated system

Section – C

04X06 = 24 Marks

15. Explain wheel speed sensor with construction.

Ans- Wheel speed sensors and how we test them have been changing. Currently, two types of wheel speed sensors are in use: magnetic inductive (passive) and magneto resistive (active).

- Passive sensors have been around since the early days of the anti-lock brake system (ABS). These are the sensors that function on the generator principle.
- The sensors work with the toothed tone wheels to monitor and provide the anti-lock brake module (ABM) with wheel speed information. The actuator is a toothed tone wheel that rotates with the individual wheel. Each tooth on the tone wheel acts as an actuator for the wheel speed sensor. As the tone wheel rotates, the teeth go in and out of the proximity of the sensor.

16. Explain the following:

a. Fuse- The primary use of an electric fuse is to protect electrical equipment from excessive current and to prevent short circuits or mismatched loads.
b. Multimeter- an instrument designed to measure electric current, voltage, and usually resistance, typically over several ranges of value.
c. Voltage- an electromotive force or potential difference expressed in volts. "the ratio of two voltages"
d. Force- strength or energy as an attribute of physical action or movement.

17. Explain the process of AC gas filling in Vehicle.

Ans- use of Ac gas filling machine.

18. Explain the function of OBD tool in brief.

Ans- On-board diagnostics (OBD) is an automotive term referring to a vehicle's self-diagnostic and reporting capability. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle subsystems.

The amount of diagnostic information available via OBD has varied widely since its introduction in the early 1980s versions of on-board vehicle computers. Early versions of OBD would simply illuminate a malfunction indicator light or "idiot light" if a problem was detected but would not provide any information as to the nature of the problem.

Modern OBD implementations use a standardized digital communications port to provide real-time data in addition to a standardized series of diagnostic trouble codes (DTCs) which allow one to rapidly identify and remedy malfunctions within the vehicle.

Q.P. Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

(Set A), End Sem. Examination

Course Code: AUT1106 **Time: 2 Hour**

Course Name: Automotive tools and measurement **Max. Marks: 50**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 4 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

Q1. Least count of an outside micrometer is 0.01mm. Range of the micrometer is 75-100 mm. The barrel reading is 15.5 mm and the tenth thimble graduation coincides with the barrel datum line. The reading is _____

a. 15.60 mm

b. 15.06 mm

c. 15.50 mm

d. 15.40 mm

Q2. Which type of measurement does not provide numerical values?

a. Gauging

b. Measuring

c. Both (A) & (B)

d. None of the above

Q3. The least count defines the.....

a. Smallest unit we can measure

b. Smallest dimension

c. Smallest length

d. None of these

Q4. Why do not we use second angle and fourth angle projection?

a. Due to overlapping
b. Due to complications
c. Due to lacking
d. None of the above

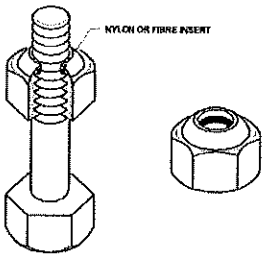
Q5. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

a. Clearance angle
b. Point angle
c. Rake angle
d. None of the above

Q6. Name the projection symbol

a. First angle
b. Second angle
c. Third angle
d. None of the above

Q.7 Name the type of nut



a) Self-lock nut
b) T-Nut
c) Square nut
d) None of the above

Q8. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

a) Anti-Fatigue Bolts
b) Body fit Bolts

c) Studs

d) None of the above

Q9. _____ are used in places where fixing and removal of components are frequent

a. Set screw

b. Thumb screw

c. Grub screw

d. Countersink screw

Q10. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

a. Clearance angle

b. Point angle

c. Rake angle

d. None of the above

Section – B

04X04 = 16 Marks

Q11. What is light gap method, explain work technique of radius gauge.

Q.12 Explain different types of lines with their uses.

Q13. Write Different types of nuts and bolts.

Q.14 Write different angles of chisel and their effects.

Section – C

04X06 = 24 Marks

Q15. Explain the types of machine screws.

Q16. What is fit? Name types of fit.

Q.17 Differentiate between first angle and third angle projection?

Q.18 Explain parallel and perspective projection.

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

Answer sheet (Set A) End Sem. Examination

Course Code: AUT1106 **Time: 2 Hour**

Course Name: Automotive tools and measurement **Max. Marks: 50**

Instruction:

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3. Section A contains 10 Questions. Each question carries 1 Marks.
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Section – A

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c. 15.50 mm
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Q2. Which type of measurement does not provide numerical values?

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c. Both (A) & (B)
d. None of the above

Q3. The least count defines the.....

a. **Smallest unit we can measure**
b. Smallest dimension
c. Smallest length
d. None of these

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Q4. Why do not we use second angle and fourth angle projection?

a. **Due to overlapping**
b. Due to complications
c. Due to lacking
d. None of the above

Q5. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

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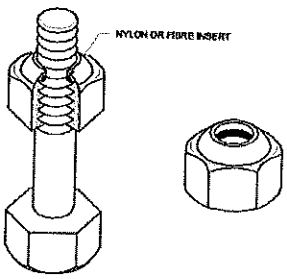
b. Point angle
c. **Rake angle**
d. None of the above

Q6. Name the projection symbol

a. **First angle**
b. Second angle
c. Third angle
d. None of the above

Q.7 Name the type of nut



a. **Self lock nut**
b. Square nut
c. T-Nut
d. None of the above

Q8. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

a. **Anti-Fatigue Bolts**
b. Body fit Bolts
c. Studs
d. None of the above

Q9. _____ are used in places where fixing and removal of components are frequent

a. Set screw
b. **Thumb screw**
c. Grub screw
d. Countersink screw

Q10. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

a. Clearance angle
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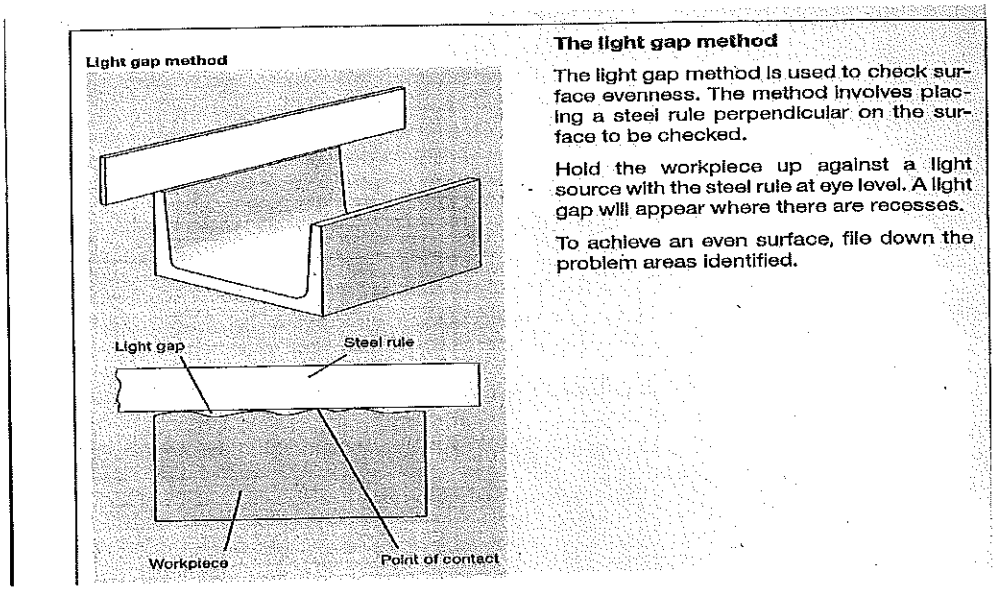
c. **Rake angle**
d. None of the above

