BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1301 **Time: 1 Hour**

Course Name: Automotive Power Train **Max. Marks: 20**

Instruction: Attempt all questions.

Section A: Select the one correct option from the given options in the following questions.

Section – A

05X01 = 05 Marks

Q-1. What is the full form of EGR?

a. Exhaust gas Recirculation
c. Exhaust gas Reconnection
b. Exhaust gas Resources
d. None of these

Q-2. Hydraulic brakes function on the principle of...

a. Law of conservation of momentum
c. Pascal's law
b. Law of conservation of energy
d. None of the above

Q-3. The function of oil scraper rings is to....

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

Q-4. If a four-cylinder engine is of capacity 2.4 litres. Then swept volume of one cylinder will be:

a. 2400 cubic centimeters
c. 4100 cubic centimeters
b. 1400 cubic centimeters
d. 1200 cubic centimeters

Q-5. The maximum temperature in the I.C. engine cylinder is of the order of

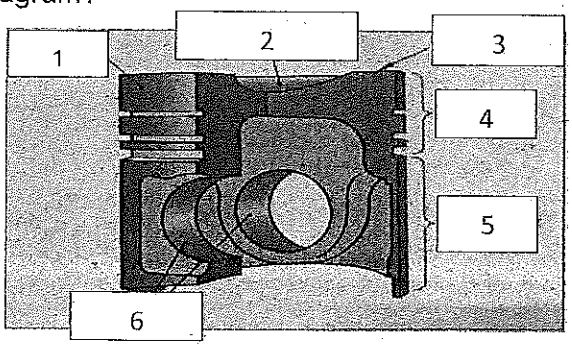
a. 500-1000°C
c. 1500-2000°C
b. 1000-1500°C
d. 2000-2500°C

Section – B

03X02 = 06 Marks

Q-6. Write down the difference between dry and wet cylinder liners?

Q-7. Label the piston diagram?



Q-8. What is 5S? write the name and advantages of 5S.

Section – C

03X03 = 09 Marks

Q-9. What is engine block? Explain different types of material used in construction of engine block material.

Q-10. What is cylinder head? Explain different types of cylinder heads.

Q-11. Explain turbocharger and its types also write advantages of turbocharger.

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Section – A

05X01 = 05 Marks

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a. Exhaust gas Recirculation
c. Exhaust gas Reconnection
b. Exhaust gas Resources
d. None of these

Ans: (A) Exhaust gas Recirculation

Q-2. Hydraulic brakes function on the principle of...

a. Law of conservation of momentum
c. Pascal's law
b. Law of conservation of energy
d. None of the above

Ans: (C) Pascal's law

Q-3. The function of oil scraper rings is to....

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

Ans: (C) Lubricate cylinder walls

Q-4. If a four-cylinder engine is of capacity 2.4 litres. Then swept volume of one cylinder will be:

a. 2400 cubic centimeters
c. 4100 cubic centimeters
b. 1400 cubic centimeters
d. 1200 cubic centimeters

Ans: (A) 2400 cubic centimeters

Q-5. The maximum temperature in the I.C. engine cylinder is of the order of

a. 500-1000°C
c. 1500-2000°C
b. 1000-1500°C
d. 2000-2500°C

Ans: (D) 2000-2500°C

Section – B

03X02 = 06 Marks

Q-6. Write down the difference between dry and wet cylinder liners?

Ans: **Wet Cylinder Liner: -**

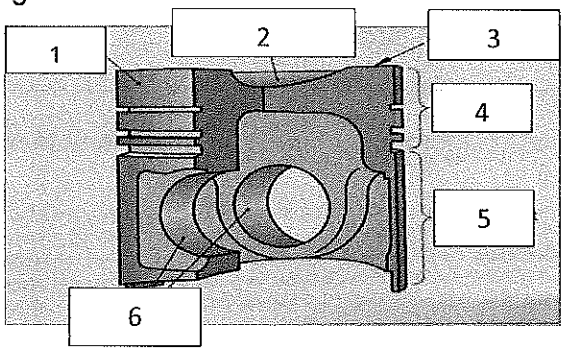
- Water Jacket direct contact with outer wall of liner.

- Cylinder and water jacket are cast in one piece.
- No separate cylinder liner.
- For engine more than 125mm bore
- For small engine

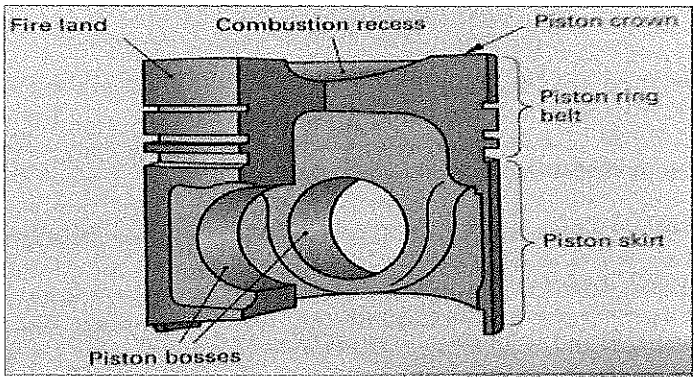
Dry cylinder liners:

- These are the slip fit or press fit as thin-walled liners into the cylinder block. Since they do not come into contact with the coolant, the transfer of heat to the coolant is not good as good with wet liners.
- Cylinder liners with a slip fit are finish machined prior to installation.
- Liners with press fit installation are pressed when a predrilled cylinder bore into the cylinder block.
- They are then fine-bored and honed.
- No direct contact with liners and water jacket.
- The water jacket is made into cylinder block itself.
- Engine having less than 125mm bore, dry liners are used.

Q-7. Label the piston diagram?



Ans:



Q-8. What is 5S write the name? Also write the advantages of 5S.

Ans: 5 S is a workplace organisation that uses a list of five Japanese words.

