BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

CI P 301 A

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

End-Sem. Examination

Course Code: AUT1301 Set-A **Time: 2 Hours**

Course Name: Automotive Power Train **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 mark.
3. Answer all questions from section C, each question carries six mark.

Section – A

10X01 = 10 Marks

Q. 1 What is the full form of CVJ?

a. Continuous velocity joint
c. Constant variable joint
b. Constant velocity joint
d. None of the above

Q.2 Viscosity is measure of how easily a .....

a. Liquid flow
c. Acid Build up
b. Cool the engine
d. Cleaning agent work

Q.3 In a seven cylinder four stroke engine the working cycle completes in.....

a. Seven revolution of crankshaft
c. four revolution of crankshaft
b. two revolution of crankshaft
d. One revolution of crankshaft

Q.4 In which condition grease perform better than oils:

a. High bearing load & shock load
c. Temperature extremes
b. Slow journal speed
d. All the above

Q.5 Which of the following air-fuel ratio is considered is as rich mixture in spark ignition system?

a. Below 11:1
c. Below 20:1
b. Below 15:1
d. Above 20:1

Q.6 Fan clutch is part of.....

a. transmission system
c. lubrication system
b. Clutch engaging/dis-engaging
d. cooling system

Q.7 The function of oil scraper rings is to....

a. Retain compression
c. Lubricate cylinder walls
b. Maintain vacuum
d. Reduce piston wear

Q.8 Two types of oil pumps in automotive engines are use.

a. Gear and piston
c. Gear and rotor
b. Rotor and piston
d. Full flow and bypass

Q.9 Which is the most commonly use antifreeze ?

a. Ethyl octane
b. Water
c. Alcohol
d. Ethylene glycol

Q.10 . The transferring of heat from engine to coolant is happened through which heat transfer mode?

a. Convection
b. Conduction
c. Radiation
d. None of the above

Section – B 04X04 = 16 Marks

Q.11 Write short note on

a. Engine gasket
b. Piston rings

Q.12 Explain the Sankey diagram with the help of a neat sketch.

Q.13 Write the difference between mechanical injection and electronic injection system.

Q.14 Explain Engine cooling system and its types.

Section – C

04X06 = 24 Marks

Q.15 Explain Dry sump lubrication system and its components.

Q.16 Explain engine emission control system.

Q.17 Explain fuel supply system for diesel engine with the help of a diagram.

Q.18 What is fasteners? Briefly explain eight different types of fastners.

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Registration No.: .....

Answer key SET A

School of Automotive Skills

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Section – B 04X04 = 16 Marks

Q.11 Write short note on

a. Engine gasket
b. Piston rings

Ans. Gaskets and sealants are used in engines to seal gaps and potential gaps between two or more parts. Gaskets and sealants must be able to withstand:

1.Temperatures to which the engine part may be exposed during normal operation

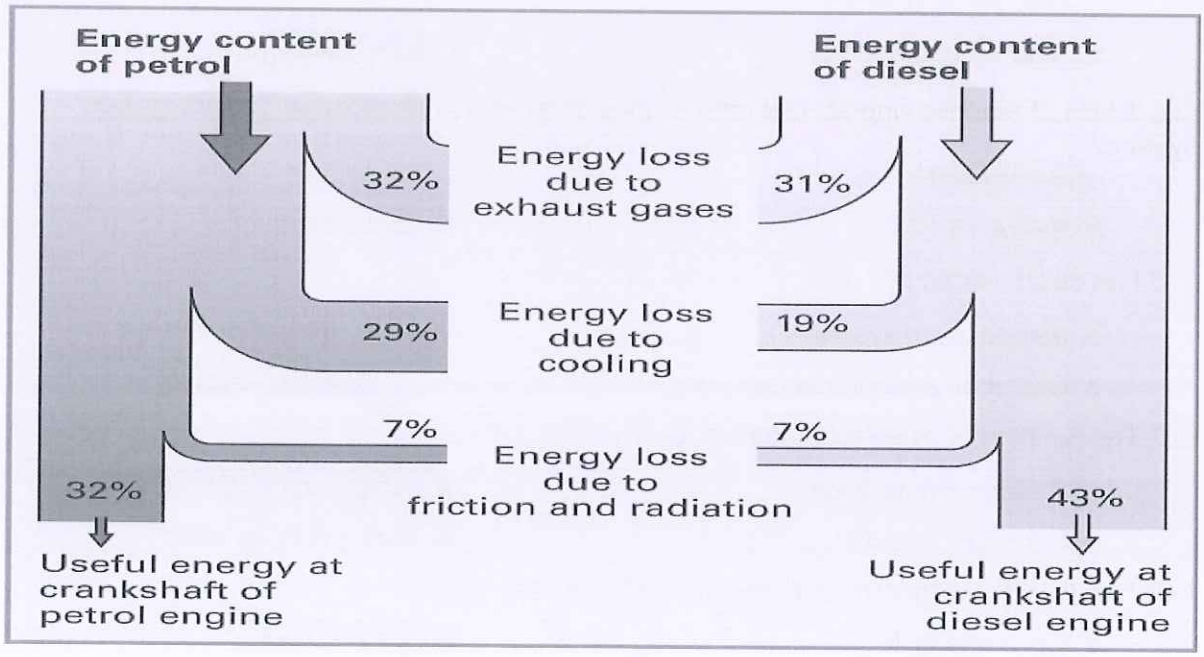
2. Vibrations produced in the engine and the accessories that are attached to the engine

3. Acids and other chemicals that are found in and throughout an engine

4. Expanding and contracting at different rates (They must be able to seal even though the two parts are expanding and contracting at different rates as the engine is started at low temperature all the way to normal operating temperature and repeating this cycle every time the engine is operated.)

Q.12 Explain the Sankey diagram with the help of a neat sketch.

Ans.



Q.13 Write the difference between mechanical injection and electronic injection system.

Ans. Mechanical Injection

Fuel pressure pump, pumps the fuel at a specified pressure (about 700 kpa). Quantity of fuel delivered is controlled in the distributor by the engine manifold pressure. Fuel pressure open the injector to deliver atomised spray of fuel.

- Electronic Injection

Electrical fuel pumps draw fuel through filter & supplies to injector at a pressure which held constant by means of a fuel pressure regulator. Excess fuel is returned to tank by fuel pressure regulator. Vapour lock is prevented in fuel line

Q.14 Explain Engine cooling system and its types.

Ans. The following different types of cooling are used:-

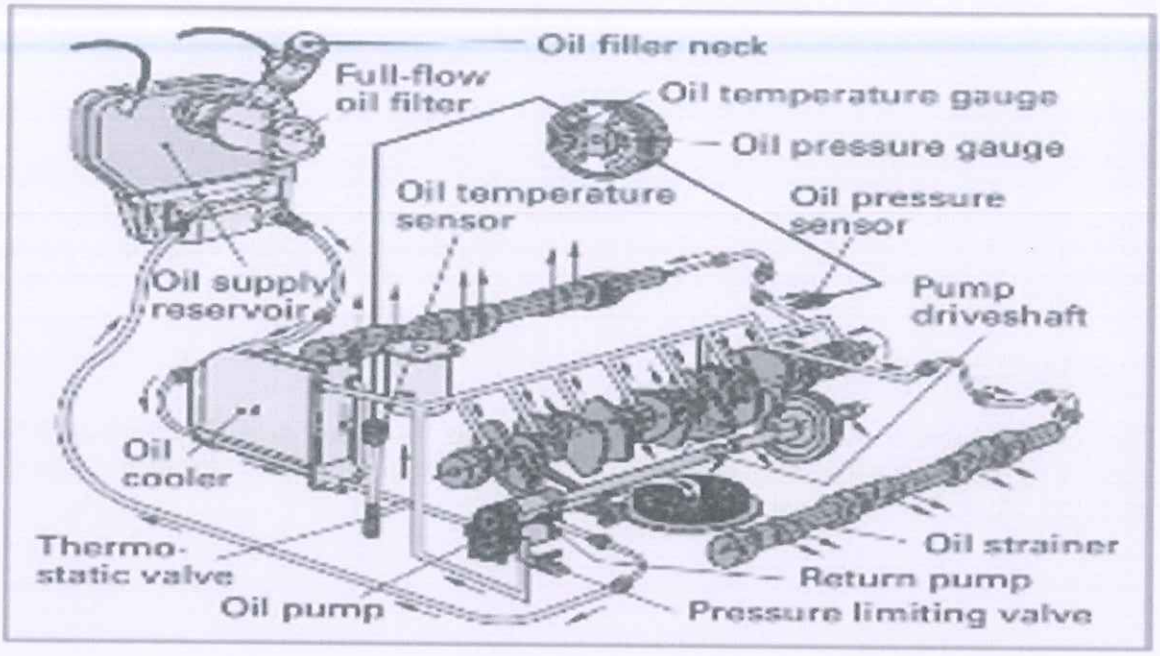
- **Air cooling**
- Airstream cooling
- Forced air cooling
- **Liquid cooling**
- Thermocooling
- Pump Cooling
- **Internal cooling of the combustion chamber by**
- Heat of fuel evaporation

Section – C

04X06 = 24 Marks

Q.15 Explain Dry sump lubrication system and its components.

- Ans. This is a special type of forced-feed lubrication system.
- In this the oil returning to the oil pan is directed by a suction pump to a separate oil supply reservoir.



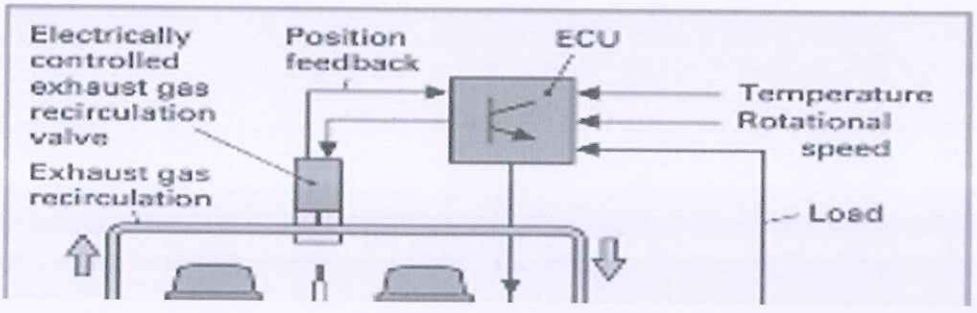
Q.16 Explain engine emission control system.

Ans. **Procedures for reducing pollutants:**

- It is possible to reduce the pollutants constituents in the exhaust gases by using suitable fuel in conjunction with on-engine measures or after-treatment of the exhaust gases.
- **On-engine measures:** A reduction in pollutants is achieved by burning the fuel-air mixture as completely as possible by reducing the fuel consumption. The following On-engine measures can improve the exhaust gas quality:
    - **Suitable engine design:** optimization of combustion chamber and compression ratio; variable intake manifolds; variable valve control with regard to opening time and lift; de throttling of induction process
    - **Type and quality of mixture formation:** exterior/interior mixture formation, homogeneous mixture; stratified charge.
    - **Exhaust gas recirculation:** Internal by valve overlap; external by exhaust gas recirculation.
    - **Engine management system:** Map-controlled ignition and fuel injection, overrun fuel cut-off; boost-pressure control; selective cylinder cut-off; checking function of exhaust-gas-relevant components, e.g. oxygen sensors, catalyst.
    - **Turbocharger with charge-air cooling:** Increase in power output per litre with simultaneously reduction of peak combustion chamber temperature. This reduced the formation of NOx.

EGR System:

- External exhaust gas recirculation involves a portion of the exhaust gas being removed shortly after the exhaust manifold and being remixed with the fuel-air mixture in the intake manifold.



Q.17 Explain fuel supply system for diesel engine with the help of a diagram.

Ans. **DIESEL FUEL SYSTEM BASICS**

INTRODUCTION

The function of the diesel fuel system is to inject a precise amount of atomized and pressurized fuel into each engine cylinder at the proper time. Combustion in a diesel engine occurs when this rush of fuel is mixed with hot compressed air. (No electrical spark is used as in a gasoline engine.)

The fuel system consists of the following components.

FUEL TANKS

There are many different types and shapes of fuel tanks. Each size and shape is designed for a specific purpose. The fuel tank must be capable of storing enough fuel to operate the engine for a reasonable length of time. The tank must be closed to prevent contamination by foreign objects. It must also be vented to allow air to enter, replacing any fuel demanded by the engine. Three other tank openings are required--one to fill, one to discharge, and one to drain.

FUEL LINES

There are three types of diesel fuel lines. These include heavyweight lines for the high pressures found between the injection pump and the injectors, medium weight lines for the light or medium fuel pressures found between the fuel tank and injection pump, and lightweight lines where there is little or no pressure.

FUEL FILTERS

Diesel fuel must be filtered not once, but several times in most systems. A typical system might have three stages of progressive filters--a filter screen at the tank or transfer pump, a primary fuel filter, and a secondary fuel filter. In series filters, all the fuel goes through one filter and then through the other. In parallel filters, part of the fuel goes through each filter.

For more information on fuel filters, see Diesel Fuel Filter Basics.

FUEL TRANSFER PUMPS

Simple fuel systems use gravity or air pressure to get fuel from the tank to the injection pump. On modern high speed diesel engines, a fuel transfer pump is normally used. This pump, driven by the engine, supplies fuel automatically to the diesel injection system. The pump often has a hand primer lever for bleeding air from the system. Modern injection pumps are almost all jerk pumps which use the plunger and cam method of fuel injection.

Q.18 What is fasteners? Briefly explain eight different types of fastners.

Ans. A fastener or fastening is mechanical hardware device that mechanically joins and affixes two or more objects together.

It is used to create non-permanent joint

Three major steel fastener used in the industries

1. Stainless steel
2. Carbon steel
3. Alloy steel

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

Q paper B

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester

End-Sem. Examination

Course Code: AUT1301 Set-B **Time: 2 Hours**

Course Name: Automotive Power Train **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 mark.
3. Answer all questions from section C, each question carries six mark.