Section – B

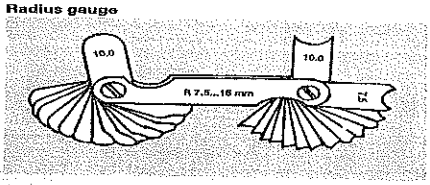
04X04 = 16 Marks

Q.11 What is light gap method, explain work technique of radius gauge.

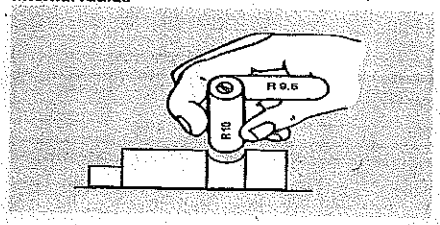
Ans.



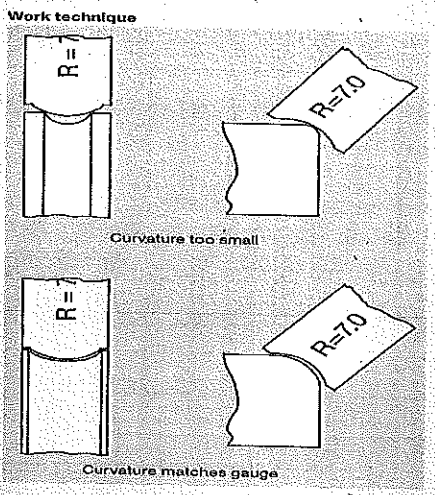
Radius gauge



Internal radius



Work technique



Radius gauge (radius template)

Grooves and raised external radii are checked with a radius template. The rounding of the test part is compared with the corresponding profile of the gauge. The check uses the light gap method. With a radius gauge, the radius is indicated in "millimetres" on a metal template. The radius template is referred to as a gauge since each template only has a single measurement.

Work technique

Curvatures which are part of circles are checked with radius gauges. During the check, the gauge is held at right angles to the workpiece. The light gap makes errors visible.

The terms external radius and internal radius are used in technical language.

An external radius is arched outwards or raised (convex).

An internal radius is arched inwards or hollow (concave).

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Q.12 Explain different types of lines with their uses.

Ans.

Illustration	Application
Thick ———	Outlines, visible edges, surface boundaries of objects, margin lines
Continuous thin ———	Dimension lines, extension lines, section lines leader or pointer lines, construction lines, boarder lines
Continuous thin wavy ~~~	Short break lines or irregular boundary lines – drawn freehand
Continuous thin with zig-zag —/\/\/\—	Long break lines
Short dashes, gap 1, length 3 mm - - - - - - - - - -	Invisible or interior surfaces
Short dashes — · — · — · — · — · — · — · — · q	Center lines, locus lines Alternate long and short dashes in a proportion of 6:1,
Long chain thick at end and thin elsewhere ▬ - ▬ - ▬ - ▬ - ▬	Cutting plane lines

Q13. Write Different types of nuts and bolts.

Ans.

There are different types of nut:

- Hexagonal nuts
- Square nuts
- Self-locking nuts
- T- nuts
- Slotted & Castle nuts
- Round nuts
- Slotted Round nuts

Depending upon type of application, different types of bolts are used:

- Bolts with clearance hole
- Body fit bolt
- Anti-fatigue bolt
- Studs

Q.14 Write different angles of chisel and their effects.

Ans.

Point Angle:

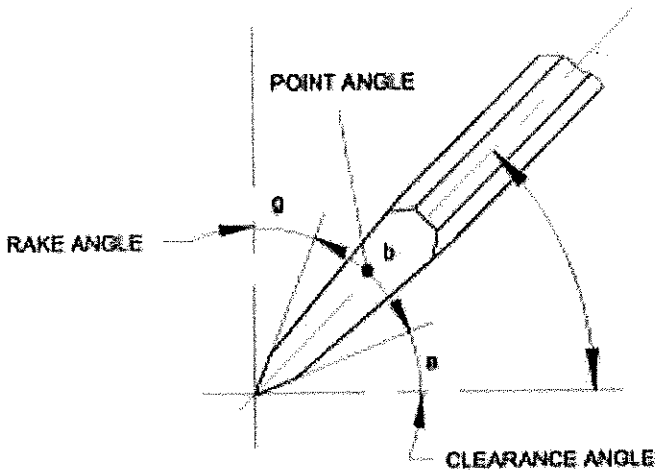
•Correct point/cutting angles of chisel depends on the material to be chipped, sharp angles for soft materials and wide angles for hard materials

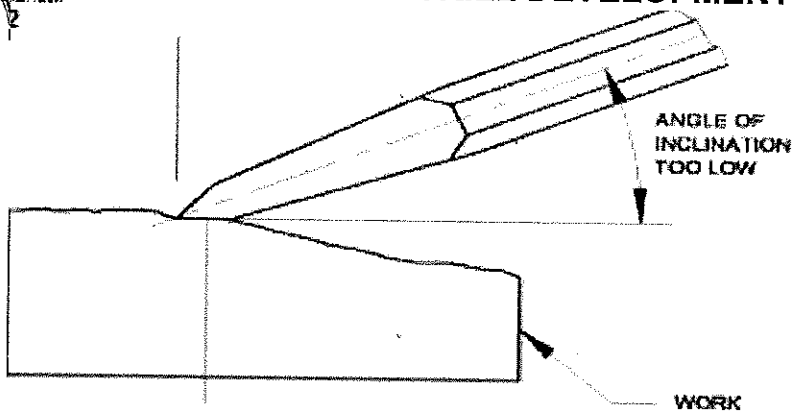
•Rake Angle:

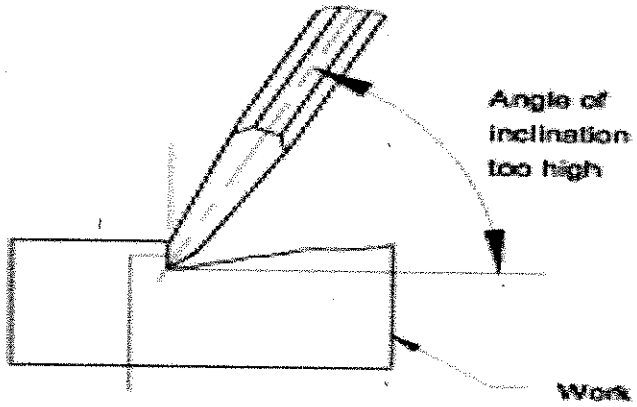
•Rake angle is angle between the top face of cutting point and normal to work surface at cutting edge

•Clearance Angle:

•Clearance angle is angle between the bottom face of point and tangent to the work surface originating at the cutting edge







Effects -

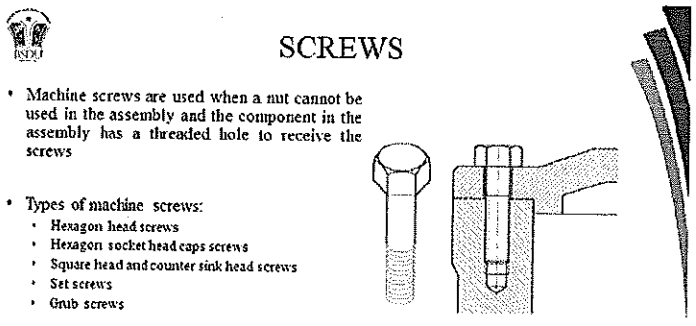
- Angle of Inclination too low, Rake angle increases cutting edge cannot penetrate into work-piece
- Angle of Inclination too high, Rake angle decreases, cutting edge digs in, and the cut progressively increase

Section – C

04X06 = 24 Marks

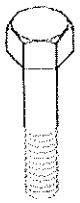
Q15. Explain the types of machine screws

Ans.



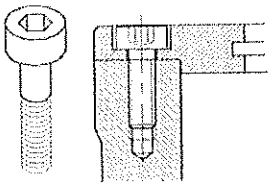
HEXAGON HEAD SCREWS

- Hexagon head screws are used when the projection of the screw head will not be an obstruction in the assembly
- They are made of steel and for electrical work they are made of brass



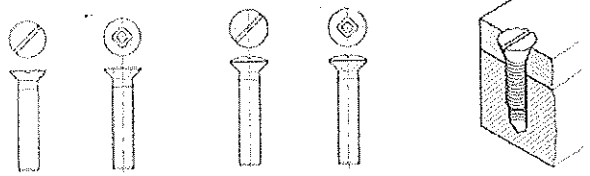
HEXAGON SOCKET HEAD CAP SCREWS

- These are used when the projection of the screw head above the surface is to be avoided
- The Indian standard specification head socket cap screws cover the range from 1.6 mm to 36 mm
- They are made of steel.



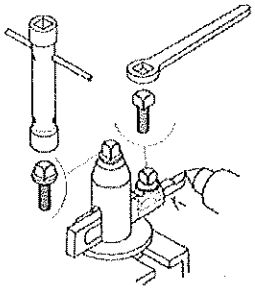
COUNTER SINK SCREWS

- There are four types of counter-sink head screws in common use:
  - Slotted countersink head screws (M1-M20)
  - Cross recessed countersink head screws (M1.6-M10)
  - Slotted raised countersink head screws (M1-M20)
  - Cross recessed, raised countersink head screws (M1.6-M10)
- Countersink screws are capable of aligning the matching component correctly with threaded hole



SQUARE HEAD SCREWS

- Square head screws are used in places where there is frequent removal and refitting of the assembly
- These screws are tightened to a higher torque using a wrench
- Square head screws are also available with a collar
- There is a washer at the base which is integral part of the head
- The purpose of collar is to protect the work surface from damages due to constant use of wrenches



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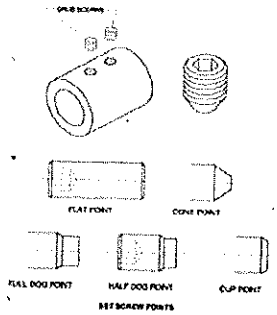
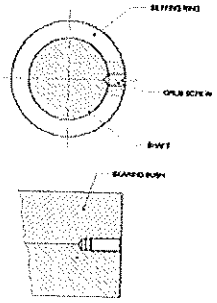
SET SCREWS AND GRUB SCREWS

- Hexagonal socket set screws: these are headless socket screws available with different points for various functional requirement
- These points either allow to bite into the metal or tighten without damage to work surface
- They are used to fasten pulleys, collars etc. to shafts
- They are used for higher strength applications where space is limited



SET SCREWS AND GRUB SCREWS

- Grub Screws have similar application as hexagon socket set screws but are used for light holding
- Grub screws are also available with different types of points



Q16. What is fit? Name types of fit

Ans.

Manufactured parts are required to mate with one another during assembly.

- The relationship between the two mating parts that are to be assembled, that is, the hole and the shaft, with respect to the difference in their dimensions before assembly is called a fit.
- An ideal fit is required for proper functioning of the mating parts. Three basic types of fits can be identified, depending on the actual limits of the hole or shaft:

a. Clearance fit
b. Interference fit
c. Transition fit

Clearance fit: The largest permissible diameter of the shaft is smaller than the diameter of the smallest hole.

- In case of clearance fit, the difference between the sizes is always positive.

Interference fit: The minimum permissible diameter of the shaft exceeds the maximum allowable diameter of the hole.