1. Seiri/sort
2. Seiton/set in order
3. Seiso/shine
4. Seiketsu/standardize
5. Shitsuke/sustain

Advantages of 5S:

- Less Waste (Improved Efficiency)

- Reduced Space Used for Storage.
- Improved Maintenance.
- Improved Safety.
- Better, More Committed Employees.
- Improved Quality.

Section – C

03X03 = 09 Marks

Q-9. What is engine block? Explain all kind of engine block material.

Ans: The purpose of the engine block is to support the components of the engine. Additionally, the engine block transfers heat from friction to the atmosphere and engine coolant. The material selected for the engine block is either gray cast iron or aluminum alloy

Materials Used:

The following materials are used:

- **Flake-graphite Cast Iron (Grey Cast Iron):** As well as good rigidity and strength and good sliding and wear performance, It has low thermal expansion and good noise damping.
- **Vermicular-graphite cast iron:** As the casting cools, the graphite precipitates not in the form of lamellas but rather in a vermicular form. The notch effect between the structure crystals is lower than with cast iron, thereby greatly increasing strength and rigidity.
- **Al alloys:** Of Particular benefit is the low density in comparison with grey cast iron and good thermal conductivity. The engine blocks are also finned in order to improve inherent stability. The wear properties of the cylinder barrels must be improved by means of special production process.

Q-10. What is cylinder head? Explain different types of cylinder heads.

Ans: The cylinder head seals off the combustion chamber at the top. It is secured by the cylinder head bolts with the inserted cylinder head gasket on cylinder block.

The cylinder head contains the fresh gas and exhaust gas ducts with their valves seats and usually also the compression space (clearance volume).

- It accommodates the spark plugs as well as the fuel injectors in the case of direct injection engines together with the engine timing components. E.g. The valves.
- The camshaft is often mounted on the cylinder head. The cylinder head is subjected to high loads resulting from combustion pressure and hot combustion gases and must therefore demonstrate high inherent stability, good heat conduction and low thermal expansion.

There are two types of cylinder head: -

1. Liquid-cooled cylinder head: This is predominantly cast from Al alloys for each cylinder individually or for the entire block in one piece. The coolant flows from the cylinder block into the cylinder head via flow ducts.
2. Air-Cooled Cylinder Head: This is manufactured entirely from AL alloys and is provided with cooling fins. Because the transfer of heat to air is less efficient than to coolant (cooling liquid), the cooling surface must be enlarged by cooling fins.

Q-11. Explain what is turbocharger and its types is and also write advantages of turbocharger.

Ans: A Turbocharger is a device that is used to increase the power of the engine or one can say efficiency of engine by increasing the amount of air entering into the combustion chamber. More air into the combustion chamber means more amount of fuel will be admitted into the cylinder and as a result one will get more power from the same engine if the turbocharger is installed in it.

Very simply, a turbocharger is a kind of air pump taking air at ambient pressures (atmospheric pressure), compressing to a higher pressure and passing the compressed air into the engine via the inlet valves.
TYPES OF TURBOCHARGER

1. Single-Turbo

Single turbochargers alone have limitless variability. Differing the compressor wheel size and turbine will lead to completely different torque characteristics. Large turbos will bring on high top-end power, but smaller turbos will provide better low-end grunt as they spool faster. There are also ball bearing and journal bearing single turbos. Ball bearings provide less friction for the compressor and turbine to spin on, thus are faster to spool (while adding cost).

2. Twin-Turbo

Just like single turbochargers, there are plenty of options when using two turbochargers. You could have a single turbocharger for each cylinder bank (V6, V8, etc). Alternatively, a single turbocharger could be used for low RPM and bypass to a larger turbocharger for high RPM (I4, I6, etc). You could even have two similarly sized turbos where one is used at low RPM and both are used at higher RPM. On the BMW X5 M and X6 M, twin-scroll turbos are used, one on each side of the V8.

3. Twin-Scroll Turbo

A turbo is powered by exhaust gases that are redirected to spin turbine blades and force air into the engine. Now, an engine's cylinders fire in sequence, meaning that exhaust gases enter the turbo in pulses. As you can probably imagine, these pulses can easily overlap and interfere with one another when powering the turbo, and a twin-scroll turbocharger solves this issue by using a divided-inlet turbine housing and a specific exhaust manifold that pairs the right cylinders to each scroll. In a four-cylinder vehicle, you can then have the first and fourth cylinders powering one scroll, and two and three powering another. This means that there's less pulse overlap and less lag.
4. Variable Geometry Turbocharger (VGT)

A variable geometry turbo (VGT) is an expensive and complex power solution that's especially prevalent in diesel engines. A VGT has a ring of aerodynamically-shaped vanes in the turbine housing that can alter their area-to-radius ratio to match the revolutions of the engine. At low revs, area-to-radius ratio creates more pressure and velocity to spool up the turbo more effectively. At higher revolutions, the ratio increases to let in more air. The result is a wider boost range and less lag.

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, 3rd Semester
1st In-Sem. Examination

Course Code: AUT1302 **Time: 1 Hour**

Course Name: Automotive Braking Suspension and Steering System **Max. Marks: 20**

Instruction:

1. **Attempt all questions from section A, each question carries one mark.**
2. **Attempt all questions from section B, each question carries two mark.**
3. **Attempt all questions from section C each question carries three mark**

Section – A

Directions: Select any one correct answer from the given options: 05X01 = 05 Marks

Q.1 In HPS If the working piston is fully extended in one direction at full steering angle, the pressure is reduced via a

a) Fluid Control Valve
b) Fluid Hoses
c) Pressure Relief Valve
d) Pressure Vent

Q.2 Which one of the following steering system works on sliding mechanism?

a) Ackermann
b) Davis
c) Both a & b
d) None of them

Q.3 Which type of steering mechanism uses a sector gear?

a) Rack and Pinion type
b) Recirculating Ball type
c) Worm and Worm Wheel type
d) All of the above

Q.4 Which component of HPS feeds information about demand on the power steering system to the vehicle's engine ECU?

a) Rotary valve
b) Control Bushing
c) Pressure Switch
d) Control Sleeve

Q.5 What is the range of steering ratio for power steering system in cars?