Section – A

10X01 = 10 Marks

Q.1 If the intake air temperature of I.C. engine increases, its efficiency will:

a. Increase
c. Remain same
b. Decrease
d. Unpredictable

Q.2 The thermostatic valve opens and provides passage for the flow of water towards the radiator at approximately

a. 90°C
c. 160°C
b. 180°C
d. 250°C

Q.3 The full form of DOHC:

a. Dual overhead camshaft
c. Dual overhand crankshaft
b. Dual overhead crankshaft
d. None of the above

Q.4 Which of the following is one of the major exhaust emissions from CI engines compared to SI engines?

a. Oxides of nitrogen
c. Particulates
b. CO and CO_2
d. Unburnt hydrocarbon

Q.5 The ECU uses which sensor to define the pulse width?

a. oxygen sensor
c. Air mass flow sensor
b. coolant temperature sensor
d. All of the above

Q.6 The gasoline engine requires much _____ air than a diesel engine:

a. Less
c. More
b. Equal
d. None of the mentioned

Q.7 Full form of GDI is .....

a. gasoline direct injection system
c. gasoline diesel inspection system
b. gasoline dual injection system
d. None of the above

Q.8 Removal of air from the pipeline is termed as _____ in injection system:

a. Bleeding
c. Sweating
b. Wound
d. None of the mentioned

Q.9 Viscous coupling used in...

a. cooling system
b. lubrication system
c. transmission system
d. None of the mentioned

Q.10 Fuel is injected into the cylinder at the end of _____ stroke:

a. Suction
b. Compression
c. Expansion
d. Exhaust

Section – B

04X04 = 16 Marks

Q.11 Write short note on

a. Fan clutch
b. Thermostat

Q.12 What is a CRDI system?

Q.13 What is cylinder liner? Explain different type of cylinder liner.

Q.14 What is a lubrication system and explain force feed lubrication system?

Section – C

04X06 = 24 Marks

Q.15 What is an engine cooling system and Explain its types.

Q.16 Explain all kind of pollutants for SI and CI engines and methods to control it.

Q.17 what is a carburetor? Explain different type of carburetors on the basis of jet position?

Q.18 What is cylinder block? Explain types of cylinder block.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

pRegistration No.: .....

Answer key set B

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester

Answer key - Set - B

End-Sem. Examination

Course Code: AUT1301 **Time: 2 Hours**

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d. Exhaust

Section – B 04X04 = 16 Marks

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a. Fan clutch
b. Thermostat

Ans. You might have a temperature control on a wall in your home to control the heating system but, although it's probably marked in degrees, it's not a thermometer. It's called a thermostat, a modern word based on two ancient Greek ones: *thermo* (meaning heat) and *statos* (which means standing and is related to words like stasis, status quo, and static—meaning to stay the same). We can tell just from its name that a thermostat is something that "keeps heat the same": when our home is too cold, the thermostat switches on the heating so things quickly warm up; once the temperature reaches the level we've set, the thermostat switches the heating off so we don't boil.

Let's just be clear about the difference: a thermometer is something that *measures* the temperature; a thermostat is something that tries to *maintain* the temperature (keep it roughly the same).

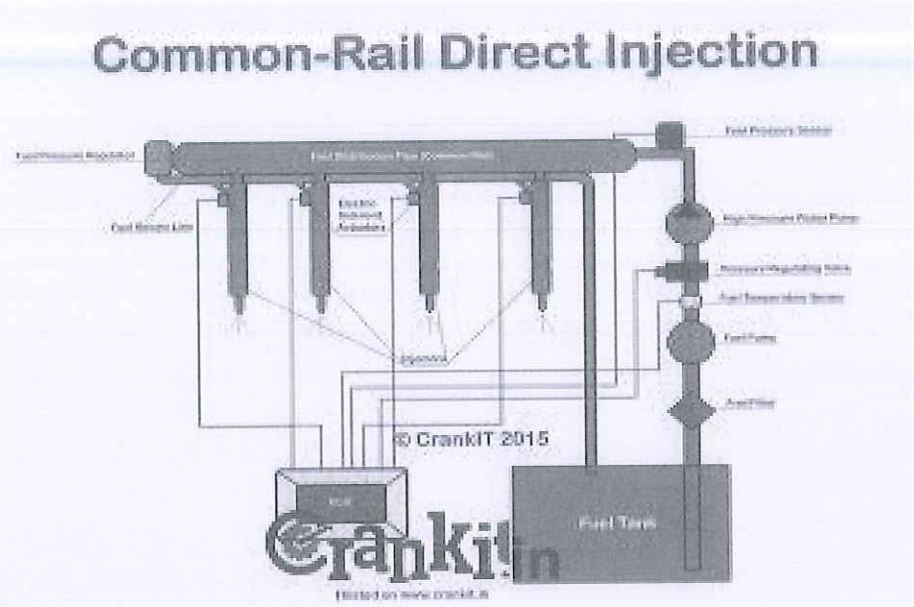
Q.12 What is a CRDI system?

Ans. Common Rail Direct Injection (CRDi):

Most modern engine's fuel systems use an advanced technology known as CRDi or Common Rail Direct Injection. Both petrol end diesel engines use a common 'fuel-rail' which supplies the fuel to injectors. However, in diesel engines, manufacturers refer to this technology as CRDi whereas Petrol engines term it as Gasoline Direct Injection (GDI) or Fuel Stratified Injection (FSI). Both these technologies have a similarity in design since they consist of "fuel-rail" which supplies fuel to injectors. However, they considerably differ from each other on parameters such as pressure & type of fuel used.

In Common Rail Direct Injection, the combustion takes place directly into the main combustion chamber located in a cavity above the piston crown. Today, manufacturers use CRDi technology to overcome some of the deficiencies of conventional diesel engines which were sluggish, noisy and poor in performance when implemented, especially in passenger vehicles.

Following is the schematic Common Rail Direct Injection line diagram:



Q.13 What is cylinder liner? Explain different type of cylinder liner.

- ❖ Ans. **Cylinder block with Cylinder liners:**
- Cylinder liners are inserted into casted iron or aluminum –alloy cylinder blocks.
- They have long service life, since they are more resistant to wear than the cylinder liners of cast iron cylinder blocks.
- There are two types of liners used in cylinder block:

1. Wet cylinder liners
2. Dry Cylinder liners

Q.14 What is a lubrication system and explain force feed lubrication system?

- Ans. This is the most commonly used system.
- A pump draws in the supply of oil from the oil pan through an oil strainer and forces it through pipes and lubricating passages to the engine lubrication points.

Section – C

04X06 = 24 Marks

Q.15 What is an engine cooling system and Explain its types.

Ans. The following different types of cooling are used:-

- ❖ **Air cooling**
- Airstream cooling
- Forced air cooling
- ❖ **Liquid cooling**
- Thermocooling

Pump Cooling

- **Internal cooling of the combustion chamber by**
- Heat of fuel evaporation

Q.16 Explain all kind of pollutants for SI and CI engines and methods to control it.

- Ans. Pollutants are produced by the incomplete burning of the air fuel mixture in the combustion chamber. The major pollutants emitted from the exhaust due to incomplete combustion are:

a) Carbon monoxide (CO)
b) Hydrocarbons (HC)
c) Oxides of nitrogen (NO).

Note: Other products produced are acetylene, aldehydes etc. If combustion is complete, exhaust would be water vapor and CO2.

Carbon monoxide:

- It is a color less gas of about same density of air. It is a poisonous gas which when inhaled, replaces the oxygen in the blood stream so that body's metabolism can not function correctly.
- Small amount of CO slow down the physical & mental activity and produces headaches, while large concentration will kill.
- Hydrocarbon: Resulting from the release of unburned fuel into the atmosphere.
- Produced by incomplete combustion or by fuel evaporation.
- Mostly related to ignition problems
- Effect could be eye, throat, and lung irritation, and, possibly cancer.
- Oxides of nitrogen: Produced by extremely high temperatures during combustion.
- Air consist of about 79% nitrogen and 21% oxygen.
- With enough heat (above 2500ºF / 1370ºC), nitrogen and oxygen in air-fuel mixture combines to form NOx emissions.

Q.17 what is a carburetor? Explain different type of carburetors on the basis of jet position?

Ans The main parts of carburettor are: -

- Float chamber
- Fuel jet
- Venturi
- Nozzle
- Throttle valve

Float chamber

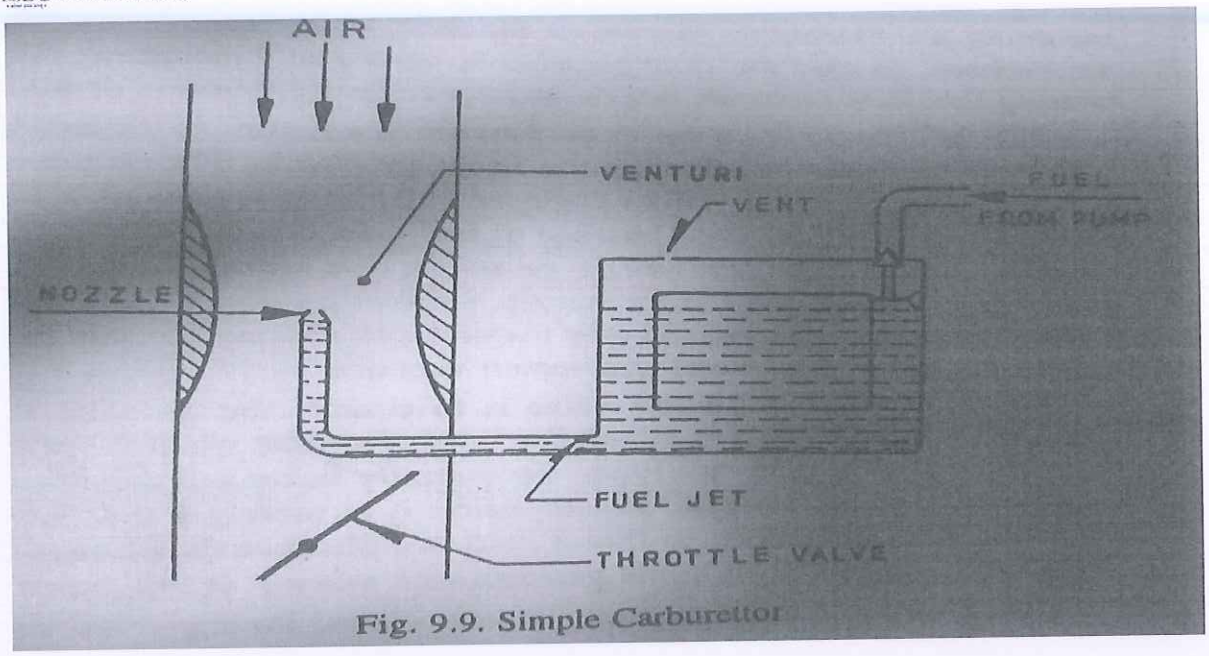


Fig. 9.9. Simple Carburettor

Q.18 What is cylinder block? Explain types of cylinder block.

- Ans. **Cylinder Block**: The cylinders of liquid-cooled engines are usually combined to form a single block.

Stresses:

High combustion pressures and temperatures

High thermal stresses due to rapid temperature changes.

Cylinder barrel subject to wear due to piston friction and combustion residues.

Increases friction during cold starting, uncarburated fuel washes lubricant layer off the cylinder.

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School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1302 **Time: 2 Hours**

Course Name: Automotive Braking, Suspension and Steering **Max. Marks: 50**

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

10X01 = 10 Marks

Q.1 What is the value of G for steel if, the spring rate (K) for coil springs is expressed by the formula:

$$K = \frac{Gd4}{8ND3}$$

a) 11,250,000
b) 11,350,000
c) 11,450,000
d) 12,000,000

Q 2. I Which component of suspension system is made of a special round spring steel wrapped in a helix shape?

a) Leaves of leaf spring
b) Coil Spring
c) Bushes
d) None of the above

Q.3 What does DPT stands for:

a) Dry park test
b) Dull push test
c) Dew point test
d) None of the above

Q 4. The leaves of a leaf spring are held together by a:

a) Centering Pin
b) Centre Bolt
c) Both a & b
d) None of them

Q 5. The friction lining on brake shoes or the brake pads is done using:

a) Bakelite
b) Asbestos
c) Silicon
d) Diamond

Q.6 The shock absorber is also known as damper because they:

a) Absorb the sound of springs
b) Absorb the vibrations of springs
c) Absorb the heat of springs
d) All of the above

Q 7. Which of the following are the component of HPS system?

a) Torsional bar
b) Rotary slide valve
c) Hoses and fitting
d) All of the above

Q.8 which of these are the tire repairing process.

a) plug installation
b) cold patch installation
c) Hot patch installation
d) All of the above

Q.9 Does the Spring Rate Change as the Vehicle Gets Older?

a) YES
b) NO

Q 10 Which type of suspension system Allows one wheel to move up and down with minimum effect to the other?

a) Independent
b) Rigid
c) Flexible
d) None of the above

Section – B

04X04 = 16 Marks

Q 11. Write the classification of different types of axle.

Q 12. What is steering ratio and how is it calculated? Give an example for calculations done for finding Steering Ratio.

Q. 13 Write any two difference between dead axle and live axle.

Q. 14 Explain the working of control valves in ABS system.

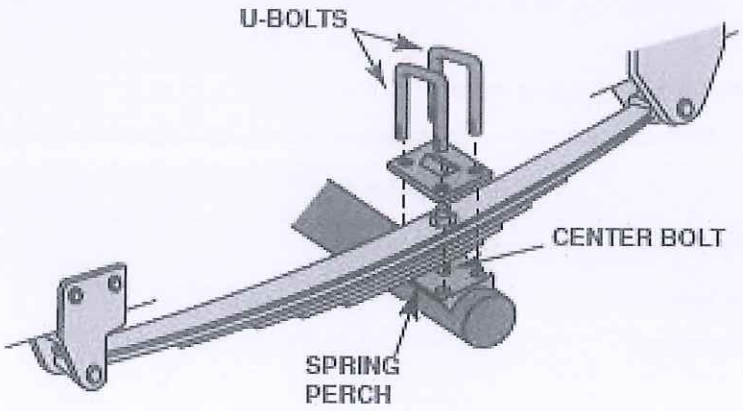
Section – C

04X06 = 24 Marks

Q 15. Explain operating principle of EPS.