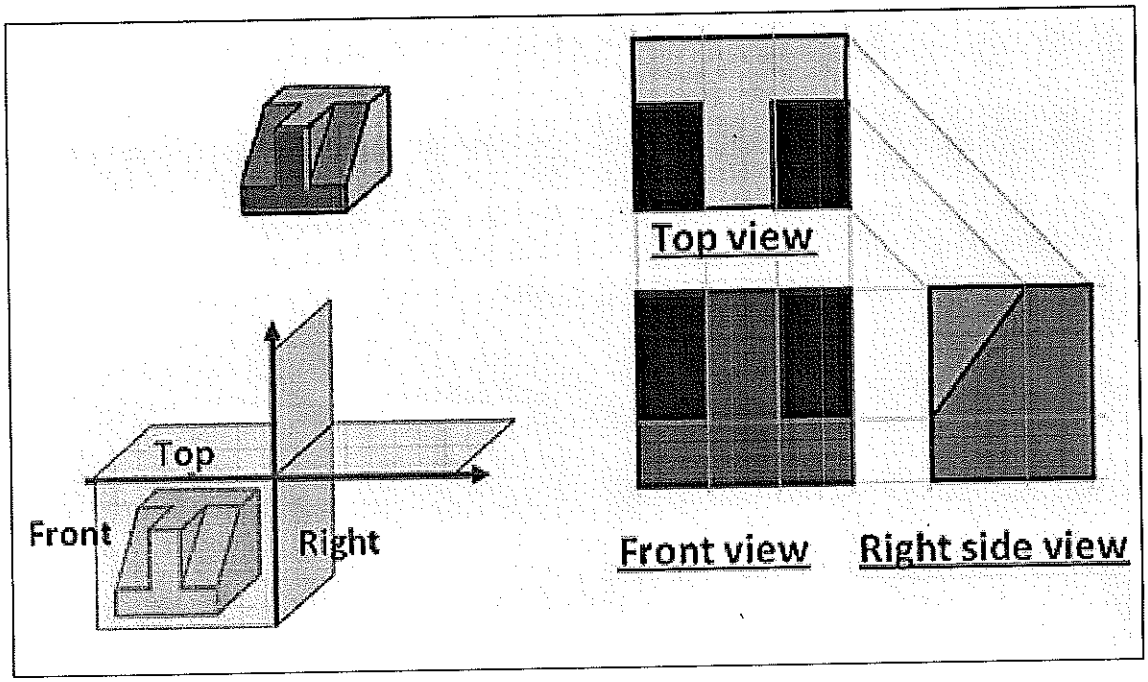
- This type of fit always provides interference. Interference fit is a form of a tight fit. Tools are required for the precise assembly of two parts with an interference fit.
- In an interference fit, the difference between the sizes is always negative.

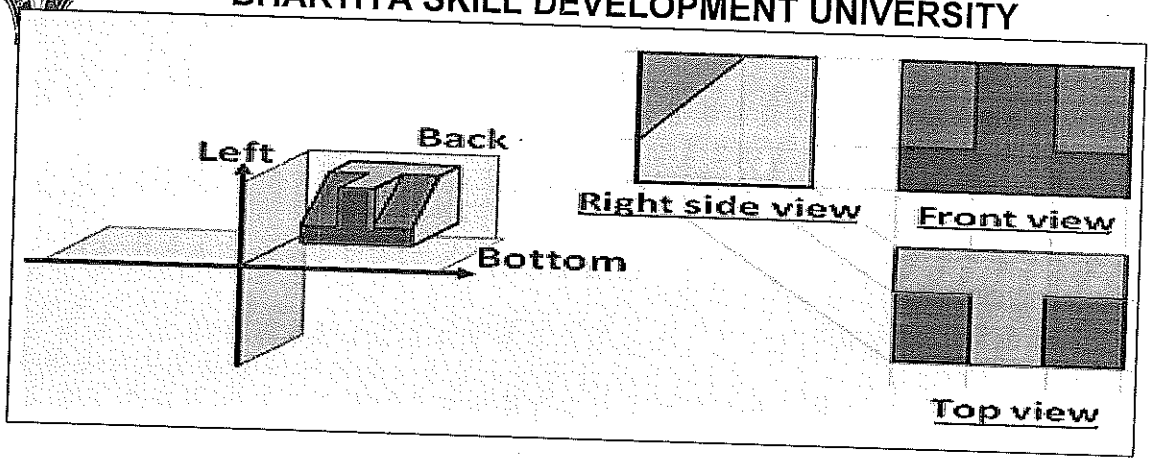
Transition fit: Occurs when two tolerance mating parts are sometimes and interference fit and sometimes clearance fit when assembled.

Q.17 Differentiate between first angle and third angle projection?

Ans.

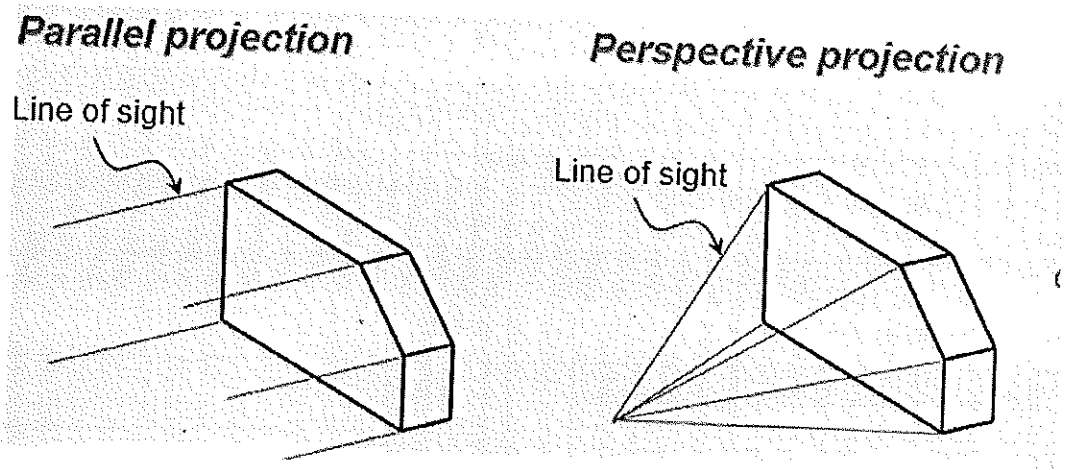
First angle projection	Third-angle projection
Object is kept in the first quadrant.	Object is assumed to be kept in the third quadrant.
Object lies between observer and the plane of projection.	Plane of projection lies between the observer and the object.
The plane of projection is assumed to be non-transparent.	The plane of projection is assumed to be transparent.
Front (elevation) view is drawn above the XY line	Front (elevation) view is drawn below the XY line
Top (plan) view is drawn below the XY line	Top (plan) view is drawn above the XY line
Left view is projected on the right plane and vice versa	Left view is projected on the left plane itself.
Followed in India, European countries	Followed in USA





Q.18 Explain parallel and perspective projection

Ans.



Parallel vs. perspective projection

Parallel Projection	Perspective Projection
Distance from the observer to the object is infinite projection lines are parallel – object is positioned at infinity.	Distance from the observer to the object is finite and the object is viewed from a single point – projectors are not parallel
Less realistic but easier to draw.	Perspective projections mimic what the human eyes see, however, they are difficult to draw.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

(Set B) End Sem. Examination

Course Code: AUT1106 **Time: 2 Hour**

Course Name: Automotive tools and measurement **Max. Marks: 50**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 4 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

Q1. Name the projection symbol

a. First angle

b. Second angle

c. Third angle

d. None of the above

Q2. The least count defines the.....

a. Smallest unit we can measure

b. Smallest dimension

c. Smallest length

d. None of these

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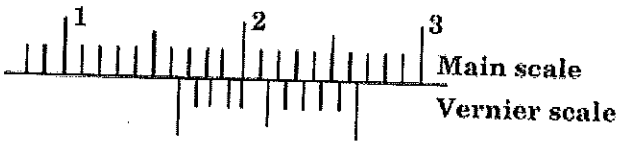
Q3. What is the least count of the instrument?