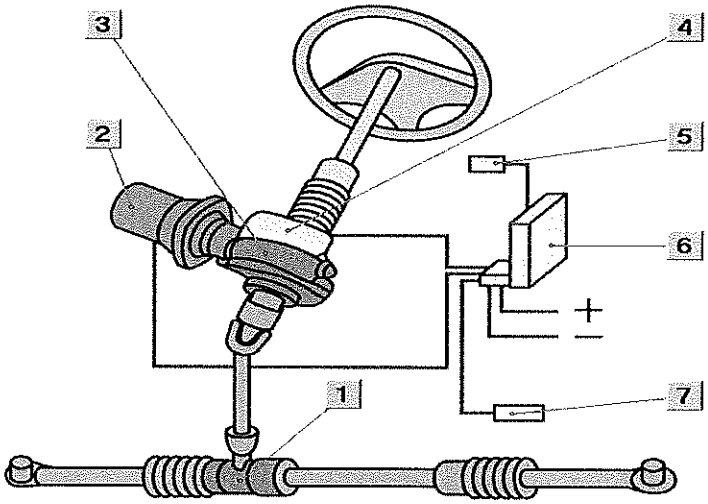
a) 12:1-17:1
b) 19:1-25:1
c) 22:1-33:1
d) 15:1-21:1

Section – B

03X02 = 06 Marks

Q.6 Write a short note on power steering pump used in a HPS.

Q.7 Label the diagram given below. Also mention which type of steering system is illustrated in the diagram.



Q.8 What is EPHS? Write the advantages of EPHS over HPS.

Section – C

03X03 = 09 Marks

Q.9 Explain steering ratio. How it is calculated? Give an example for calculations done for finding Steering Ratio.

Q.10 Write nine differences between Ackermann and Davis steering system.

Q.11 Write a short note on:

a. Recirculating Ball Type Steering Mechanism

b. Rack and Pinion Type Steering Mechanism

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School of Automotive Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, 3rd Semester
1st In-Sem. Examination

Course Code: AUT1302 **Time: 1 Hour**

Course Name: Automotive wheel care & steering system **Max. Marks: 20**

Instruction:

1. **Attempt all questions from section A, each question carries one mark.**
2. **Attempt all questions from section B, each question carries two mark.**
3. **Attempt all questions from section C each question carries three mark**

Section – A

Directions: Select any one correct answer from the given options: 05X01 = 05 Marks

Q.1 In HPS If the working piston is fully extended in one direction at full steering angle, the pressure is reduced via a

a) Fluid Control Valve
b) Fluid Hoses
c) **Pressure Relief Valve**
d) Pressure Vent

Q.2 Which one of the following steering system works on sliding mechanism?

a) Ackermann
b) **Davis**
c) Both a & b
d) None of them

Q.3 Which type of steering mechanism uses a sector gear?

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Q.5 What is the range of steering ratio for power steering system in cars?

a) 12:1-17:1
b) 19:1-25:1
c) 22:1-33:1
d) **15:1-21:1**

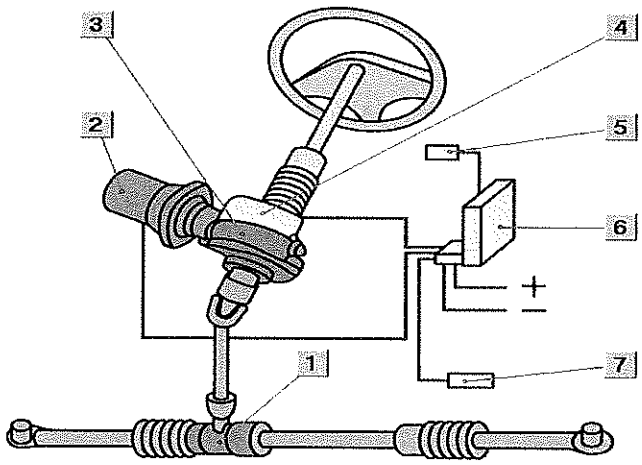
Section – B

03X02 = 06 Marks

Q.6 Write a short note on power steering pump used in a HPS.

Answer: The power steering pump is driven by the engine's crankshaft via a belt-pulley mechanism. The pump is usually located in the front of the engine, adjacent to the alternator or AC compressor. The steering pump compresses the hydraulic fluid at a rate directly proportional to the speed of the engine.

Q.7 Label the diagram given below. Also mention which type of steering system is illustrated in the diagram.



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.8 What is EPHS? Write the advantages of EPHS over HPS.

- **Electro power hydraulic steering system(EPHS):** is similar to **HPS** one major difference is, it use electric power to operate hydraulic pump. Hydraulic Pump do not using engine power to operate steering system.

❖ **Advantages of EPHS:**

- The oil flow rate can be controlled electronically via a control unit by adjusting the delivery rate. (steering force assistance as a function of speed)
- - steering assistance is guaranteed even when the engine is at a standstill
- - Energy consumption can be reduced because the pump does not run continuously
- - the steering characteristics can be adjusted via the control electronics depending on the vehicle.

Section – C

03X03 = 09 Marks

Q.9 Explain steering ratio. How it is calculated? Give an example for calculations done for finding Steering Ratio.

- When the steering wheel is rotated from lock-to-lock the front wheels turn about 30° each in each direction from the straight-ahead position. Therefore, the total front wheel movement from left to right is approximately 60°.
- The steering gear must have a ratio that allows more steering wheel rotation in relation to front wheel movement. A steering ratio of 15:1 is acceptable, and this ratio provides 1° of front wheel movement for every 15° of steering wheel rotation.
- 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.10 Write nine differences between Ackermann and Davis steering system.