Q 16. Differentiate between 3 channel single channel ABS.

Q 17. Explain the construction and working of a leaf spring system with the help of a neat sketch.



Q 18. Explain the SOP to remove the front axle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

3d+A

Course Code: AUT1302 Answer key **Time: 2 Hours**

Course Name: Automotive Braking, Suspension and Steering **Max. Marks: 50**

Instruction: (if any)

Section – A

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c) Flexible
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Section – B

04X04 = 16 Marks

Q 11. Write the classification of different types of axle.

- Ans. **Front Axle**

1.Dead Front Axle

2. Live Front Axle

- **Rear Axle:**

1. Full Floating Axle

2. Semi Floating

3. Three Quarter Floating

- **Stub Axle:**

1. Elliot

2. Reversed Elliot

3. Lemoine

4. Reversed Lemoine

Q 12. What is steering ratio and how is it calculated? Give an example for calculations done for finding Steering Ratio.

Ans. To calculate the steering ratio, divide the lock-to-lock steering wheel rotation in degrees by the total front wheel movement in degrees.

- **For example:**
- If the lock-to-lock steering wheel rotation is 3.5 turns, or 1,260°, and the total front wheel movement is 60°, the steering ratio is 1,260 ÷ 60 = 21:1. As a general rule, large, heavy cars have higher numerical steering ratios than small, lightweight cars.

Q. 13 Write any two difference between dead axle and live axle.

Ans. **Dead Axle:** Which does not transfer any power and acts like a beam is known as a dead axle.

- The dead axle is also known as a lazy axle. The dead axle is not a working part of a drivetrain but is actually on the drivetrain. It is not responsible for the motion of a car as it doesn't transfer any power to wheels. Instead, it is just a freely rotating axle used to mount bearings, wheels sometimes even gears. No differential or driveshaft is attached or connected with it.
- **Live Axle:** Live axle transmits power to wheels coming from the differential. Or a mechanical engineer will call it a 'prime mover'.
- The live axle is in a two half axles both of which are combined with a differential using the universal joint. Each half of a joint is connected to its corresponding wheels using constant velocity joint (CV). The role of CV joint is to facilitate vertical as well as pivot motions of a wheel assembly.

Q. 14 Explain the working of control valves in ABS system.

Ans. **CONTROL VALVES** Electrically operated **solenoid valves** (or motor-driven valves in the case of Delphi ABS-VI applications) are used to hold, release, and reapply hydraulic pressure to the brakes. This produces a pulsating effect, which can be felt in the brake pedal during hard braking. The rapid modulation of brake pressure in a given brake circuit reduces the braking load on the affected wheel and allows it to regain traction to prevent lockup. The effect is much the same as pumping the brakes, except that the ABS system does it automatically for each brake circuit, and at speeds that would be humanly impossible—up to 20 times per second depending on the system (some cycle faster than others). Once the rate of deceleration for the affected wheel catches up with the others, normal braking function and pressure resume, and antilock reverts to a passive mode.

Section – C

04X06 = 24 Marks

Q 15. Explain operating principle of EPS.
Ans. The energy for steering support is supplied by the drive motor. A high-pressure pump pumps hydraulic oil from a reservoir to a control valve. Depending on whether it was driven in on the right or left, it transfers the working pressure to the sides of a working piston. This supports the movement of the rack or the steering nut.

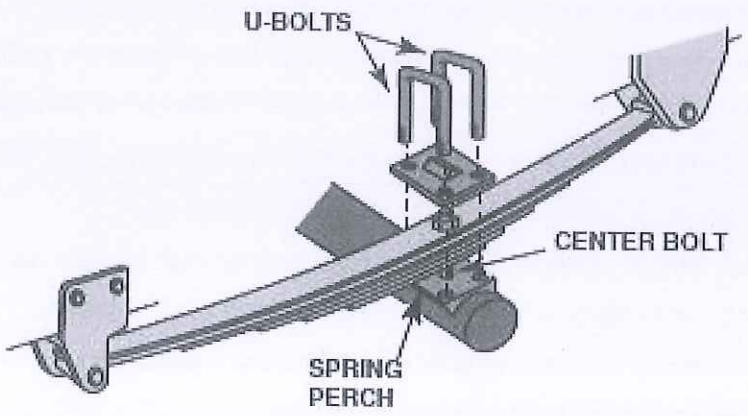
After the pressure is released, the hydraulic oil returns to the reservoir. If the working piston is fully extended in one direction at full steering angle, the pressure is reduced via a pressure relief valve to prevent damage. You can tell by a hissing sound.

Q 16. Differentiate between 3 channel single channel ABS.
Ans. **THREE-CHANNEL ABS SYSTEMS** Some four-wheel ABS systems have a separate wheel speed sensor for each front wheel but use a common speed sensor for both rear wheels. These are called "three-channel" systems. The rear wheel speed sensor is mounted in either the differential or the transmission. The sensor reads the combined or average speed of both rear wheels. This type of setup saves the cost for an additional sensor and reduces the complexity of the system by allowing both rear wheels to be controlled simultaneously. This is known as the **select low principle.** Three-channel systems are the most common type of ABS setup used on rear-wheel-drive applications.

- **SINGLE-CHANNEL ABS SYSTEMS** The single-channel rear wheel-only ABS system is used on many rear-wheel-drive pickups and vans. Ford's version is called **Rear Antilock Braking System (RABS),** while General Motors and Chrysler call theirs **Rear Wheel**

Q 17. Explain the construction and working of a leaf spring system with the help of a neat sketch.
Ans. **LEAF SPRINGS: Leaf springs** are constructed of one or more strips of long, narrow spring steel. These metal strips, called leaves, are assembled with plastic or synthetic rubber insulators between the leaves, allowing for freedom of movement during spring operation.

The ends of the longest spring leaf are rolled or looped to form eyes. Rubber bushings are installed in the eyes of the spring and act as noise and vibration insulators. The leaves are held together by a **centre bolt,** also called a *centring pin.*



Q18. Explain the SOP to remove the front axle.

Ans. **VISUAL INSPECTION:** All suspension components should be carefully inspected for signs of wear or damage. A thorough visual inspection should include checking all of the following:

- Shock absorbers or struts.
- Springs
- Stabilizer bar links
- Stabilizer bar bushings
- Upper and lower shock absorber mounting points
- Bump stops
- Body-to-chassis mounts
- Engine and transmission (transaxle) mounts
- Suspension arm bushings

1. Remove the wheel from wheel mounting.
2. Remove the lock nut from the wheel.
3. Remove the circlip from the axle.
4. Pull the axle from the CV joint in geaebox and differential.

DRY PARK TEST (SUSPENSION): A **dry park test** can also be used to help locate worn or defective suspension components. The dry park test is performed by having an assistant move the steering wheel side to side while feeling and observing for any free play in the steering or suspension.

1. Front wheel bearings
2. Control arm bushing wear or movement.
3. Ball joint movement.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

OP Set B

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1302 Set-B **Time: 2 Hours**

Course Name: Automotive Braking, Suspension and Steering **Max. Marks: 50**

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

10X01 = 10 Marks

Q.1 The shock absorber is also known as damper because they:

a) Absorb the sound of springs
c) Absorb the heat of springs
b) Absorb the vibrations of springs
d) All of the above

Q 2. I Which component of suspension system is made of a special round spring steel wrapped in a helix shape?

a) Leaves of leaf spring
c) Bushes
b) Coil Spring
d) None of the above

Q 3. Which type of suspension system Allows one wheel to move up and down with minimum effect to the other?

a) Independent
c) Flexible
b) Rigid
d) None of the above

Q 4. The leaves of a leaf spring are held together by a:

a) Centering Pin
c) Both a & b
b) Centre Bolt
d) None of them

Q 5. The friction lining on brake shoes or the brake pads is done using:

a) Bakelite
c) Silicon
b) Asbestos
d) Diamond

Q 6. Which of the following are the component of HPS system?

a) Torsional bar
c) Hoses and fitting
b) Rotary slide valve
d) All of the above

Q.7 which of these are the tire repairing process.

a) plug installation
c) Hot patch installation
b) cold patch installation
d) All of the above

Q.8 What is the value of G for steel if, the spring rate (K) for coil springs is expressed by the formula:

$$K = \frac{Gd4}{8ND3}$$

a) 11,250,000
b) 11,350,000
c) 11,450,000
d) 12,000,000

Q.9 Does the Spring Rate Change as the Vehicle Gets Older?

a) YES
b) NO

Q.10 What does DPT stands for:

a) Dry park test
b) Dull push test
c) Dew point test
d) None of the above

Section – B

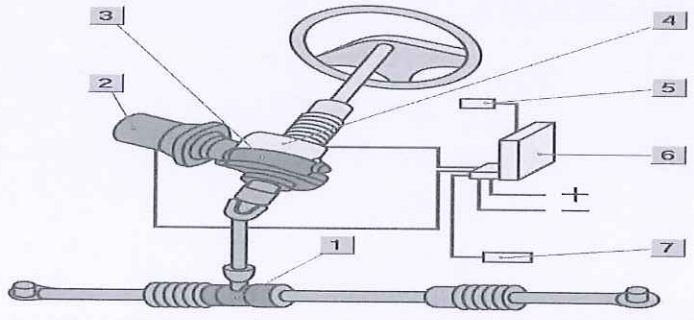
04X04 = 16 Marks

Q 11. Write a short note on:

a. Macpherson Strut Suspension
b. Wishbone

Q 12. What is steering ratio and how is it calculated? Give an example for calculations done for finding Steering Ratio.

Q. 13 write the component of EPS.



Q. 14 How to identify to problem occur in wheel and tires?

Section – C

04X06 = 24 Marks

Q 15. Explain operating principle of HPS.

Q 16. Which system must be used for avoiding skidding of vehicle in case of sudden braking? Explain the components and working of this system in details.

Q 17. Explain the construction and working of a leaf spring system with the help of a neat sketch.

Q 18. What type of problems can occur in a suspension system? Explain briefly the reason of their occurrence and the process through which they can be diagnosed and rectified.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

Set B

End-Sem. Examination

Set-B

Course Code: AUT1302 **Time: 2 Hours**

Course Name: Automotive Braking, Suspension and Steering **Max. Marks: 50**

Instruction: (if any)

Answer key

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Section – B

04X04 = 16 Marks

Q 11. Write a short note on:

a. Macpherson Strut Suspension

Ans. MacPherson Sturt: The **MacPherson strut** is a type of automotive **suspension** system that uses the top of a telescopic damper as the upper steering pivot. It is widely used in the front **suspension** of modern vehicles and is named for American automotive engineer Earle S. **MacPherson**, who originally invented and developed the design.

b. Wishbone

Ans. **WishBone:** The short/long-arm suspension uses a short upper control arm and a longer lower control arm and usually is referred to as the *SLA-type suspension.* This type of

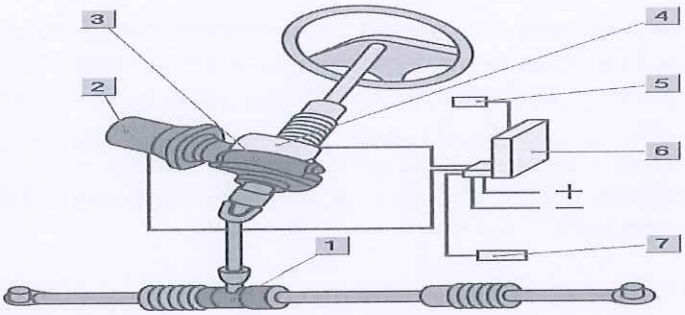
suspension system goes by a variety of names, including unequal-arm suspension, double-wishbone suspension, or **A-arm** suspension.

Q 12. What is steering ratio and how is it calculated? Give an example for calculations done for finding Steering Ratio.

Ans. To calculate the steering ratio, divide the lock-to-lock steering wheel rotation in degrees by the total front wheel movement in degrees.

- **For example:**
- If the lock-to-lock steering wheel rotation is 3.5 turns, or 1,260°, and the total front wheel movement is 60°, the steering ratio is 1,260 ÷ 60 = 21:1. As a general rule, large, heavy cars have higher numerical steering ratios than small, lightweight cars.

Q. 13 write the component of EPS.



Ans.

1. Mechanical steering gear
2. Electric motor
3. Worm gear unit
4. Torque sensor
5. Distance signalling device
6. Control unit
7. Speed signal transmitter

Q. 14 How to identify to problem occur in wheel and tires?

Ans. **Identify the Problems:** To remove the problem it is necessary to identify the problem and what are the causes of these problems, so there are so many processes to identify problems and the processes are

1. Test drive
2. Visual inspection or sensory inspection
3. Using some measuring or testing equipment's

- **These are some problem which generally occurs**

1. Tire noise and steering problem
2. Tread wear
3. Air leak from tire
4. Vibration in steering wheel

Section – C

04X06 = 24 Marks

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Ans. The energy for steering support is supplied by the drive motor. A high-pressure pump pumps hydraulic oil from a reservoir to a control valve. Depending on whether it was driven in on the right or left, it transfers the working pressure to the sides of a working piston. This supports the movement of the rack or the steering nut.

After the pressure is released, the hydraulic oil returns to the reservoir. If the working piston is fully extended in one direction at full steering angle, the pressure is reduced via a pressure relief valve to prevent damage. You can tell by a hissing sound.

Q 16. Which system must be used for avoiding skidding of vehicle in case of sudden braking? Explain the components and working of this system in details.

Ans.