a. 0.1cm
b. 0.01cm
c. 1m
d. 0.01mm

Q4. Which type of measurement does not provide numerical values?

a. Gauging
b. Measuring
c. Both (A) & (B)
d. None of the above

Q5. Why do not we use second angle and fourth angle projection?

a. Due to overlapping
b. Due to complications
c. Due to lacking
d. None of the above

Q6. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

a. Clearance angle
b. Point angle
c. Rake angle
d. None of the above

Q7. Name the type of spanner

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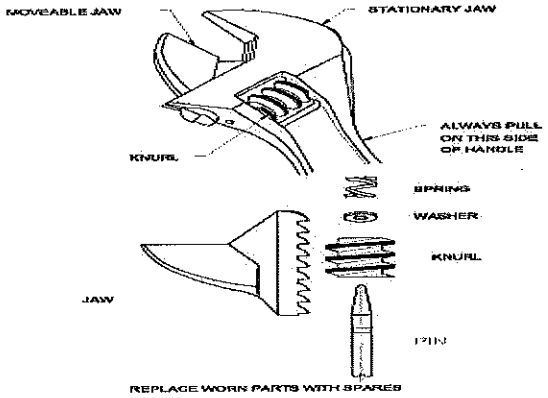


a. Open end spanner
b. Close end spanner
c. Adjustable spanner
d. Hook spanner

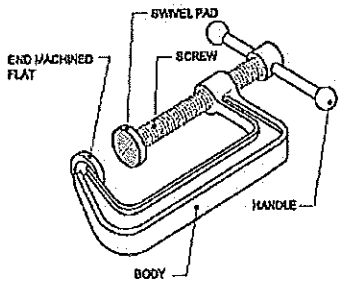
Q8. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

a. Anti-Fatigue Bolts
b. Body fit Bolts
c. Studs
d. None of the above

Q9. _____ are used in places where fixing and removal of components are frequent

a. Set screw
b. Thumb screw
c. Grub screw
d. Countersink screw

Q10. Name the equipment



a. Pin vice
b. Measuring Gauge
c. C-clamp
d. None of the above

Section – B

04X04 = 16 Marks

Q11. Write short note on measuring errors.

Q12. Write Different types of nuts and bolts.

Q.13 Write different angles of chisel and their effects.

Q14. What necessary points should remember while safe and correct using of spanners?

Section – C

04X06 = 24 Marks

Q15. Explain the parts of Vernier caliper with diagram.

Q.16 Differentiate between first angle and third angle projection?

Q17. Write short note on surface finish indication.

Q18. Write and explain different pliers and snips.

A.R. Set B

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

Answer sheet (Set B) End Sem. Examination

Course Code: AUT1106 **Time: 2 Hour**

Course Name: Automotive tools and measurement **Max. Marks: 50**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 4 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

Q1. Name the projection symbol

a. **First angle**
b. Second angle
c. Third angle
d. None of the above

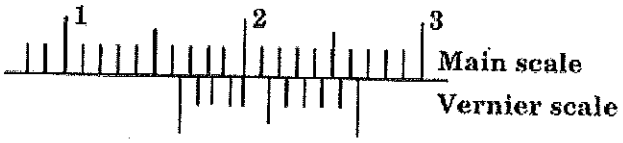
Q2. The least count defines the.....

a. **Smallest unit we can measure**
b. Smallest dimension
c. Smallest length
d. None of these

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Q3. What is the least count of the instrument?



a. 0.1cm

b. 0.01cm

c. 1m

d. 0.01mm

Q4. Which type of measurement does not provide numerical values?

a. Gauging

b. Measuring

c. Both (A) & (B)

d. None of the above

Q5. Why do not we use second angle and fourth angle projection?

a. Due to overlapping

b. Due to complications

c. Due to lacking

d. None of the above

Q6. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

a. Clearance angle

b. Point angle

c. Rake angle

d. None of the above

Q7. Name the type of spanner

Registration No.: .....

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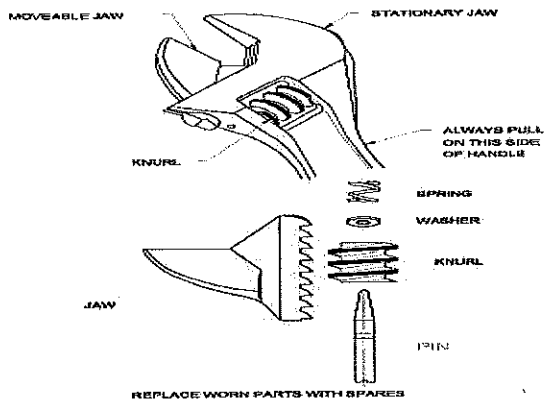

a. Open end spanner
b. Close end spanner
c. Adjustable spanner
d. Hook spanner

Q8. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

a. Anti-Fatigue Bolts
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Q9. _____ are used in places where fixing and removal of components are frequent

a. Set screw
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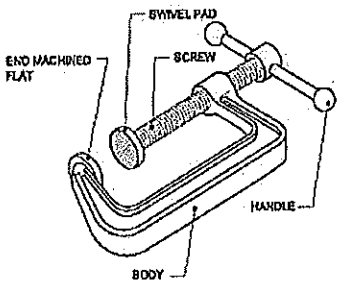
Q10. Name the equipment