ACKERMANN TYPE STEERING GEAR	DAVIS TYPE STEERING GEAR
1.In Ackermann steering gear mechanism is on the back of the wheel axle.	1.The Davis steering gear mechanism is on the front of the wheel axle.
2.It consist only turning pair.	2.It consist of turning as well as sliding pair.
3.Less wear and tear is involved.	3. More wear and tear is involved.
4.Less effort is required while turning.	4.more effort is required turning.
5. Space required is less.	5. it require more space.
6.Skidding is more compare to davis.	6.Skidding is relatively less.
7. Wearing OF tires and skidding effects for analysis is less considerable.	7.Effects of wearing and skidding for analysis is more considerable.
8.It is an approximate steering gear mechanism.	8. It is an exact steering gear mechanism.
9. Maintenance is simple and low in cost.	9. It is high in maintenance complex and cost.

Q.11 Write a short note on:

a. Recirculating Ball Type Steering Mechanism

It has a sector gear on the inner end of the output shaft. A sector gear is section of gear teeth from a gear wheel. The output shaft is called the sector shaft or pitman-arm shaft. The teeth on the sector gear mesh with the teeth of the ball nut. It rides on the worm or worm gear that connects to the end of the steering shaft. Balls roll in grooves inside the ball nut and in the worm. As the steering shaft rotates, the worm forces the ball to roll in the grooves. The balls, as they roll, force the ball nut to move up or down the worm. Movement of the ball nut forces the pitman-arm shaft to turn. This swings the pitman arm which forces the steering linkage to pivot the wheels for steering.

The balls are the only contact between the worm and nut. This reduces friction. The balls are recirculating balls because they recirculate from on end of the ball nut to the other end during

steering. As the balls reach the end of the groove in the ball nut, they enter the return guides. The balls then travel back to the other end of the ball nut.

b. Rack and Pinion Type Steering Mechanism

Most smaller and down-sized vehicles use a rack-and-pinion steering gear. It has a pinion gear on the end of steering shaft that meshes with a flat rack of gear teeth. Tie rods connect the end of the rack to the steering arms. As the steering wheel turns, the pinion gear moves the rack to right or left. This moves the tie rods and steering arms which turns the steering knuckles and wheels inward or outward.

The inner end of the tie rods has a ball which fit into ball sockets on the end of rack. This allows the outer ends of the tie rods to move up and down with the steering knuckles and wheels. Flexible rubber boots or bellows protect the steering gear from dust and water.

Many steering systems have an intermediate steering shaft between the steering column and the steering gear. The intermediate shaft has a universal joint at the upper end and a flexible coupling at the lower end. These help prevent road shock and noise from passing up through the steering column to the driver.

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School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1303 **Time: 1 Hour**

Course Name: Automotive Body Works **Max. Marks: 20**

Instruction:

1. Answer all questions from **"Section-A"**, each question carries 01 mark.
2. Answer all questions from **"Section-B"**, each question carries 02 marks.
3. Answer all questions from "**Section-C"**, each question carries 03 marks.

Section – A

Directions: Select any one correct answer from the given options: 05X01 = 05 Marks

1) Technician **A** says that the gas flow rate must be regulated before using a GMAW or MIG/MAG welding. Technician **B** says that the wire speed must be adjusted before using a GMAW. Who is right?
   a) Only A
   b) Only B
   c) Both A & B
   d) Neither A nor B

2) Serrate head hammers are used for.....
   a) shrinking metal
   b) Panel flattening
   c) Restoring Bodylines
   d) All of the above

3) ..... is the event in which two or more bodies exert forces on each other in about a relatively short time.
   a) Denting
   b) Bending
   c) Clamping
   d) Collision

4) ..... is an essential tool for the quick removal of paint, primer and old body filler from an area being repaired.
   a) Sliding hammers
   b) Sander
   c) Shears
   d) Nibblers

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

Section – B

03X02 = 06 Marks

6) Give the reasons of wearing safety gloves, safety goggles and safety shoes in an Auto Body Repair works.

7) Where do we use spoons in bodywork and why?

8) Write the advantages of using sanding blocks.

Section – C

03X03 = 09 Marks

9) Describe the types of body hammer along with their applications.

10) Discuss the dent repair techniques when the dent regains its original position.

11) Write short notes on:

a) Shear

b) Grinder

c) Mallet

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Section – A

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   a) Only A
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   b) Only B
   d) Neither A nor B

2) Serrate head hammers are used for.....

   a) shrinking metal
   c) Restoring Bodylines
   b) Panel flattening
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5) Worker operating with hammer do not need.....

   a) Safety glasses
   c) Hearing protection
   b) Safety shoes
   d) Respirator

Section – B

03X02 = 06 Marks

6) Give the reasons of wearing safety gloves, safety goggles and safety shoes in an Auto Body Repair works.

Ans: -

Safety Gloves

Body technicians and painters are constantly handling substances which are harmful to health. The harmful effect of liquids, chemicals and materials on the hands can be prevented, in many cases, by wearing the correct type of gloves. To comply with COSHH Regulations, vinyl disposable gloves must be used by painters to give skin protection against toxic substances. Other specialist gloves available are: rubber and PVC gloves for protection against solvents, oil and acids; leather gloves for hard wear and general repair work in the bodyshop; and welding gauntlets, which are made from specially treated leather and are longer than normal gloves to give adequate protection to the welder's forearms.

Safety Goggles

Eye protection is required when there is a possibility of eye injury from flying particles when using a grinder, disc sander, power drill or pneumatic chisel, or when removing glass windscreens or working underneath vehicles. Many employers are now requiring all employees to wear some form of safety glasses when they are in either the repair or the paint areas of the body shop, because in any body shop location there is always the possibility of flying objects, dust particles, or splashing liquids entering the eyes. Not only is this painful but it can, in extreme cases, cause loss of sight. Eyes are irreplaceable: therefore, it is advisable to wear safety goggles, glasses or face shields in all working areas.