Antilock braking systems (ABS) help prevent the wheels from locking during sudden braking, especially on slippery surfaces. This helps the driver maintain control. Antilock brakes increase safety because they eliminate lockup and minimize the danger of skidding, allowing the vehicle to stop in a straight line. ABS also allows the driver to maintain steering control during heavy braking so the vehicle can be steered to avoid an obstacle or another vehicle.

- **On dry or wet pavement, maximum braking traction occurs when tire slip is held between approximately 15% and 30%.**

- **TIRE SLIP AND BRAKING DISTANCE:** On dry or wet pavement, maximum braking traction occurs when tire slip is held between approximately 15% and 30%. On snow- or ice-covered pavement, the optimum slip range is 20% to 50%. In each case, if tire slip increases beyond these levels, the amount of traction decreases. A skidding tire with 100% slip provides 20% to 30% less braking traction on dry pavement, and this is generally true on slippery roads as well. In nearly all cases, the shortest stopping distances are obtained when the brakes are applied with just enough force to keep the tire slip in the range where traction is greatest.

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Ans. **LEAF SPRINGS: Leaf springs** are constructed of one or more strips of long, narrow spring steel. These metal strips, called leaves, are assembled with plastic or synthetic rubber insulators between the leaves, allowing for freedom of movement during spring operation.

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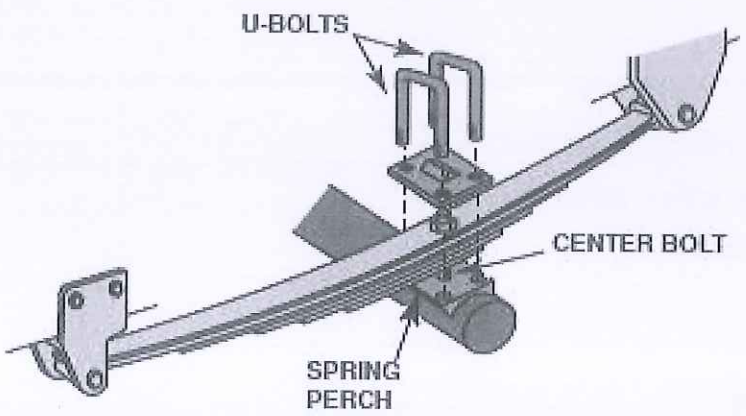

Q.18. What type of problems can occur in a suspension system? Explain briefly the reason of their occurrence and the process through which they can be diagnosed and rectified.

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1. Front wheel bearings
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3. Ball joint movement.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester) Set A

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1303 Set A **Time: 2 Hours**

Course Name: Automotive body works **Max. Marks: 50**

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

10X01 = 10 Marks

1) The loads supported by an automobile frame are:
   a) Weight of the body, passengers and cargo loads
   b) Torque from engine and transmission
   c) Sudden impacts from collisions
   d) All of the mentioned

2) Worker operating with hammer do not need.....
   a) Safety glasses
   b) Safety shoes
   c) Hearing protection
   d) Respirator

3) The ionized state of gas is called .....
   a) Fume
   b) Liquid
   c) Helium
   d) Plasma

4) Which type of weld involves filling a hole in one of the parts with molten metal?
   a) Butt
   b) Plug
   c) Fillet
   d) Spot

5) Machine guards should be fitted to protect the operator and other nearby from.....,
   a) Flying chips and sparks
   b) Rotating parts
   c) Points of operation
   d) All of the these

6) An upraised part on the hood which directs the air flow into the engine compartment is called.....

a) Hood scoop
b) Bumper
c) Spoiler
d) Wings

7) Door replacement should be done only when:

a) The inner panel damaged and can be easy repaired.
b) The inner panel still usable.
c) It has large dent on the door skin.
d) All of the above.

8) Which of the following ray is not produce during welding?

a) Ultra violet rays
b) Infrared rays
c) Visible light rays
d) Gamma rays

9) .....are typically used for hammer-forming flat sheet metal into custom shapes.

a) Sliding hammers
b) Dollies
c) Mallets
d) Nibblers

10) The first step of denting procedure is to:

a) Cut the surface
b) Apply body fillers
c) Apply sanding
d) Inspect the dented areas

Section – B

04X04 = 16 Marks

11) Explain the process of Door Removal in an Automotive vehicle.
12) Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.
13) What are the various PPE must be considered in an Automotive workshop?
14) Write the SOP's of removing front bumper assembly.

Section – C

04X06 = 24 Marks

15) Discuss the Traditional and PDR dent repair techniques.
16) Write short notes on:

a) Mini Puller
b) Grinder
c) Carbon Heating Electrode

17) Discuss the reason behind spot welding in Automobile vehicle.
18) Discuss the quarter panel removal process in a vehicle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

S.R.A

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1303 Answer key set-A **Time: 2 Hours**

Course Name: Automotive body works **Max. Marks: 50**

Instruction: (if any)

Section – A

10X01 = 10 Marks

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Section – B

04X04 = 16 Marks

11) Explain the process of Door Removal in an Automotive vehicle.

Ans.

1. Door frame preparation
2. Clean the frame
3. Replacement of door trim carefully.
4. Remove all the plastic locks
5. Remove the sealant below the door trim
6. Carefully open the fasteners and hinges.
7. Remove the door carefully and take care of the glass
8. Now place the door on the table.
9. Door is removed from the vehicle.

12) Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.

Ans. **Chemical paint remover**

Caustic paint removers, typically sodium hydroxide (also known as lye or caustic soda), work by breaking down the chemical bonds of the paint, usually by hydrolysis of the chain bonds of the polymers forming the paint. Caustic removers must be neutralized or the new finish will fail prematurely.
many are absorbed readily through the skin or are inhaled easily, some paint stripping chemicals can irritate the skin and eyes or cause headaches, drowsiness, nausea, dizziness, or loss of coordination.

Dry Sanding

Dry sanding abrasive paper usable over a wide range, from base adjustment of metal and woodworking polishing to coating film polishing. Dry sanding requires small circles. This way, each successive pass works to remove the scratches from the previous one.

Dry sanding is a lot less labor intensive, is less time consuming, and more times than not, creates more of a professional look. The smoother finish is better achieved through the mechanical process of the sander than the physical process of the sponge.

13) What are the various PPE must be considered in an Automotive workshop?

Ans: -

The Health and Safety at Work Act imposes on employers a statutory duty to ensure safe working conditions and an absence of risk in the use of equipment and the handling of materials, and to comply with Regulations regarding safe working practices in order to reduce to a minimum the hazards to health and safety associated with vehicle body repair work. To skilled and experienced operators this does not mean that any additional restrictions are imposed on their activities, but merely that they should carry out their tasks with constant regard for the health and safety of themselves and their fellow workers.

- Safety glasses and hearing protection - every person entering the workshop must collect these items from just inside the door. They must be worn at all times.
- Students that wear glasses should be aware these are not safety glasses, they are only impact resistant and may shatter, safety glasses must be worn.
- All loose clothing (e.g. shirts hanging out) must be tucked in.
- Safety boots or enclosed shoes must be worn in the workshop. Do not enter under any circumstances without this footwear, there are no exceptions to this rule.
- Long hair has to be tied up including fringes.
- Remove rings and loose jewelry before operating machinery they can be a hazard

14) Write the SOP's of removing front bumper assembly.

Ans: -

Step 1- Remove Front Beauty Cover

- Remove plastic push-pins holding the top plastic shroud that rests on top of the front clip and extends around the engine bay, including the weather-stripping used to seal out water.
- Once all pins are removed, peel back the weather stripping to loosen the cover.
- Pins locations shown with arrows in the photo below. Once free, set the cover aside.

Step 2- Remove Plastic fasteners

- Remove the plastic fasteners on the upper portion of the front bumper on each side.
- Use a flathead screw driver or the appropriate removal tool and pry upward.

Step 3 - Remove Upper portion bolts

- Remove the 10mm Bolts on the upper portion of the bumper

Step 4 - Remove Clips from Under Bumper

- Remove push pin clips from the bottom side of the bumper which hold the splash shield in place.
- Use a flathead screw driver or the appropriate removal tool and pry away.

Step 5 - Remove Clips from the fender areas

- Use a flathead screw driver or the appropriate removal tool and pry away.

Step 6 - Remove Front Clip

- Pull sides of front bumper outward until retention clips release on driver and passenger side.
- See photo below for arrows showing location of retention clips.
- After each side is successfully released, remove front bumper by pulling forward from the grill area. You will not be fully removing the bumper from the car at this moment.

Step 7 - Remove Fog Light Clips and Head Lamp Washer hose

Step 8 - Complete Removing the Front Bumper

- Fully remove the front bumper by continuing to pull forward in a slow motion.

If removing the bumper, yourself, its recommended to place a towel/blanket on the ground so that you do not scrape anything if dragged or dropped on the ground

Section – C

04X06 = 24 Marks

15) Discuss the Traditional and PDR dent repair techniques.

Ans: -

Traditional dent repair fills in auto body dents with paint or body filler, which is then painted to match the rest of the vehicle's exterior. While this process can make a vehicle look as good as new, it doesn't address the actual dent in a way that is a sustainable, long-term solution. It's also time-consuming, expensive and can impact the re-sale value of your vehicle.

Paintless Dent Repair, on the other hand, requires no fillers and no sanding. More and more consumers are finding PDR to be an effective and inexpensive alternative to getting minor repairs done at a body shop. PDR offers more "bang for your buck" than traditional dent repair methods and is a great way to care for your vehicle's exterior affordably.

16) Write short notes on:

a) Mini Puller
b) Grinder
c) Carbon Heating Electrode

Ans: -

Mini Puller

- It is generally used in deep and targeted dent in small area.
- It reduces the human effort.

Carbon Heating Electrode

- It is the consumables for spot welding of sheet metal shrink repair, dent pulling application.

Grinder

- A sander or grinder is a must-have tool for the quick removal of paint, primer and old body filler from an area being repaired.
- These tools are available in electric or pneumatic models, and in different sizes, motor speeds, and price ranges.
- You have a choice between an electric sander and a pneumatic model. If you don't own an air compressor, an electric sander will suffice, since your shop is most likely small enough to allow for an extension cord to reach electric outlets. If you already have an air compressor that can maintain large volume of air, a pneumatic model may serve your purposes better. Pneumatic sander can withstand longer, nonstop use, while electric models have a tendency to overheat. When it overheats, an electric sander's motor will shut down; you can get the sander going by pressing a reset switch, but this can lead to inconvenient interruptions as you work.

17) Discuss the reason behind spot welding in Automobile vehicle.

Ans. Spot welding (also known as resistance spot welding) is a resistance welding process. This welding process is used primarily for welding two or more metal sheets together by applying pressure and heat from an electric current to the weld area.

Typically, a car body contains about 5000 spot welds joining sheets of different thicknesses. Spot welding is primarily used for joining parts that are normally up to 3 mm in thickness. Thickness of the parts to be welded should be equal or the ratio of thickness should be less than 3:1. The strength of the joint depends on the number and size of the welds. Spot-weld diameters range from 3 mm to 12.5 mm. Spot welding typically delivers current for 0.1 seconds or less, so the current must be extremely high. Spot-welding machines typically deliver 150 amps per phase draw on a 440-volt system.

18) Discuss the quarter panel removal process in a vehicle.

Ans. Step 1

Unscrew the lug nuts on the left and right front wheel using a tire iron. Use a car jack to raise the front end of the vehicle and rest the front end onto jack stands. Pull the wheels off the frame.

Step 2

Unscrew the screws that are holding the cover in place inside the wheel well and remove the wheel well cover from the frame.

Step 3

Locate the bolts inside the wheel well that are holding the quarter panel in place on the vehicle's frame. Find the right-size socket in the socket set that matches the securing bolts. Remove the bolts using the ratchet and socket.

Step 4

Open the hood of the vehicle and locate the bolts on the side of the engine compartment that are securing the quarter panel to the frame. Remove the bolts using the ratchet and socket.

Pull the quarter panel off the frame.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

Set B

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Set B

Course Code: AUT1303 **Time: 2 Hours**

Course Name: Automotive body works **Max. Marks: 50**

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

10X01 = 10 Marks

1) The loads supported by an automobile frame are:
   a) Weight of the body, passengers and cargo loads
   b) Torque from engine and transmission
   c) Sudden impacts from collisions
   d) All of the mentioned

2) Worker operating with welding machine do not need.....
   a) Safety glasses
   b) Safety shoes
   c) Hearing protection
   d) Respirator

3) Which one of these is the 4th state of matter.....
   a) Fume
   b) Liquid
   c) Helium
   d) Plasma

4) Which type of welding joint join the edges of the material?
   a) Butt
   b) Plug
   c) Fillet
   d) Spot

5) Machine guards should be fitted to protect the operator and other nearby from.....,
   a) Flying chips and sparks
   b) Rotating parts
   c) Points of operation
   d) All of the these

6) An upraised part on the trunk which directs the air flow to be used as aerodynamic brake.....

a) Hood scoop
b) Bumper
c) Spoiler
d) Wings

7) Door replacement should be done only when:

a) The inner panel damaged and can be easy repaired.
b) The inner panel still usable.
c) It has large dent on the door skin.
d) All of the above.

8) Which of the following ray is not produce during welding?

a) Ultra violet rays
b) Infrared rays
c) Visible light rays
d) Gamma rays

9) .....are typically used for hammer-forming flat sheet metal into custom shapes.

a) Sliding hammers
b) Dollies
c) Mallets
d) Nibblers

10) Which process is done for filling and finishing the dents:

a) Cut the surface
b) Apply body fillers
c) Apply sanding
d) Inspect the dented areas

Section – B

04X04 = 16 Marks

11) Explain the process of Scissor machine removal in door in an Automotive vehicle.
12) Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.
13) What are the various PPE must be considered in an Automotive workshop?
14) Write the SOP's of removing front light assembly.