a. Pin vice

b. Measuring Gauge

c. C-clamp

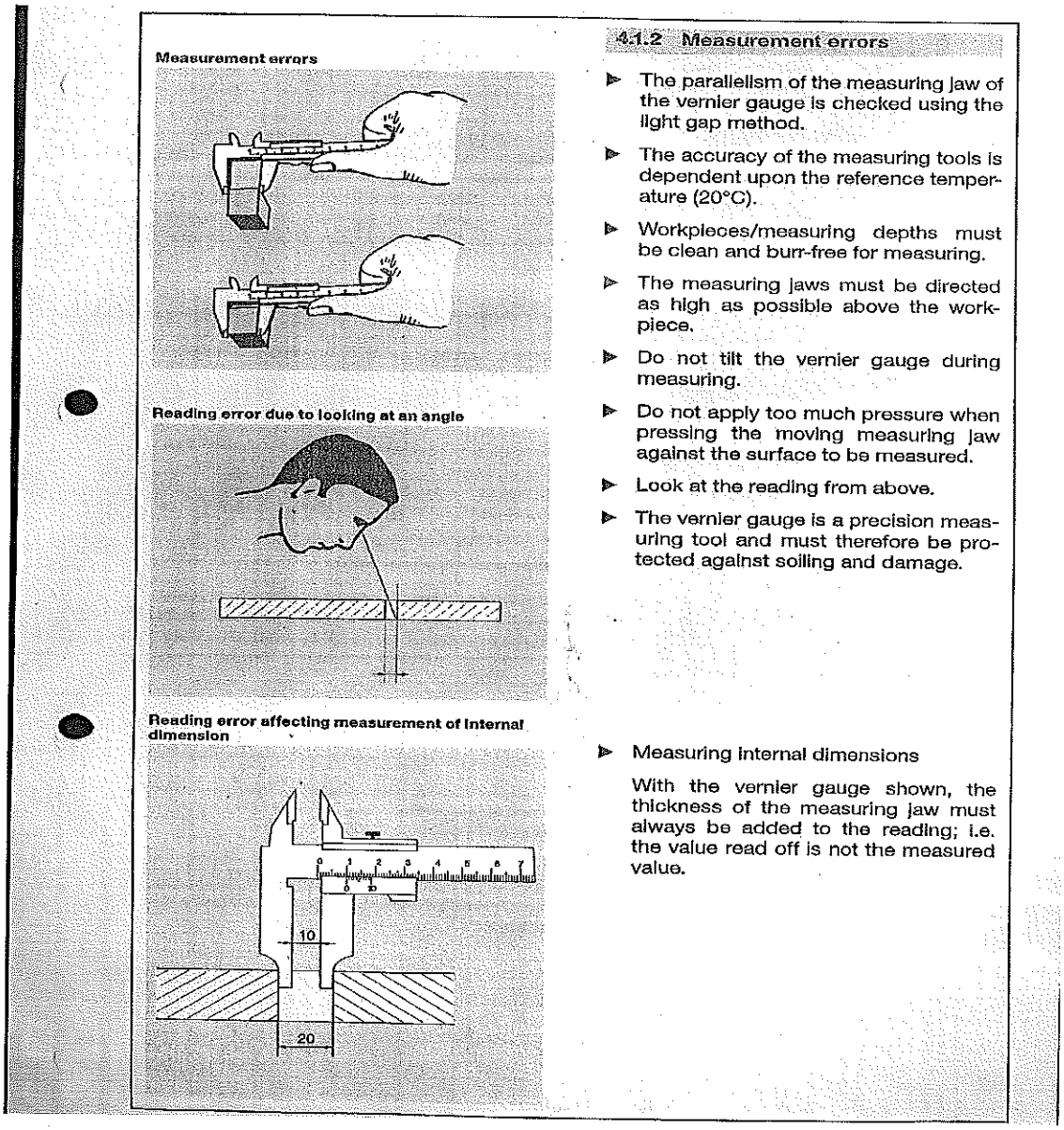
d. None of the above

Section – B

04X04 = 16 Marks

Q11. Write short note on measuring errors.

Ans.



4.1.2 Measurement errors

Measurement errors

Reading error due to looking at an angle

Reading error affecting measurement of internal dimension

- The parallelism of the measuring jaw of the vernier gauge is checked using the light gap method.
- The accuracy of the measuring tools is dependent upon the reference temperature (20°C).
- Workpieces/measuring depths must be clean and burr-free for measuring.
- The measuring jaws must be directed as high as possible above the workpiece.
- Do not tilt the vernier gauge during measuring.
- Do not apply too much pressure when pressing the moving measuring jaw against the surface to be measured.
- Look at the reading from above.
- The vernier gauge is a precision measuring tool and must therefore be protected against soiling and damage.

- Measuring internal dimensions

  With the vernier gauge shown, the thickness of the measuring jaw must always be added to the reading; i.e. the value read off is not the measured value.

Q12. Write Different types of nuts and bolts.

Ans.

There are different types of nut:

- Hexagonal nuts
- Square nuts
- Self-locking nuts

- T- nuts
- Slotted & Castle nuts
- Round nuts
- Slotted Round nuts

Depending upon type of application, different types of bolts are used:

- Bolts with clearance hole
- Body fit bolt
- Anti-fatigue bolt
- Studs

Q.13 Write different angles of chisel and their effects.

Ans.

Point Angle:

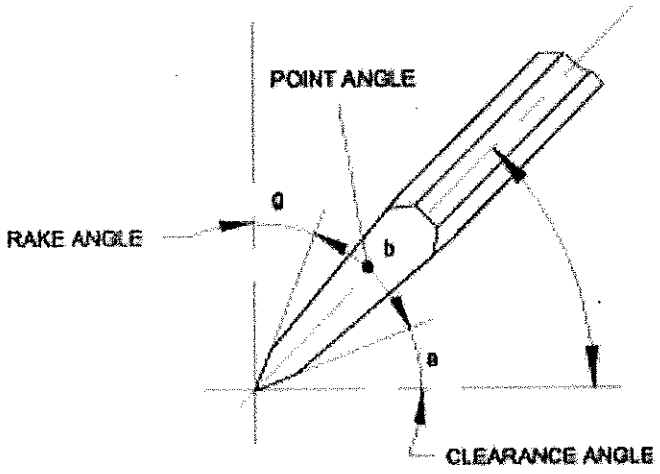
•Correct point/cutting angles of chisel depends on the material to be chipped, sharp angles for soft materials and wide angles for hard materials

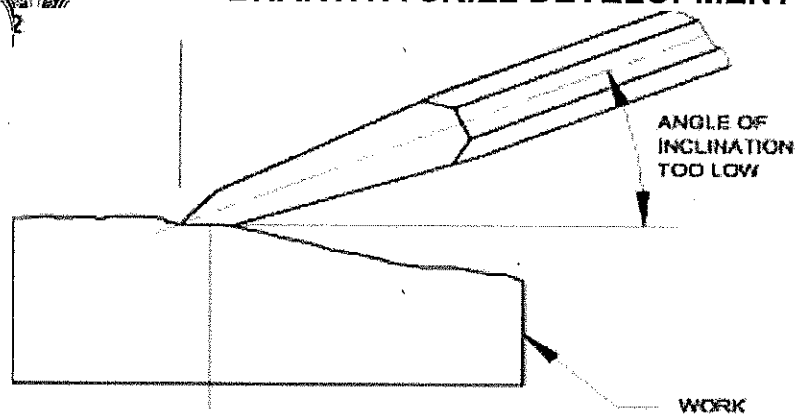
•Rake Angle:

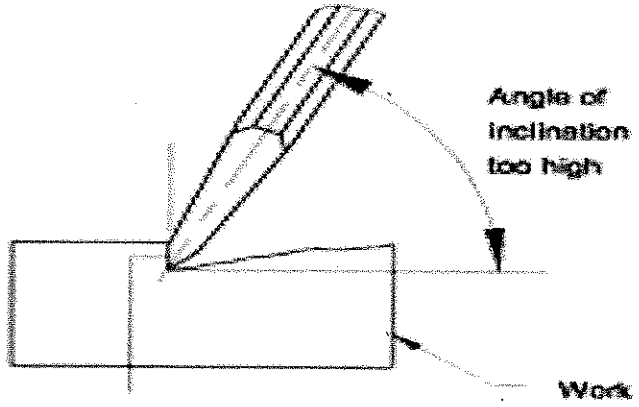
•Rake angle is angle between the top face of cutting point and normal to work surface at cutting edge

•Clearance Angle:

•Clearance angle is angle between the bottom face of point and tangent to the work surface originating at the cutting edge







Effects -

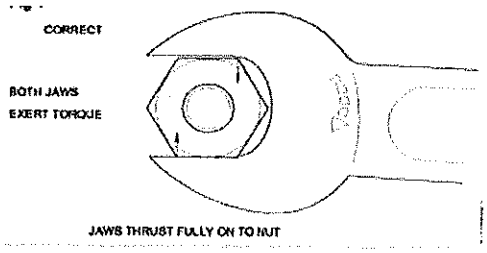
- Angle of Inclination too low, Rake angle increases cutting edge cannot penetrate into work-piece
- Angle of Inclination too high, Rake angle decreases, cutting edge digs in, and the cut progressively increase

Q14. What necessary points should remember while safe and correct using of spanners.