Safety Shoes

Safety footwear is essential in the bodyshop environment. Boots or shoes with steel toecaps will protect the toes from falling objects. Rubber boots will give protection from acids or wet conditions. Never wear defective footwear as this becomes a hazard in any workshop environment.

7) Where do we use spoons in bodywork and why?

Ans: -

Spoons are used for bumping and prying and can also be used instead of a dolly when direct access to the rear of a panel is obstructed. The choice of spoon depends on the original contour of the metal, the amount of access available and the proposed action (i.e. roughing or levelling).

Specially designed for panel beating work in restricted areas and for separating outer panels from inner frame structure

- Designed for used inside hard-to-reach areas.
- Spoons function like a body dolly with a handle.
- Often smaller and thinner than a dolly, they can be used inside of doors, fenders, hoods, or other double wall panels.
- They can also be used for prying panels outward from behind.

8) Write the advantages of using sanding blocks.

Ans: -

- Sanding blocks are commercially available in a wide variety of shapes, styles, size, and materials.
- Sanding can help you to get the best results, but without a sanding block you'll be wasting your time.
- Sanding blocks help you to exert even pressure on the sandpaper, while minimizing waves in the panel being sanded.

Section – C

03X03 = 09 Marks

9) Describe the types of body hammer along with their applications.

Ans: -

Body hammer come in a variety of shapes, sizes, and uses.

- Those with a serrate head are used for shrinking metal.
- Round heads are used for general panel flattening.
- While square heads are used for restoring bodylines.

10) Discuss the dent repair techniques when the dent regains its original position.

Ans: -

The dent repair techniques are as follows;

- Repairing bent sheet metal components is relatively simple, five-step process.
- Remove the paint from the area to be repaired, straighten the deformed sheet metal as much as possible, apply a skim coat of filler to perfect the surface shape, prime, and then paint.
- Strip the paint from the area to be repaired.
- Use dent puller and its attachment to straighten or repair the dent as close to the panel line.
- Start pulling from outside and work towards center.
- Grind the weld spot from the affected area.
- Apply the skim coat of body filler to provide the panel contour or shape.
- Apply primer to fill the small scratch and pinholes.
- After that inspection can be done.
- And then paining

11) Write short notes on:

a) Shear

b) Grinder

c) Mallet

Ans: - shear

- Bench-mounted or portable metal shears work in much the same way as scissors: two or more blades act against each other to cut the metal.
- A long arm and ratchet or gear mechanism works to ease the process of cutting sheet metal.
- Shear can be used to cut custom patch panels from a piece of flat sheet metal, before welding the piece to the vehicle.

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.
- If you'll be working on a large area of the vehicle, a large sanding surface will be better, but a smaller workspace (such as around door handles, trim, or other obstacles) will limit how much room you'll have for sanding. Smaller, high-speed grinders and larger speed author. Both can be equipped with sanding disc for removing paint. The relatively small grinder (around 4 inches) can be equipped with a grinding disc for work on heavy metal, such as that found on chassis, while the 7-inch sander can be equipped with a polishing bonnet for buffing and polishing operations.

Mallet

- Mallets differ from bodywork hammers in construction material and shape, as well as how they are used.
- A mallet's striking surface is usually made of plastic or some other composite that will not mar sheet metal or Aluminium.
- Mallets are typically used for hammer-forming flat sheet metal into custom shapes, and sometime require the use a wooden buck against which to hammer the metal.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1304 **Time: 1 Hour**

Course Name: Automotive Refinish Painting **Max. Marks: 20 marks**

Instruction:

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

Section – A

05X01 = 05 Marks

Q-1. What is Hue?

a. Color family
c. Lightness
b. Darkness
d. None of these

Q-2. What is the recommended intensity of light required in a paint booth?

a. 1000 lux
c. 1500 lux
b. 2000 lux
d. None of the above

Q-3. What is the best way of removing the dust particles after putty dry sanding?

a. Air blowing
c. Cleaning with degreaser
b. Cleaning with thinner
d. Both (a) and (c)

Q-4. What are the primary colors?

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

Q-5. Which of the following paint layer is not a part of refinish painting?

a. Electrophoretic dip coat primer
c. Polyester putty
b. Epoxy primer
d. Body filler

Section – B

03X02 = 06 Marks

Q-6. Write a short note on unique Hues and Hombination hues

Q-7. What is HVLP gun? Write down its applications.

Q-8. Define Paint? Name different components of paint.

Section – C

03X03 = 09 Marks

Q-9. Write short notes on: -

a. Hue

b. Value

c. Chroma

Q-10. Draw and explain Hue circle diagram.

Q-11. Discuss the correct parameters of spray gun handling during paint application.

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School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1304 **Time: 1 Hour**

Course Name: Automotive Refinish Painting **Max. Marks: 20 marks**

Instruction:

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

Section – A

05X01 = 05 Marks

Q-1. What is Hue?

a. Color family
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d. None of these

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a. Air blowing
b. Cleaning with thinner
c. Cleaning with degreaser
d. Both (a) and (c)

Q-4. What are the primary colors?

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

5

Section – B

03X02 = 06 Marks

Q-6. Write a short note on unique hues and combination hues?

Ans 1.Some hue perceptions appear to be combined from other hues. For example, we perceive that orange combines hue aspects of red and yellow

2. Other hue perceptions appear to be unique or not combinations. For example, green is a unique hue. It is not perceived as a combination of blue and yellow.

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Q-7. What is HVLP gun? Write down its application.

Ans . 1. HVLP stands for high-volume, low-pressure.