Section – C

04X06 = 24 Marks

15) Discuss the Traditional and PDR dent repair techniques.
16) Write short notes on:

a) Dent puller Gun
b) Parallel beam dent puller
c) Stamping tool

17) Discuss the reason behind spot welding in Automobile vehicle.
18) Discuss the Fender removal process in a vehicle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

Set-B

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1303 **Time: 2 Hours**

Course Name: Automotive body works **Max. Marks: 50**

Instruction: (if any)

Answer key Set-B

Section – A

1) The loads supported by an automobile frame are:
   a) Weight of the body, passengers and cargo loads
   b) Torque from engine and transmission
   c) Sudden impacts from collisions
   d) All of the mentioned

2) Worker operating with welding machine do not need.....
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   a) Flying chips and sparks
   b) Rotating parts
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6) An upraised part on the trunk which directs the air flow to be used as aerodynamic brake.....
   a) Hood scoop
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   a) The inner panel damaged and can be easy repaired.
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   a) Cut the surface
   b) Apply body fillers
   c) Apply sanding
   d) Inspect the dented areas

10X01 = 10 Marks

Section – B

04X04 = 16 Marks

1) Explain the process of Scissor machine removal in door in an Automotive vehicle.

Ans.

1. Door frame preparation
2. Clean the frame
3. Replacement of door trim carefully.
4. Remove all the plastic locks
5. Remove the sealant below the door trim
6. Carefully open the fasteners and hinges.
7. Remove the door carefully and take care of the glass
8. Now place the door scissor machine on the table.
9. Door is removed from the vehicle.

2) Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.

Ans. **Chemical paint remover**

Caustic paint removers, typically sodium hydroxide (also known as lye or caustic soda), work by breaking down the chemical bonds of the paint, usually by hydrolysis of the chain bonds of the polymers forming the paint. Caustic removers must be neutralized or the new finish will fail prematurely.
many are absorbed readily through the skin or are inhaled easily, some paint stripping chemicals can irritate the skin and eyes or cause headaches, drowsiness, nausea, dizziness, or loss of coordination.

Dry Sanding

Dry sanding abrasive paper usable over a wide range, from base adjustment of metal and woodworking polishing to coating film polishing. Dry sanding requires small circles. This way, each successive pass works to remove the scratches from the previous one.

Dry sanding is a lot less labor intensive, is less time consuming, and more times than not, creates more of a professional look. The smoother finish is better achieved through the mechanical process of the sander than the physical process of the sponge.

3) What are the various PPE must be considered in an Automotive workshop?

Ans: -

The Health and Safety at Work Act imposes on employers a statutory duty to ensure safe working conditions and an absence of risk in the use of equipment and the handling of materials, and to comply with Regulations regarding safe working practices in order to reduce to a minimum the hazards to health and safety associated with vehicle body repair work. To skilled and experienced operators this does not mean that any additional restrictions are imposed on their activities, but merely that they should carry out their tasks with constant regard for the health and safety of themselves and their fellow workers.

- Safety glasses and hearing protection - every person entering the workshop must collect these items from just inside the door. They must be worn at all times.
- Students that wear glasses should be aware these are not safety glasses, they are only impact resistant and may shatter, safety glasses must be worn.
- All loose clothing (e.g. shirts hanging out) must be tucked in.
- Safety boots or enclosed shoes must be worn in the workshop. Do not enter under any circumstances without this footwear, there are no exceptions to this rule.
- Long hair has to be tied up including fringes.
- Remove rings and loose jewelry before operating machinery they can be a hazard

1) Write the SOP's of removing front light assembly.

Ans: -

Step 1- Remove Front Beauty Cover

- Remove plastic push-pins holding the top plastic shroud that rests on top of the front clip and extends around the engine bay, including the weather-stripping used to seal out water.
- Once all pins are removed, peel back the weather stripping to loosen the cover.
- Pins locations shown with arrows in the photo below. Once free, set the cover aside.

Step 2- Remove Plastic fasteners

- Remove the plastic fasteners on the upper portion of the front bumper on each side.
- Use a flathead screw driver or the appropriate removal tool and pry upward.

Step 3 - Remove Upper portion bolts

- Remove the 10mm Bolts on the upper portion of the bumper

Step 4 - Remove Clips from Under Bumper

- Remove push pin clips from the bottom side of the bumper which hold the splash shield in place.
- Use a flathead screw driver or the appropriate removal tool and pry away.

Step 5 - Remove Clips from the fender areas

- Use a flathead screw driver or the appropriate removal tool and pry away.

Step 6 - Remove Front Clip

- Pull sides of front bumper outward until retention clips release on driver and passenger side.
- See photo below for arrows showing location of retention clips.
- After each side is successfully released, remove front bumper by pulling forward from the grill area. You will not be fully removing the bumper from the car at this moment.

Step 7 - Remove Fog Light Clips and Head Lamp Washer hose

Step 8 - Complete Removing the Front Light

- Fully remove the front Light by continuing to pull forward in a slow motion.

If removing the bumper, yourself, its recommended to place a towel/blanket on the ground so that you do not scrape anything if dragged or dropped on the ground

Section – C

04X06 = 24 Marks

4) Discuss the Traditional and PDR dent repair techniques.

Ans: -

Traditional dent repair fills in auto body dents with paint or body filler, which is then painted to match the rest of the vehicle's exterior. While this process can make a vehicle look as good as new, it doesn't address the actual dent in a way that is a sustainable, long-term solution. It's also time-consuming, expensive and can impact the re-sale value of your vehicle.

Paintless Dent Repair, on the other hand, requires no fillers and no sanding. More and more consumers are finding PDR to be an effective and inexpensive alternative to getting minor repairs done at a body shop. PDR offers more "bang for your buck" than traditional dent repair methods and is a great way to care for your vehicle's exterior affordably.

11) Write short notes on:

a) Dent puller Gun

b) Parallel beam dent puller

c) Stamping tool

Ans: -

Dent Puller Gun

- It is generally used in deep and targeted dent in small area.
- It reduces the human effort.

Parallel beam dent puller

- It is the consumables for spot welding of sheet metal shrink repair, dent pulling application.

Stamping tool

- It stamps the heap created by the dent puller or hammer.
- These tools are available in electric or pneumatic models, and in different sizes, motor speeds, and price ranges.
- You have a choice between an electric sander and a pneumatic model. If you don't own an air compressor, an electric sander will suffice, since your shop is most likely small enough to allow for an extension cord to reach electric outlets. If you already have an air compressor that can maintain large volume of air, a pneumatic model may serve your purposes better. Pneumatic sander can withstand longer, nonstop use, while electric models have a tendency to overheat. When it overheats, an electric sander's motor will shut down; you can get the sander going by pressing a reset switch, but this can lead to inconvenient interruptions as you work.

5) Discuss the reason behind spot welding in Automobile vehicle.

Ans. Spot welding (also known as resistance spot welding) is a resistance welding process. This welding process is used primarily for welding two or more metal sheets together by applying pressure and heat from an electric current to the weld area.

Typically, a car body contains about 5000 spot welds joining sheets of different thicknesses. Spot welding is primarily used for joining parts that are normally up to 3 mm in thickness. Thickness of the parts to be welded should be equal or the ratio of thickness should be less than 3:1. The strength of the joint depends on the number and size of the welds. Spot-weld diameters range from 3 mm to 12.5 mm. Spot welding typically delivers current for 0.1 seconds or less, so the current must be extremely high. Spot-welding machines typically deliver 150 amps per phase draw on a 440-volt system.

12) Discuss the Fender removal process in a vehicle.

Ans. Step 1

Unscrew the lug nuts on the left and right front wheel using a tire iron. Use a car jack to raise the front end of the vehicle and rest the front end onto jack stands. Pull the wheels off the frame.

Step 2

Unscrew the screws that are holding the cover in place inside the wheel well and remove the wheel well cover from the frame.

Step 3

Locate the bolts inside the wheel well that are holding the quarter panel in place on the vehicle's frame. Find the right-size socket in the socket set that matches the securing bolts. Remove the bolts using the ratchet and socket.

Step 4

Open the hood of the vehicle and locate the bolts on the side of the engine compartment that are securing the quarter panel to the frame. Remove the bolts using the ratchet and socket.

Pull the quarter panel off the frame.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester) Set A

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1304 Set-A **Time: 2 Hours**

Course Name: Automotive Refinish painting **Max. Marks: 50**

Instruction:

a. All the questions are compulsory to attend.
b. Students are not allowed to bring any smart device or cell phone in the exam hall.
c. Marks will be deducted if any overwriting in words will be found.

Section – A

10X01 = 10 Marks

1. which paint is more environment friendly?

a. NC paint
b. Waterborne paint
c. PU paint
d. Synthetic Paint

2. Which of the following are secondary colors?

a. Red, blue & yellow
b. lime, orange & violet
c. Violet, green & blue
d. Red, orange & blue

3. What is the purpose of feather edging?

a. It creates good adhesion.
b. It provides gloss to the putty
c. flexibility
d. All of the above

4. What is the purpose of dry coat?

a. To facilitate sanding
b. To remove dust
c. a & b
d. None of the above

5. What is the transfer efficiency of HVLP spray guns?

a. Less than 30%
b. Less than 40%
c. More than 45 %
d. None of the above

6. DFT meter is used to measure…

a. Thickness of coating
b. Color quantity
c. Gloss of paint
d. All of the above

7. What is the baking temperature for 2k refinish paint?

a. 45 degree Celsius
b. 60 degree Celsius
c. 90 degree Celsius
d. 120 degree Celsius

8. The appropriate light for color inspection is…

a. Sun light
b. Sodium light
c. LED light
d. All of the above

9. What is the main reason behind mottling defect?

a. Less overlapping
b. 100% overlapping
c. Higher pressure
d. Higher discharge

10. Pressure recommended for refinish painting is: -

a. 2 Bar
b. 3 Bar
c. 4 Bar
d. None of the above

Section – B

04X04 = 16 Marks

1. Why there is a need of positive pressure for refinish painting in paint booth?
2. Draw Hue circle diagram with neat sketch.
3. What are the reasons for these paint defects? Write down two prevention and remedies of each.
   a. Water spotting
   b. Clouding
4. Write a short note on correct parameter of spray gun handling in refinish painting.

Section – C

04X06 = 24 Marks

1. Write a short note on: -
   a. Glossometer
   b. Luxometer
   c. viscometer.
2. Explain putty and body filler application in automotive body shop in after sales market.
3. Explain the role of check putty.
4. Explain the role of paint booth in refinish painting application

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester) Set-A

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1304 Answer key **Time: 2 Hours**

Course Name: Automotive Refinish painting **Max. Marks: 50**

Instruction: (if any) Set-A

Section – A

10X01 = 10 Marks

1. which paint is more environment friendly?

a. NC paint
c. PU paint
b. Waterborne paint
d. Synthetic Paint

2. Which of the following are secondary colors?

a. Red, blue & yellow
c. Violet, green & blue
b. lime, orange & violet
d. Red, orange & blue

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c. 90 degree Celsius
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10. Pressure recommended for refinish painting is: -

a. 2 Bar
b. 3 Bar
c. 4 Bar
d. None of the above

Section – B

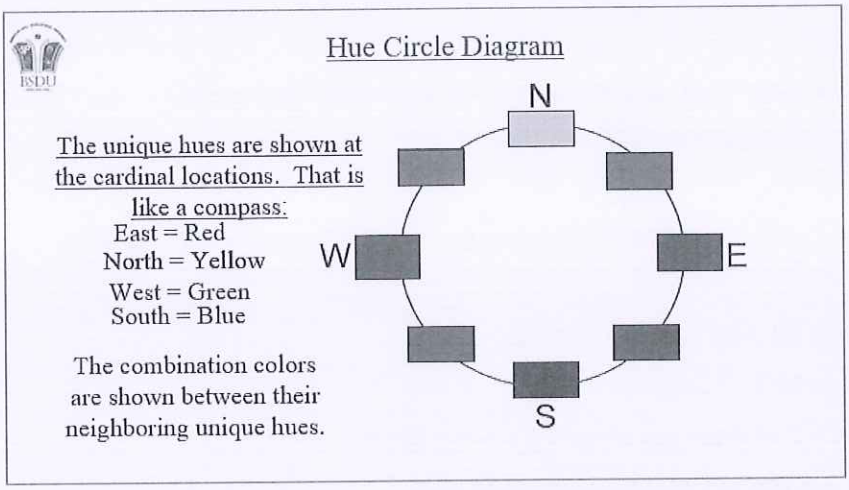
04X04 = 16 Marks

1. Why there is a need of positive pressure for refinish painting in paint booth?

Ans. Paint is a volatile organic compound and it evaporates in the environment. Where paint is sprayed on the substrate in fine droplets so that paint can stick to the panel easily due to greater surface area and as it evaporates. positive pressure provides the downwards flow to the paint which helps to stick the paint on the substrate.

2. Draw Hue circle diagram with neat sketch.

Ans.



3. What are the reasons for these paint defects? Write down two prevention and remedies of each.
   a. Water spotting
   b. Clouding

Ans. 2. **water spotting**

Causes: -

- Topcoat not sufficiently cured.
- Excessive film thickness, drying time too short.
- Use of unsuitable thinner.
- Incorrect hardener mixing ratio.
- Wrong hardener used

Prevention: -

- Follow application recommendations on technical data sheets

Remedies: -

- After through-drying, remove marks by polishing
- Thoroughly dry topcoat, sand and repaint

3.**Clouding**

Causes: -

- Incorrect spraying viscosity, spraying technique, flash-off times, spray booth temperature.
- Defective spray gun set up, incorrect spraying pressure.
- Use of unsuitable thinner.

Prevention: -

- Adjust material correctly.
- Keep spray gun parallel to object.
- Choose suitable spray gun set up.
- Use manufacturer's thinners.

Remedies: -

- When using conventional base coat: use droplet method before spraying clear.
- After clear has through-dried, sand surface and repaint.