Ans. **Correct use of spanners**

- To fit Exactly a spanner must be:
- Of correct size
- Placed correctly on nut
- In good condition
- Spanners have their jaws slightly wider than the width of the nut sothat they can be placed intoposition easily.

- Any excess more than fewhundredth of millimeter clearancecould cause the spanner to slipunder pressure.



Things to remember

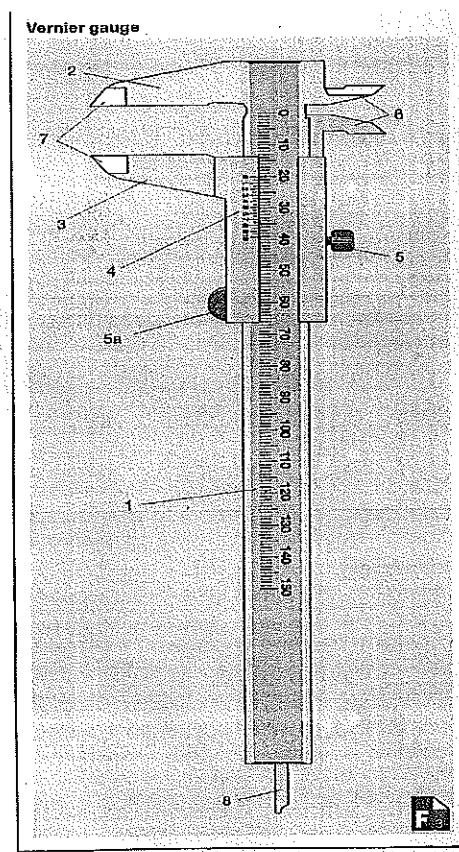
- Place the Spanner so that its jaws arebear fully on flats of nut
- Incorrect use damages the spannersand nuts too
- Discard any defective spanners
- Choose spanners that allow room foruse

Section – C

04X06 = 24 Marks

Q15. Explain the parts of Vernier caliper with diagram.

Ans.



Components of a vernier gauge

A vernier gauge consists of the following parts:

1. The bar with the line graduation in millimetres
2. The fixed measuring jaw.
3. The adjustable measuring jaw.
4. The slide with vernier graduation
5. The retaining screw (type 1A)

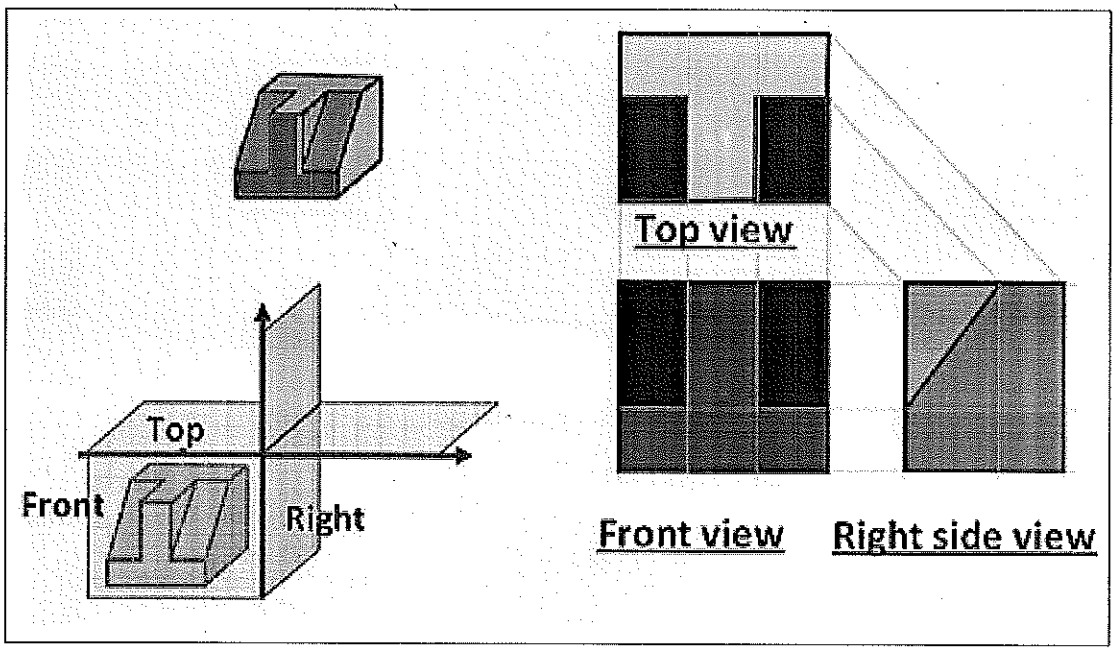
5a. The clamp (type 2A)

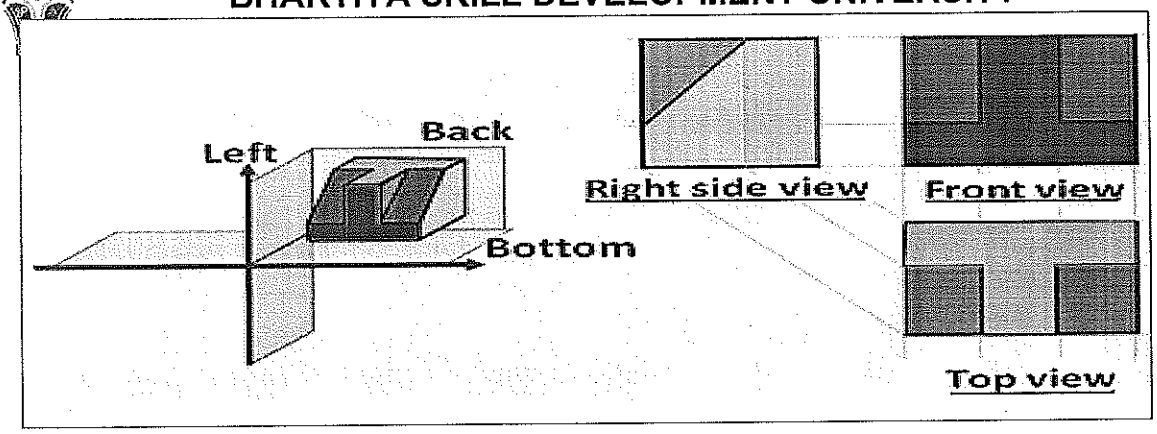
6. The cutting areas for measuring internal dimensions
7. The measuring areas for measuring threads
8. The depth measuring rod for measuring drill depths, groove depths and ridge heights

20

Q.16 Differentiate between first angle and third angle projection?