2. These guns use high volume of air to push the paint through the nozzle.

3. Dilute the paint to make it thinner, and spray from a distance of five to eight inches.

4. It decreases the wastage of paint.

Q-8. Define Paint? Name different components of paint

Ans. Paint is a mixture of different chemicals which gives aesthetic appearance, provides strength, prevent from atmospheric conditions.

Paint is made up of five basic elements: -

1. Binder/Resin
2. Pigment
3. Additives
4. Hardener
5. Solvent

Section – C

03X03 = 09 Marks

Q-9. Write short notes on: -

a. Hue
b. Value
c. Chroma

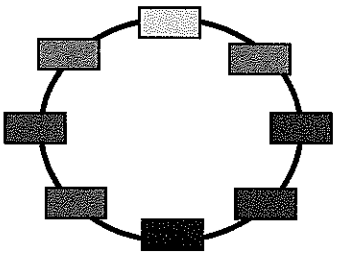
Ans. Hue: - Hue is the most important property of colour as it simply described by simply names of colour. Colour names like red, blue, yellow etc. all are hue names.

Value: - The attribute with which we can classify color on the basis of their lightness and darkness is called value.

Chroma: - The attribute with which we can classify color on the basis of their Brightness and dullness is called chroma.

Q-10. Draw and explain Hue circle diagram.

Ans



White, black and gray are"neutral" colors. They have no hue.Neutral colors are not more related to one hue than to anyother. To show this on the huecircle diagram, we place neutral colors at the center.

Q-11. Discuss the correct parameters of spray gun handling during paint application.

Ans 1. The angle of gun should be 90 degrees to the panel.

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

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

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

5. Overlapping should be 50% in each lap.

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Ans 1. The angle of gun should be 90 degrees to the panel.

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Registration No.: .....

School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT 1305 **Time: 1 Hour**

Course Name: Automotive electrical and A.C. **Max. Marks: 20**

Instruction:

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

Section – A

05X01 = 05 Marks

1. Which of the following term Is responsible for the effect on resistance?

a) Material
b) Temperature
c) length and cross sectional area
d) All of the above

2. Which of the following is responsible for the flow of current?

a) Higher potential
b) Lower potential
c) Drift of free electron
d) Fully filled orbit of an atom

3. Which of the following materials is not an electrical conductor?

a) copper
b) Gold
c) Ceramics
d) Graphite

4. Which of the following term in Flemings right hand rule is denoted by fore finger?

a) F (Direction of force)
b) B (Direction of magnetic field)
c) I (Direction of induced current)
d) None of the above

5. Which of the following is an example of induction of current?

a) Change in cross sectional area
b) Change in current
c) Change in time
d) Change in magnetic flux

Section – B

03X02 = 06 Marks

6. What do you mean by magnetic flux, magnetic induction? Explain with the help of diagram.

7. What do you mean by Flemings right hand rule? Explain with diagram.

8. What is the difference between analogue multimeter and digital multimeter? Why analogue multimeter is more precise than digital multimeter?

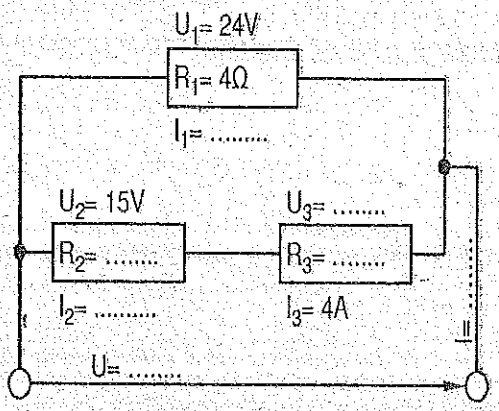
Section – C

03X03 = 09 Marks

9. What is ohm law? Ohm's law describes the relationship of the three values: (write name and unit!). write the resistivity of copper.

10. What are the difference between star connection and delta connection? Write their applications and draw their diagram.

11. Calculate the missing values in the mixed circuit.
The calculation path must be visible on the answer sheet!



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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT 1305 **Time: 1 Hour**

Course Name: Automotive electrical and A.C. **Max. Marks: 20**

Instruction:

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

Section – A

05X01 = 05 Marks

1. **Which of the following term Is responsible for the effect on resistance?**
   a) material
   b) temperature
   c) length and cross sectional area
   d) All of the above
2. **Which of the following is responsible for the flow of current?**
   a) Higher potential
   b) Lower potential
   c) Drift of free electron
   d) Fully filled orbit of an atom
3. **Which of the following materials is not an electrical conductor?**
   a) copper
   b) gold
   c) ceramics
   d) graphite
4. **Which of the following term in Flemings right hand rule is denoted by fore finger?**
   a) F (direction of force)
   b) B (direction of magnetic field)
   c) I (direction of induced current)
   d) None of the above
5. **Which of the following is an example of induction of current?**
   a) Change in cross sectional area
   b) Change in current
   c) Change in time
   d) Change in magnetic flux

Section – B

03X02 = 06 Marks

6. What do you mean by magnetic flux, magnetic induction? Explain with the help of diagram.

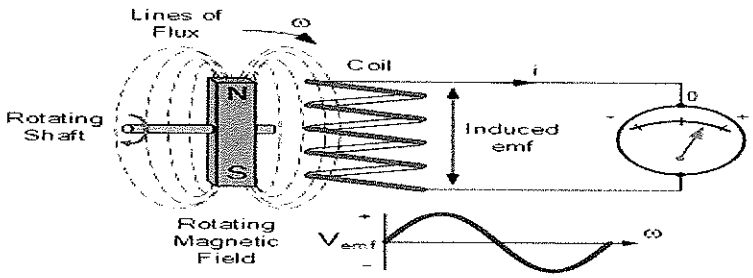
Ans. When the coils are stationary, no current is induced. But when the small coil is moved in or out of the large coil *(B)*, the magnetic flux through the large coil changes, inducing a current which is detected by the galvanometer *(G)*.