4. Write a short note on correct parameter of spray gun handling in refinish painting.

Ans.

a. The angle of gun should be 90 degrees to the panel.

b. The pressure of gun should be 2-3 bar.

c. The distance between the panel and gun should be 5-8 inches.

d. The discharge should be 2.5 rounds of the discharge knob.

e. Overlapping should be 50% in each lap.

Section – C

04X06 = 24 Marks

1. Write a short note on: -
   a. Glossometer
   b. Luxometer
   c. viscometer.

Ans. DFT meter: - A coating thickness gauge (also referred to as a paint meter) is used to measure dry film thickness. Dry film thickness is probably the most critical measurement in the coatings industry because of its impact on the coating process, quality and cost.

Glossometer: - A glossmeter (also gloss meter) is an instrument which is used to measure specular reflection gloss of a surface

Luxometer: - The lux (symbol: lx) is the SI derived unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre. In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface

Viscometer: - A viscometer is an instrument used to measure the viscosity of a fluid. For liquids with viscosities which vary with flow conditions, an instrument called a rheometer is used. Thus, a Rheometer can be considered as a special type of viscometer. Viscometers only measure under one flow condition

.

2. Explain putty and body filler application in automotive body shop in after sales market.

Ans. Using putty blade apply the first coat evenly to the substrate with enough pressure to ensure tight contact. First coat should not be more than 1.50 mm in thickness. Cure the surface for one day, second coat shall be applied next day to finish the surface. Thickness of second shall not exceed 1.50 mm.

3. Explain the role of check putty.

Ans. Apply a thin putty layer to the surface.
In order to reduce the workload of sanding, make the surface flatten every time after scraping.
Polyester putty must be applied on the polished area.
Curing time is about 3 minutes.
Scraper should be cleaned immediately after using.
More items...
•
Feb 24, 2018

4. Explain the role of paint booth in refinish painting application

Ans

PAINT BOOTH

- Paint booths are walled structures used to safely contain painting and other finishing processes.
- Paint booths are present in a variety of industries including automotive, aviation, manufacturing, millworks, and many more.

In general, there are two types of paint booths:

- Non-ducted (open face)
- Directly ducted (enclosed)

PARTS OF PAINT BOOTH

- Exhaust Blower
- Air inlet blower
- Floor Filters.
- Ceiling filters
- Burner.

Set B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Set-B

Course Code: AUT1304 Time: 2 Hours

Course Name: Automotive Refinish painting Max. Marks: 50

Instructions:-

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Section – A

10X01 = 10 Marks

1. What is the full form of DFT…

   a. Dry film thickness
   b. Dew fluid thickness
   c. Dry fluid thickness
   d. All of the above

2. The appropriate light for color inspection is…

   a. Sun light
   b. Sodium light
   c. LED light
   d. All of the above

3. Which of the following are secondary colors?

   a. Red, blue & yellow
   b. lime, orange & violet
   c. Violet, green & blue
   d. Red, orange & blue

4. What is the purpose of Air gun?

   a. To facilitate sanding
   b. To remove dust
   c. a & b
   d. None of the above

5. What is the transfer efficiency of Traditional spray guns?

   a. Less than 30%
   b. Less than 40%
   c. More than 45 %
   d. None of the above

6. which paint is more environment friendly?

   a. NC paint
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a. It creates good adhesion.
b. It provides gloss to the putty
c. flexibility
d. All of the above

9. What is the main reason behind orange peel defect?

a. Less overlapping
b. 100% overlapping
c. Higher pressure
d. Higher discharge

10. Pressure recommended for refinish painting is: -

a. 2 Bar
b. 3 Bar
c. 4 Bar
d. None of the above

Section – B

04X04 = 16 Marks

1. Why do we use flexi panels in painting?
2. Explain Munsell theory.
3. What are the reasons for these paint defects? Write down two prevention and remedies of each.
   a. Sanding Scratches
   b. Runs
4. Discuss the correct parameters of spray gun handling during paint application.

Section – C

04X06 = 24 Marks

1. Explain DFT meter, Glossometer, luxometer and viscometer.
2. Write the SOP of putty and body filler application.
3. Explain the role of degreasing tack cloth and Antistatic suit.
4. Explain the role of paint booth in after sales painting application

Set-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, IIIrd Semester,

End-Sem. Examination

Course Code: AUT1304 Answer key Time: 2 Hours

Course Name: Automotive body works Max. Marks: 50

Instruction: (if any) Set-B

Section – A

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10. Pressure recommended for refinish painting is: -

a. 2 Bar
b. 3 Bar
c. 4 Bar
d. None of the above

Section – B

04X04 = 16 Marks

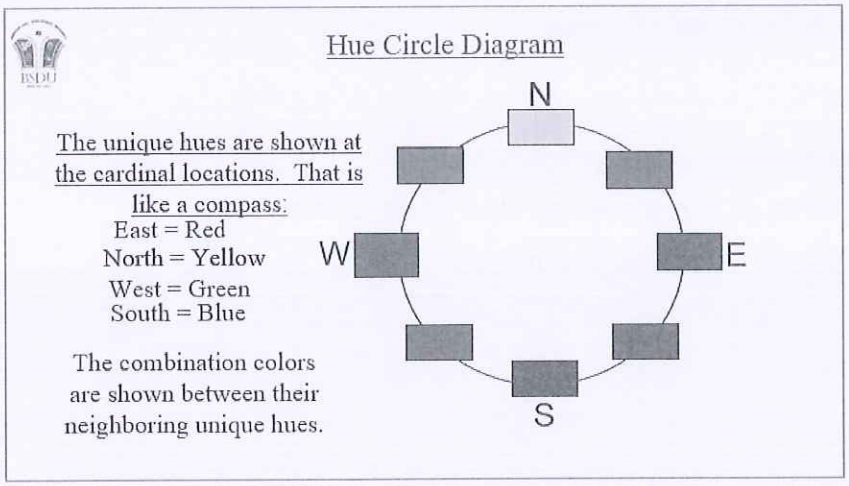
1. Why do we use flexi panels in painting?

Ans. Flexible panels are used to match the color during repair of car. It is also known as testing panels.

a. Firstly, we formulate the color.
b. Apply on flexible panel.
c. Match with the original color of car after proper drying.
d. If it matches, then we apply on the main panel.
e. If it not matches the we do the tinting or toning in color and then apply again.
f. After proper drying again we match the color.
g. Repeat the process until the color does not matches.

2. Explain Munsell theory.

Ans.



3. What are the reasons for these paint defects? Write down two prevention and remedies of each.
   a. Sanding Scratches
   b. Runs

Ans. sanding scratches

Causes: -

- Sanding paper too coarse.
- Filler sanded when soft.
- Insufficient sanded polyester stopper.

- Insufficient isolation of the stopper before topcoat application

Prevention: -

- Use recommended grade sanding paper.
- Isolate repaired areas with 2K filler.
- Dry filler thoroughly.

Remedies: -

- Thoroughly dry and sand.

Isolate or remove substrate, repaint

.Runs

Causes: -

- Incorrect spraying viscosity, spraying technique.
- Defective spray gun set up.
- Incorrect spraying pressure.
- Temperature of paint, substrate or spray booth too low.

  Incorrect choice of hardeners and thinners

Prevention: -

- Ensure that the spray gun is in good working order.
- Warm object and material up to room temperature of 20 °C/68 °F.
- Use correct combination of hardeners and thinners.
-

Remedies: -

- Sand and polish.
- Sand and repaint

4. Discuss the correct parameters of spray gun handling during paint application.

Ans.

a. The angle of gun should be 90 degrees to the panel.

b. The pressure of gun should be 2-3 bar.

c. The distance between the panel and gun should be 5-8 inches.

d. The discharge should be 2.5 rounds of the discharge knob.

e. Overlapping should be 50% in each lap.

Section – C

04X06 = 24 Marks

1. Explain DFT meter, Glossometer, luxometer and viscometer.

Ans. DFT meter: - A coating thickness gauge (also referred to as a paint meter) is used to measure dry film thickness. Dry film thickness is probably the most critical measurement in the coatings industry because of its impact on the coating process, quality and cost.

Glossometer: - A glossmeter (also gloss meter) is an instrument which is used to measure specular reflection gloss of a surface

Luxometer: - The lux (symbol: lx) is the SI derived unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre. In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface

Viscometer: - A viscometer is an instrument used to measure the viscosity of a fluid. For liquids with viscosities which vary with flow conditions, an instrument called a rheometer is used. Thus, a rheometer can be considered as a special type of viscometer. Viscometers only measure under one flow condition

2. Write the SOP of putty and body filler application.

Ans. Using putty blade apply the first coat evenly to the substrate with enough pressure to ensure tight contact. First coat should not be more than 1.50 mm in thickness. Cure the surface for one day, second coat shall be applied next day to finish the surface. Thickness of second shall not exceed 1.50 mm.

3. Explain the role of degreasing tack cloth and Antistatic suit.

Ans. Apply a thin putty layer to the surface.
In order to reduce the workload of sanding, make the surface flatten every time after scraping.
Degreaser to remove the grease from the panel
Tack cloth is lint free cloth
Respirator protects from VOC inhaling and protects our lungs
Polyester putty must be applied on the polished area.
Curing time is about 3 minutes.
Scraper should be cleaned immediately after using.
More items...
•
Feb 24, 2018

1. Explain the role of paint booth in after sales painting application

Ans

PAINT BOOTH

Paint booths are walled structures used to safely contain painting and other finishing processes.

- Paint booths are present in a variety of industries including automotive, aviation, manufacturing, millworks, and many more.

In general, there are two types of paint booths:

- Non-ducted (open face)
- Directly ducted (enclosed)

PARTS OF PAINT BOOTH

- Exhaust Blower
- Air inlet blower
- Floor Filters.
- Ceiling filters
- Burner.

1) Discuss the reason behind spot welding in Automobile vehicle.
2) Discuss the quarter panel removal process in a vehicle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester) QPA

B. Voc. Program, 3rd Semester,

End-Sem. Examination

Course Code: AUT1305 Set A **Time: 2 Hours**

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

Instruction:

1. Attempt all the questions.
2. Draw neat and clean diagram.

Section – A

10X01 = 10 Marks

1. Ohm's law is applicable to:
   a) Semiconductors
   b) Vacuum tubes
   c) Carbon resistors
   d) None of these
2. Correct form of ohm's law:
   a) $I = VR$
   b) $V \propto I$
   c) $V = IR$
   d) Above B and C
3. The _____ is the heart of the CRO: -
   (A) Focusing Anode (B) Heater
   (C) cathode-ray tube (D) None of these
4. The_____in digital instrument is used to convert non-electrical or physical quantities into an electrical quantity: -
   (A) Transducer (B) Signal modifier
   (C) Display device (D) None of these
5. Electrical current can only flow in_____electric circuit.
   (A) closed (B) Open
   (C) Both A and B (D) None of these
6. Direction of magnetic field lines inside the magnet:
   (A) North pole to South pole (B) South pole to north pole
   (C) Both A and B (D) None of these
7. The full form of BJT is:
   (A) Base Junction Transistor (B) Bipolar Junction Transistor
   (C) Basic Junction Thyristor (D) None of these
8. Center-tap full wave rectifier has _____ diodes:

(A) One
(B) Three
(C) Two
(D) None of these

9. Pumping down is similar to

a) Recovery
b) Vacuuming
c) Recharging
d) Perfect vacuuming

10. 1 microvolt is

a) 1×10^{-3} V
b) 1×10^{-4} V
c) 1×10^{-5} V
d) 1×10^{-6} V

Section – B

04X04 = 16 Marks

1. Explain the procedure of measuring the AC voltage by digital multimeter.
2. What are the properties of electric current?
3. Explain refrigerant recovery steps.
4. Explain Heating, Ventilation, Air Conditioning and Refrigeration.

Section – C

04X06 = 24 Marks

1. Explain the CRO (Cathode Ray Oscilloscope) in Detail.
2. Explain the transformer in detail.
3. Explain the halogen lamp in detail.
4. Explain Vapour compression refrigeration cycle with neat sketch.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

A.K. Sat A

End-Sem. Examination

Course Code: AUT1305 Answer Key **Time: 2 Hours**

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

Instruction: Set-A

1. Attempt all the questions.
2. Draw neat and clean diagram.

Section – A

10X01 = 10 Marks

1. Ohm's law is applicable to:

   None of these

2. Correct form of ohm's law

   Above B and C

3. The _____ is the heart of the CRO: -

   (C) cathode-ray tube

4. The_____in digital instrument is used to convert non-electrical or physical quantities into an electrical quantity: -

   (A) Transducer

5. Electrical current can only flow in_____electric circuit.

   (A) closed

6. Direction of magnetic field lines inside the magnet:

   (B) South pole to north pole

7. The full form of BJT is:

   (B) Bipolar Junction Transistor

8. Center-tap full wave rectifier has _____ diodes:

   (C) Two

9. Pumping down is similar to:

   Recovery

10. 1 microvolt is:

    1×10^{-6} V

Section – B

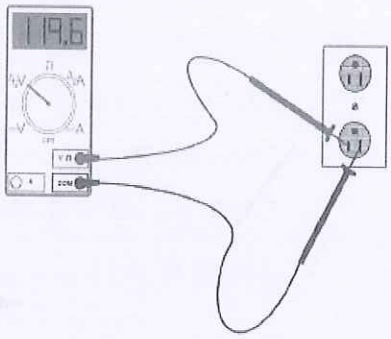
04X04 = 16 Marks

1. Explain the procedure of measuring the AC voltage by digital multimeter.

Ans.

AC VOLTAGE MEASUREMENT

1. Connect the red test lead to "V.Ω. mA" jack and the black test lead to the "COM" jack.
2. Set the rotary switch at desired ACV position.
3. Connect test leads across the source or load being measured.
4. Read voltage value on the LCD display.