First angle projection	Third-angle projection
Object is kept in the first quadrant.	Object is assumed to be kept in the third quadrant.
Object lies between observer and the plane of projection.	Plane of projection lies between the observer and the object.
The plane of projection is assumed to be non-transparent.	The plane of projection is assumed to be transparent.
Front (elevation) view is drawn above the XY line	Front (elevation) view is drawn below the XY line
Top (plan) view is drawn below the XY line	Top (plan) view is drawn above the XY line
Left view is projected on the right plane and vice versa	Left view is projected on the left plane itself.
Followed in India, European countries	Followed in USA





Q17. Write short note on surface finish indication

Ans.

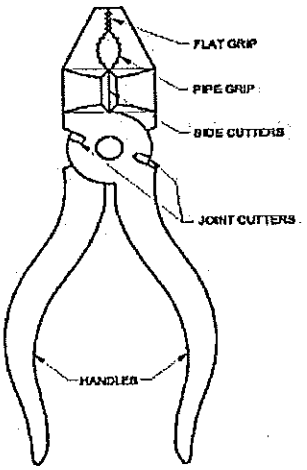
Indication of surface finish	cf. DIN EN ISO 1302 (2002-06)
Symbol / **Meaning**	**Additional marks**
All manufacturing processes are allowed.	a surface parameter[1] with numerical value in µm, transfer characteristic[2]/individual evaluation length in mm
Material removal specified, e.g. turning, milling.	b secondary surface finish requirement (as described for a)
Material removal not allowed or the surface remains in delivered condition.	c manufacturing process
All surfaces around the contour must have the same surface-finish.	d symbol for the required groove direction (table page 100)
	e machining deviation in mm

Indication of surface finish					cf. DIN EN ISO 1302 (2002-06)		
Symbols for groove direction							
Representation of groove direction	=	⊥	X	M	C	R	P
Symbol	=	⊥	X	M	C	R	P
Groove direction	parallel to the projection plane	perpendicular to the projection plane	crossed in two angular directions	multi-directional	approximately concentric to the center	approximately radial to the center	non-grooved surface, non-directional or troughs

Q18. Write and explain different pliers and snips.

Ans. **PLIERS**

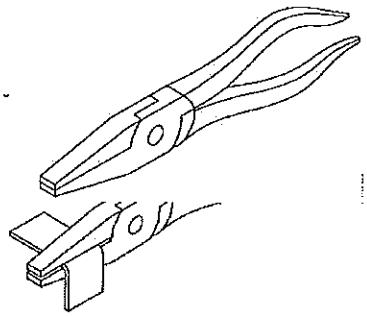
- Pliers have a pair of legs joined by a pivot, hinge orfulcrum pin (combination pliers)
- Each leg consists of long handle and a short jaw
- Elements of pliers:
- Flat Jaw: Serrated for general gripping
- Pipe Grip: serrated for gripping cylindrical objects



- Side Cutters: for cutting off soft wires
- Joint Cutters: two joint cutters for cutting or shearing offsteel wires
- Handles: for applying pressure by hand
- Available in sizes from 150 mm to 230 mm (Size =Overall length)

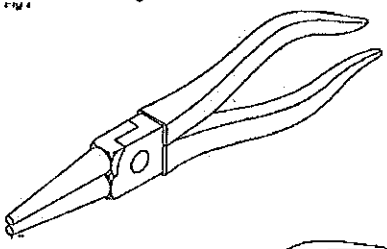
Flat nose plier

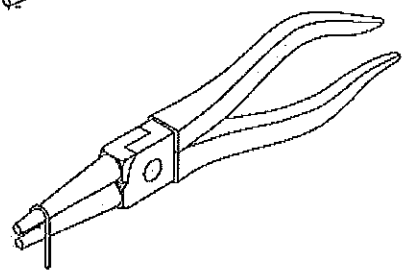
- Flat Nose Pliers has tapered jaws with flat gripping surfaces which may be either smooth or serrated
- It is used for bending and folding narrow strips of thin jobs.



Round nose pliers

- This type of pliers is made with tapered roundshape
- They are used to shapeloops in wires and form curves in light metal strips

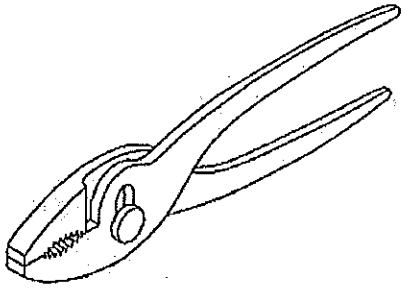




Slip – joint pliers

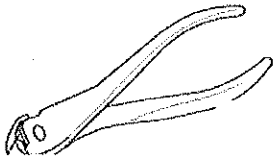
These pliers are available in different ranges of with different shapes of pivot pins so that they have various range of jaw opening.

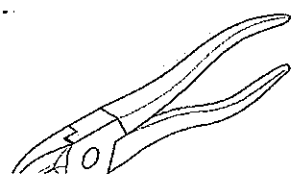
Mainly used for gripping the object.

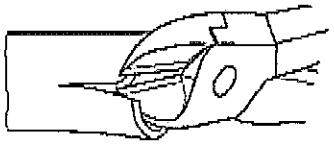


End cutting & side cutting pliers

- They are used for shearing off wires in confined spaces and cutting of wires close to surface level
- They are also used for spreading the cotter pin







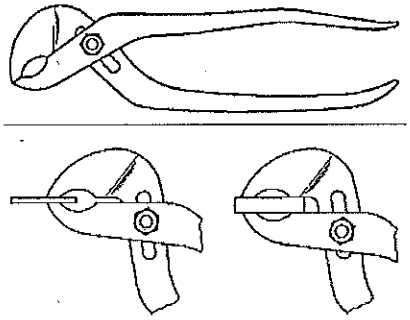
Internal & external circlip pliers

2

- Internal circlip pliers are used to fitand remove internal circlip in the groove

- External circlip pliers are used to fit and remove the external circlip in grooves of the shaft

Slip-joint, multigrip pliers



- Slip joint pliers are has more openings in the legs
- It gives range of jaw opening
- It allows parallel gripping by the jaws in number of positions.
- The shape and length of multi-grip pliers are different from thoseof the slip joint pliers