Michael Faraday's famous law of electromagnetic induction states:

"that a voltage is induced in a circuit whenever relative motion exists between a conductor and a magnetic field and that the magnitude of this voltage is proportional to the rate of change of the flux"

Electromagnetic or **magnetic induction** is the production of an electromotive force (i.e., voltage) across an electrical conductor in a changing magnetic field.

voltage (emf) can be induced into the coil using just magnetism. Well this is determined by the following 3 different factors.



7. What do you mean by Flemings right hand rule? Explain with diagram.

Ans. Right hand thumb rule

When current flows through a conducting wire, and an external magnetic field is applied across that flow, the conducting wire experiences a force perpendicular both to that field and to the direction of the current flow (i.e. they are mutually perpendicular)

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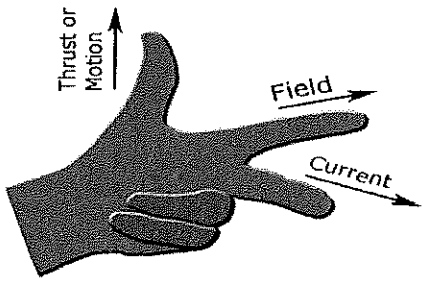


8. What is the difference between analogue multimeter and digital multimeter? Why analogue multimeter is more precise than digital multimeter?

Ans. Analogue multimeter are good at measuring multimeter, although there are few points to note about the way in which it is done.

Meter itself respond to current flowing though the component under test. A high resistance corresponds to low current and the meter needle settles on the left hand side of the dial, and

a low resistance corresponds to a higher current and the meter needle deflects more so it appears on the right hand side of the dial.

A Multimeter is a handy tool that you use to measure electricity, just like you would use a ruler to measure distance, a stopwatch to measure time, or a scale to measure weight. Almost all Multimeters can measure **voltage**, **current**, and **resistance**. Some multimeters have a **continuity check**, resulting in a loud beep if two things are electrically connected. This is helpful if, for instance, you are building a circuit and connecting wires or soldering; the beep indicates everything is connected and nothing has come loose. You can also use it to make sure two things are *not* connected, to help prevent short circuits.

Some multimeters also have a **diode check** function. A **diode** is like a one-way valve that only lets electricity flow in one direction.

Section – C

03X03 = 09 Marks

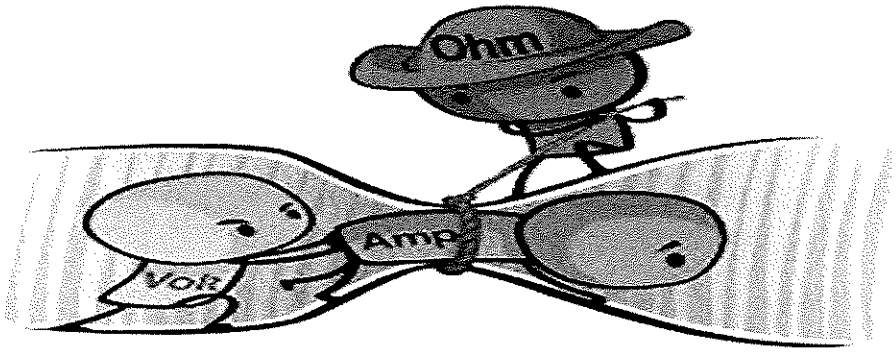
9. What is ohm law? Ohm's law describes the relationship of the three values: (write name and unit!). write the resistivity of copper.

Ans. Ohm

The ohm is the unit of resistance in a conductor. Three things determine the amount of resistance in a conductor: its size, its material, e.g., copper or aluminum, and its temperature. A conductor's resistance increases as its length increases or diameter decreases. The more conductive the materials used, the lower the conductor resistance becomes. Conversely, a rise in temperature will generally increase resistance in a conductor.

Ohm's Law

Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points. Introducing the constant of proportionality, the resistance.



Resistivity of copper: -

1.68 $x10^{-8}$

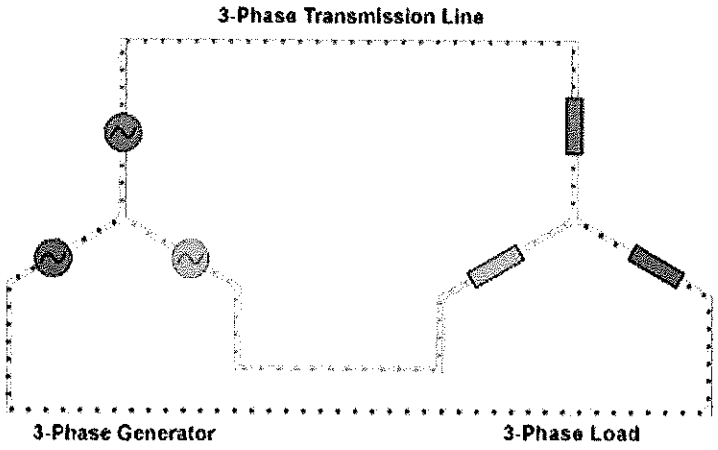
10. What are the difference between star connection and delta connection? Write their applications and draw their diagram.

Ans. Voltage generation by three phase AC

three-phase electric power is a common method of alternating current electric power generation, transmission, and distribution. It is a type of polyphase system and is the most common method used by electrical grids worldwide to transfer power. It is also used to power large motors and other heavy loads.

a three-phase supply with no neutral and the same phase-to-ground voltage and current capacity per phase can transmit three times as much power using just 1.5 times as many wires (i.e., three instead of two). Thus, the ratio of capacity to conductor material is doubled. The ratio of capacity to conductor material increases to 3:1 with an ungrounded three-phase and centre-grounded single-phase system.