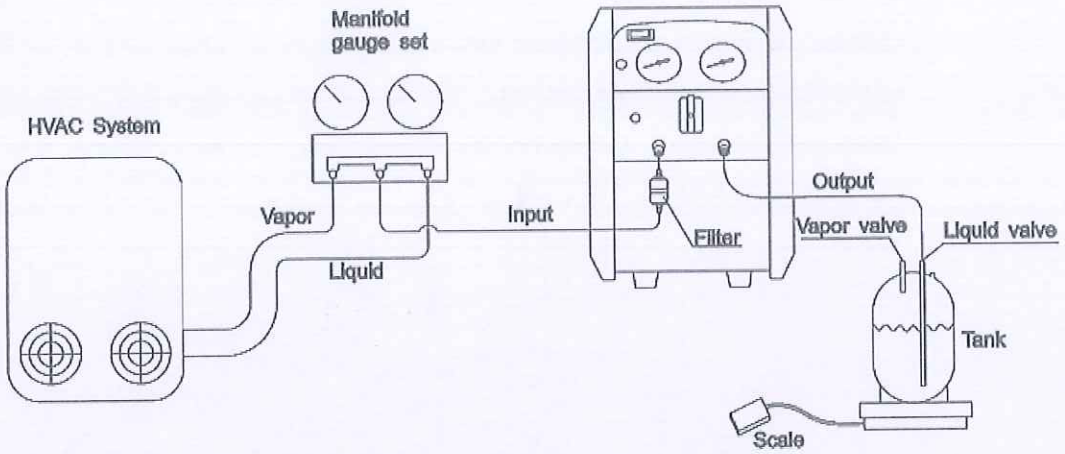


2. What are the properties of electric current?

Ans. **properties of electric current**

- The electrical current is the directional movement of free electron.
- Electrical current can only flow in closed electric circuit.
- An electric circuit consist of at least the voltage generator, the consumer and electric lines.
- The electrical energy is converted into other energy.
- There are two types of electric current.
  - Direct current
  - Alternating current

3. Gg



4. HVACR

Heating, ventilation, and air conditioning (HVAC)[1] is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality. HVAC system design is a subdiscipline of mechanical engineering, based on the principles of thermodynamics, fluid mechanics and heat transfer. "Refrigeration" is sometimes added to the field's abbreviation, as HVAC&R or HVACR or "ventilation" is dropped, as in HACR

Section – C

04X06 = 24 Marks

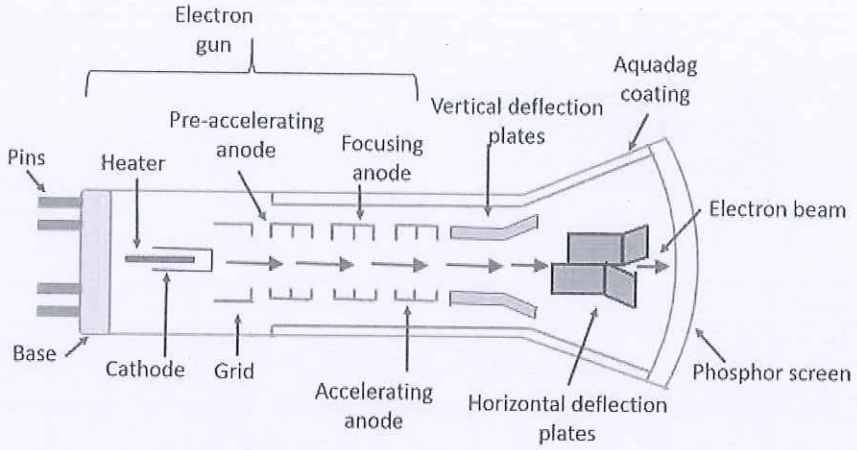
1. Explain the CRO (Cathode Ray Oscilloscope) in Detail.

Ans.

Cathode-ray oscilloscope (CRO)

- The cathode-ray oscilloscope (CRO) is a common laboratory instrument that provides accurate time and amplitude measurements of voltage signals over a wide range of frequencies. Its reliability, stability, and ease of operation make it suitable as a general purpose laboratory instrument. The heart of the CRO is a cathode-ray tube shown schematically in Fig.
- The cathode ray is a beam of electrons which are emitted by the heated cathode (negative electrode) and accelerated toward the fluorescent screen. The assembly of the cathode, intensity grid, focus grid, and accelerating anode (positive electrode) is called an electron gun. Its purpose is to generate the electron beam and control its intensity and focus. Between the electron gun and the fluorescent screen are two pair of metal plates - one oriented to provide horizontal deflection of the beam and one pair oriented to give vertical deflection to the beam.
- These plates are thus referred to as the horizontal and vertical deflection plates. The combination of these two deflections allows the beam to reach any portion of the fluorescent screen. Wherever the electron beam hits the screen, the phosphor is excited and light is emitted from that point. This conversion of electron energy into light allows us to write with points or lines of light on an otherwise darkened screen.

CRO is used to investigate waveforms and time varying quantities, and very low frequency to very high frequencies. CRO is basically very "Fast graph plotter" that display an input signal against time (or sometime against another signal) . The graph is plotted by a bright spot of light moving over the screen. CRO can display almost all types of waveforms appearing at different points of a circuit. CRO is also called the third eye of the electronics engineer.



2. Explain the transformer in detail.

Ans.

Transformer

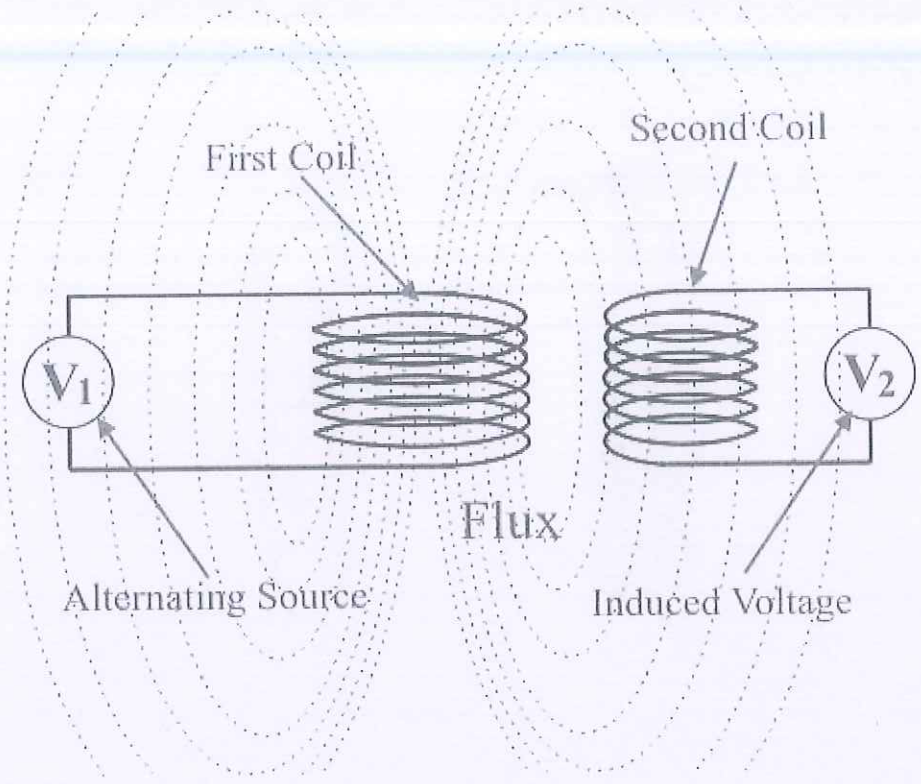
A **transformer** is defined as a passive electrical device that transfers electrical energy from one circuit to another through the process of electromagnetic induction. It is most commonly used to increase ('step up') or decrease ('step down') voltage levels between circuits.

one winding (also known as a coil) which is supplied by an alternating electrical source. The alternating current through the winding produces a continually changing and alternating flux that surrounds the winding.

If another winding is brought close to this winding, some portion of this alternating flux will link with the second winding. As this flux is continually changing in its amplitude and direction, there must be a changing flux linkage in the second winding or coil.

According to Faraday's law of electromagnetic induction, there will be an EMF induced in the second winding. If the circuit of this secondary winding is closed, then a current will flow through it. This is the basic **working principle of a transformer**.

Let us use electrical symbols to help visualize this. The winding which receives electrical power from the source is known as the 'primary winding'. In the diagram below this is the 'First Coil'.



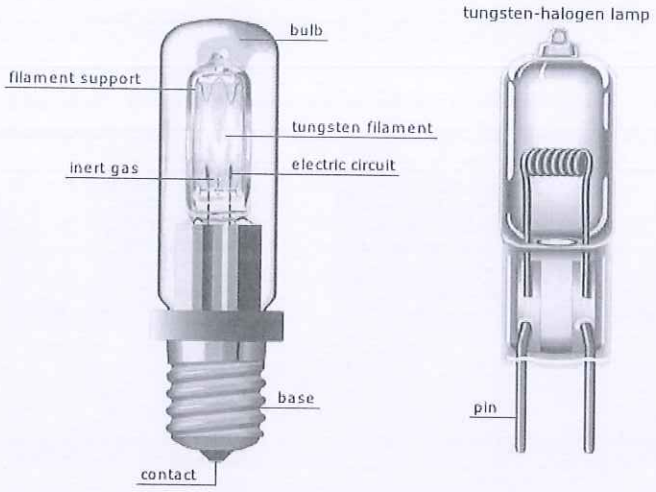
The winding which gives the desired output voltage due to mutual induction is commonly known as the 'secondary winding'. This is the 'Second Coil' in the diagram above.

A transformer that increases voltage between the primary to secondary windings is defined as a step-up transformer. Conversely, a transformer that decreases voltage between the primary to secondary windings is defined as a step-down transformer.

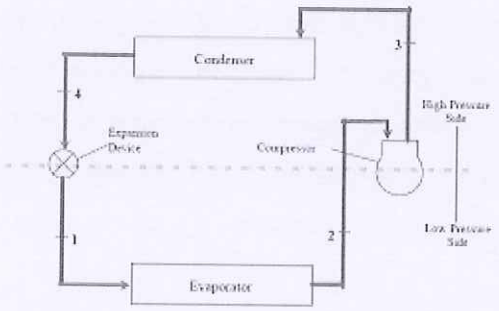
3. Explain the halogen lamp in detail.

Ans. A **halogen lamp**, also known as a **tungsten halogen**, **quartz-halogen** or **quartz iodine lamp**, is an incandescent lamp consisting of a tungsten filament sealed into a compact transparent envelope that is filled with a mixture of an inert gas and a small amount of a halogen such as iodine or bromine. The combination of the halogen gas and the tungsten filament produces a halogen cycle chemical reaction which redeposits evaporated tungsten to the filament, increasing its life and maintaining the clarity of the envelope. This allows the filament to operate at a higher temperature than a standard incandescent lamp of similar power and operating life; this also produces light with higher luminous efficacy and color temperature. The small size of halogen lamps permits their use in compact optical systems for projectors and illumination. The small glass envelope may be enclosed in a much larger outer glass bulb for a bigger package; the outer jacket will be at a much lower and safer temperature, and it also protects the hot

bulb from harmful contamination and makes the bulb mechanically more similar to a conventional lamp that it might replace.



4. VCRS



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester) QP B

B. Voc. Program, 3rd Semester,

End-Sem. Examination

Course Code: AUT1305 Set-B **Time: 2 Hours**

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

Instruction:

1. Attempt all the questions.
2. Draw neat and clean diagram.

Section – A

10X01 = 10 Marks

1. International ohm is defined in terms of the resistance of:
   a) A column of mercury
   b) A cube of carbon
   c) A cube of copper
   d) The unit length of wire
2. Ohm's law in point form in field theory can be expressed as:
   a) $V = RI$
   b) $J = E/\sigma$
   c) $J = \sigma E$
   d) $R = \rho l/A$
3. The_____ is utilized in permanent magnet moving coil instruments: -
   (A) Force between two current carrying coil
   (B) Force between two permanent magnet carrying coil
   (C) Force between current carrying coil and permanent magnet
   (D) None of these
4. The accuracy of the_____electronic instrument is very much high: -
   (A) analogue (B) digital
   (C) Both A and B (D) None of these
5. Direction of magnetic field lines outside the magnet:
   (A) North pole to South pole (B) South pole to north pole
   (C) Both A and B (D) None of these
6. Liquid that conducts electricity are_____.
   (A) Electromagnet (B) electrostatic
   (C) electrolytes (D) None of these
7. Diode allows the flow of current in_____direction.
   (A) two (B) one

(C) three (D) None of these

8. Full wave bridge rectifier has _____ diodes:

(A) One (B) Three

(C) Two (D) None of these

9. In a refrigeration and air conditioning system, the expansion device is connected between the

a) Compressor and condenser b) Condenser and receiver

c) Receiver and evaporator d) evaporator and Compressor

10. Pumping down is similar to

a) Recovery b) Vacuuming

c) Recharging d) Perfect vacuuming

Section – B

04X04 = 16 Marks

1. What are the advantages and disadvantages of analogue multimeter?
2. What do you understand by magnetism?
3. Explain the electromagnetic relay in detail.
4. Explain repairing and servicing of AC system.

Section – C

04X06 = 24 Marks

1. What is CRO (Cathode Ray Oscilloscope)? Explain in detail.
2. Explain the voltage generation by electrochemical process by using battery system.
3. Explain various components used in car Air condition system
4. Explain anti-theft systems.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

A.K. Set B

B. Voc. Program, 3rd Semester,

End-Sem. Examination

Course Code: AUT1305 Answer key **Time: 2 Hours**

Course Name: Automotive Electrical & A.C. Set-B **Max. Marks: 50**

Instruction:

1. Attempt all the questions.
2. Draw neat and clean diagram.

Section – A

10X01 = 10 Marks

1. International ohm is defined in terms of the resistance of:

   A column of mercury

2. Ohm's law in point form in field theory can be expressed as:

   $J = \sigma E$

3. The_____ is utilized in permanent magnet moving coil instruments: -

   (C) Force between current carrying coil and permanent magnet

4. The accuracy of the_____electronic instrument is very much high: -

   (B) digital

5. Direction of magnetic field lines outside the magnet:

   (A) North pole to South pole

6. Liquid that conducts electricity are_____.

   (C) electrolytes

7. Diode allows the flow of current in_____direction.

   (B) one

8. Full wave bridge rectifier has _____ diodes:

   (D) None of these

9. a

10. d

Section – B

04X04 = 16 Marks

1. What are the advantages and disadvantages of analogue multimeter?

Ans.

Advantages of Analog Multimeter

- A sudden change in signal can detect by analog multimeter more swiftly than a digital multimeter.
- All measurements are possible by using one meter only.

- Increase or decrease in signal levels can be observed.

Disadvantage of Analog Multimeter

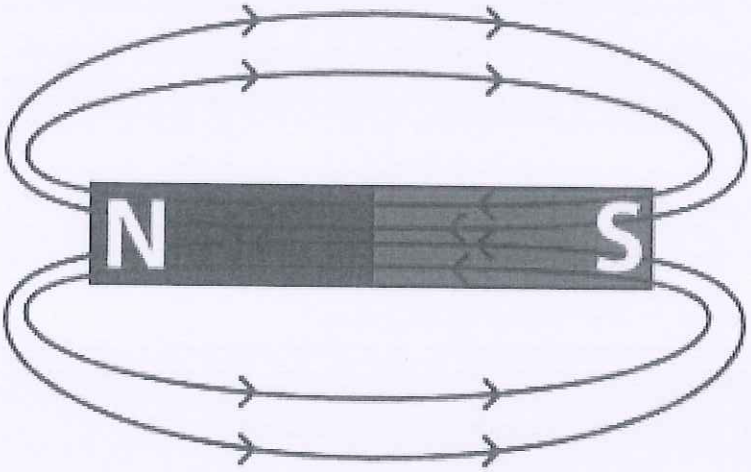
- Analog meters are bulky in size.
- They are bulky and costly.
- The pointer movement is slow, can't be used to measure voltages with frequencies higher than 50 HZ.
- Inaccurate due to the effect of earth magnetic field.
- They are vulnerable to shock and vibration.

2. What do you understand by magnetism?

Ans.

Magnetism

- Each magnet has two poles which is also known as dipole magnet.
- Opposite poles attract each other and same poles repel.
- Magnetic field lines are always closed and run outside the magnet from the north to the south pole and inside the magnet from the south to the north pole.



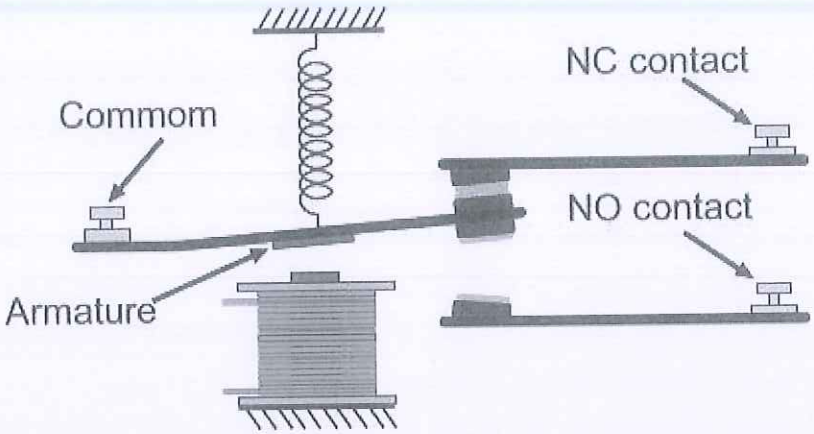
3. Explain the electromagnetic relay in detail.

Ans.

Relay

- **Relays** are switches that open and close circuits electromechanically or electronically.

It works on the principal of electromagnetic induction.



- So **relay** is a switch which controls (open and close) circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF. It is mainly used to control a high powered circuit using a low power signal.

4.

Remove brush and debris near the unit.

Clean the condenser coils every spring.

Replace any HVAC air filters.

Check for loose contacts or electric connections.

Lubricate motors and bearings.

Recharge refrigerant.

Ensure the condensate drain is clear.

Section – C

04X06 = 24 Marks

1. What is CRO (Cathode Ray Oscilloscope)? Explain in detail.

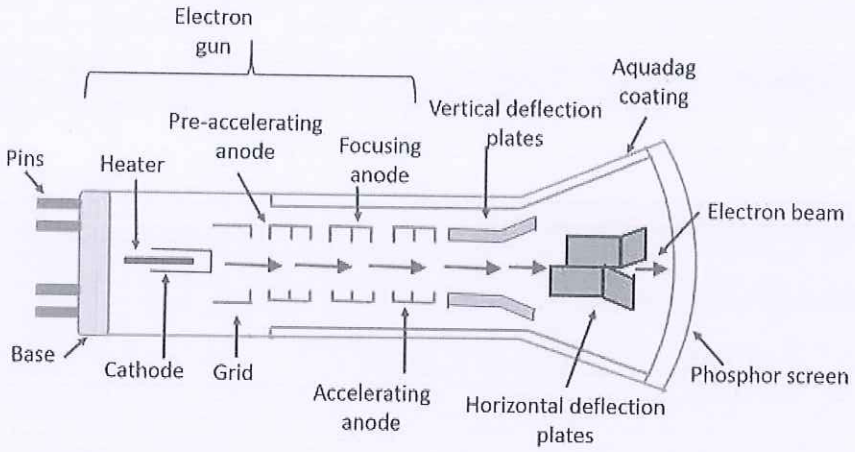
Ans.

Cathode-ray oscilloscope (CRO)

- The cathode-ray oscilloscope (CRO) is a common laboratory instrument that provides accurate time and amplitude measurements of voltage signals over a wide range of frequencies. Its reliability, stability, and ease of operation make it suitable as a general

purpose laboratory instrument. The heart of the CRO is a cathode-ray tube shown schematically in Fig.

- The cathode ray is a beam of electrons which are emitted by the heated cathode (negative electrode) and accelerated toward the fluorescent screen. The assembly of the cathode, intensity grid, focus grid, and accelerating anode (positive electrode) is called an electron gun. Its purpose is to generate the electron beam and control its intensity and focus. Between the electron gun and the fluorescent screen are two pair of metal plates - one oriented to provide horizontal deflection of the beam and one pair oriented to give vertical deflection to the beam.
- These plates are thus referred to as the horizontal and vertical deflection plates. The combination of these two deflections allows the beam to reach any portion of the fluorescent screen. Wherever the electron beam hits the screen, the phosphor is excited and light is emitted from that point. This conversion of electron energy into light allows us to write with points or lines of light on an otherwise darkened screen.
- CRO is used to investigate waveforms and time varying quantities, and very low frequency to very high frequencies. CRO is basically very "Fast graph plotter" that display an input signal against time (or sometime against another signal) . The graph is plotted by a bright spot of light moving over the screen. CRO can display almost all types of waveforms appearing at different points of a circuit. CRO is also called the third eye of the electronics engineer.

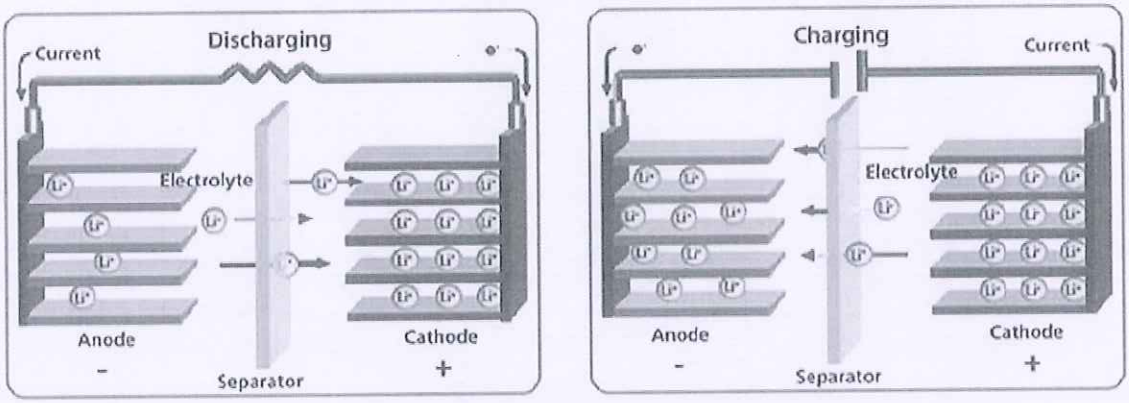


2. Explain the voltage generation by electrochemical process by using battery system.

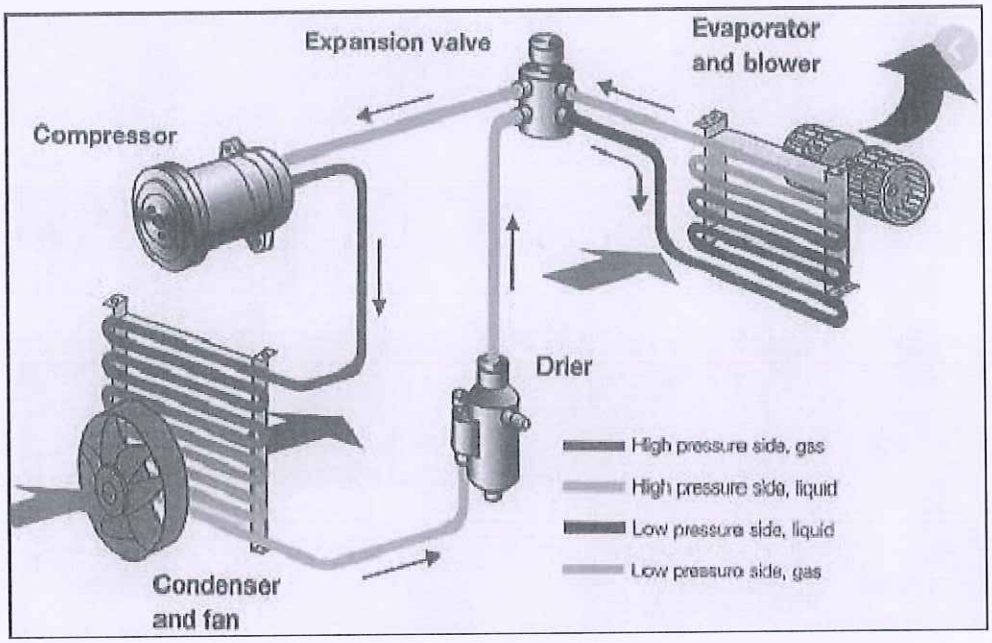
Ans.

1. Introduction

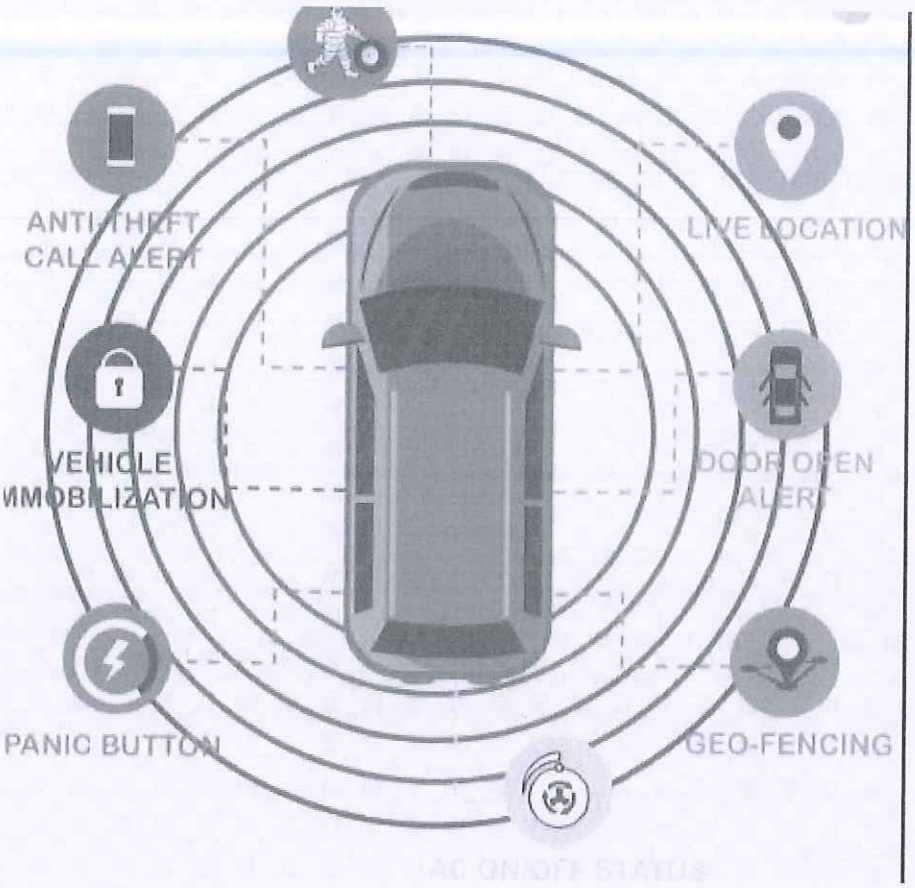
Rechargeable lithium-ion (Li-ion) batteries are widely used in portable electronic devices and are considered as the most potential power source for electric vehicles due to their high energy density and long cycle life. A Li-ion battery consists of a positively charged cathode, negatively charged anode, separator, electrolyte, and positive and negative current collectors. While discharging, the lithium ions travel from the anode to the cathode through the electrolyte, thus generating an electric current, and, while charging the device, lithium ions are released by the cathode and then go back to the anode. Figure 1 shows the basic working principle of a Li-ion battery. Since the electrolyte is the key component in batteries, it affects the electro-chemical performance and safety of the batteries.



3. Car AC system



4. Antitheft system


ANTI-THEFT
CALL ALERT
LIVE LOCATION
VEHICLE
IMMOBILIZATION
DOOR OPEN
ALERT
PANIC BUTTON
GEO-FENCING