Three-phase systems may also have a fourth wire, particularly in low-voltage distribution. This is the neutral wire. The neutral allows three separate single-phase supplies to be provided at a constant voltage and is commonly used for supplying groups of domestic properties which are each single-phase loads. The connections are arranged so that, as far as possible in each group, equal power is drawn from each phase.

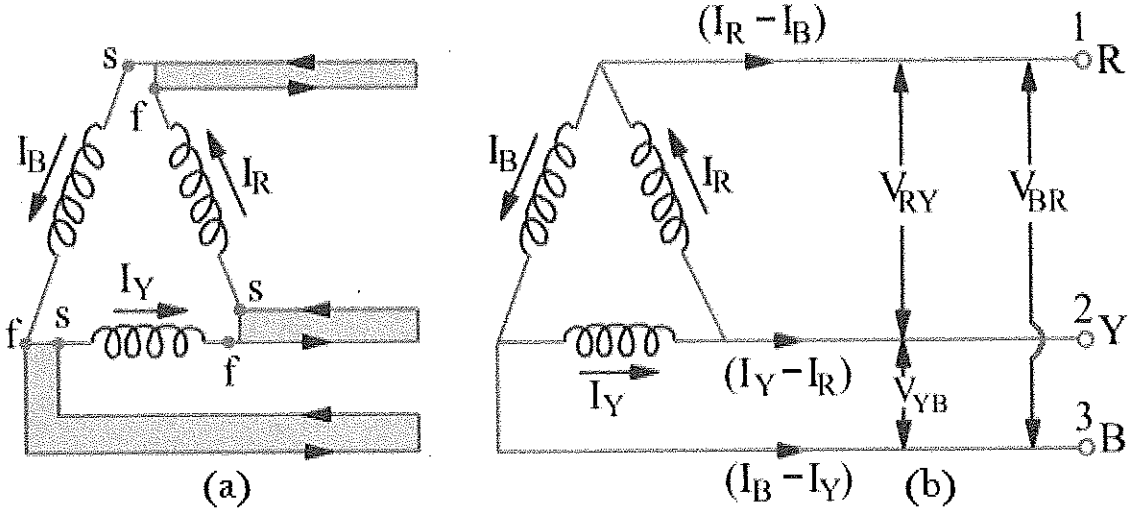


Star connections

- **Star Connection** (Y) System is also known as **Three Phase Four Wire System (3-Phase 4 Wire)** and it is the most preferred system for AC power distribution while for transmission, Delta connection is generally used.
- In **Star** (also denoted by **Y**) system of interconnection, the starting ends or finishing ends (similar ends) of three coils are connected together to form the neutral point. Or
- **Star Connection** is obtained by connecting together similar ends of the three coils, either "Starting" or "Finishing". The other ends are joined to the line wires. **The common point is called the neutral or Star Point,** which is represented by **N.**

Delta connections

In **Delta** (also denoted by **Δ**) system of interconnection, the starting ends of the three phases or coils are connected to the finishing ends of the coil. Or the starting end of the first coil is connected to the finishing end of the second coil and so on (for all three coils) and it looks like a closed mesh or circuit.



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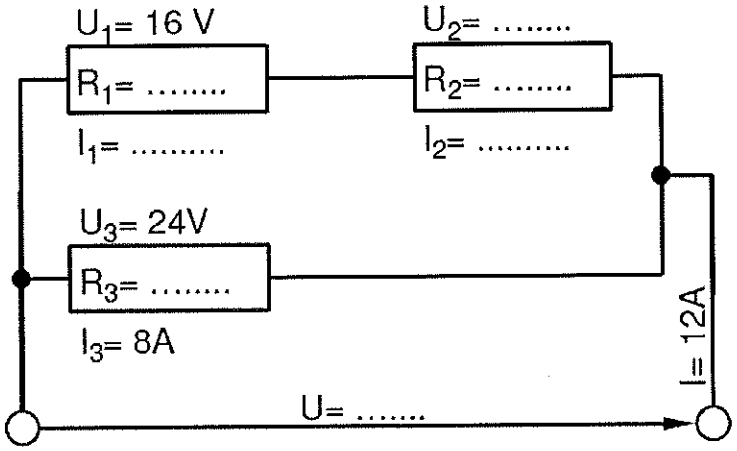
Delta Connection (Δ): 3 Phase Power, Voltage & Current Values

11. Calculate the missing values in the mixed circuit.

The calculation path must be visible on the answer sheet!



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2019-20 Summer Semester

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT 1315 **Time: 1 Hour**

Course Name: THT- Automotive **Max. Marks: 20**

Instruction:

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

Section – A

Directions: Select any one correct answer from the given options: 05X01 = 05 Marks

Q.1 Maintenance consist of the following action

(a) Replace of component
(c) Service of component
(b) Repair of component
(d) All of the above

2. The following is not a classification of maintenance

(a) Corrective maintenance
(c) Scheduled maintenance
(b) Timely maintenance
(d) Preventive maintenance

3. Belt of an electric motor is broken, it needs

(a) Corrective maintenance
(c) Preventive maintenance
(b) Scheduled maintenance
(d) Timely maintenance

4. The following is (are) scheduled maintenance

(a) Overhauling of machine
(c) Whitewashing of building
(b) Cleaning of tank
(d) All of the above

5. A systematic approach for maintenance is

(a) Problem – Cause – Diagnosis – Rectification
(c) Problem – Measure – Diagnosis – Rectification
(b) Problem– Diagnosis – Cause – Rectification
(d) Problem– Diagnosis – Measure – Rectification

Section – B

03X02 = 06 Marks

Q.6 How Often A Car Does Requires Services?

Q.7 what is Preventive Maintenance and what are its benefits?

Q.8 what is Break down Maintenance? When it is done? Give one example.

Section – C

03X03 = 09 Marks

Q. 9 Explain the steps in mechanical fault diagnosis.

Q.10 Explain IC engine electric starting system.

Q.11 How you can keep your car in good condition?

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

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Section – A

Directions: Select any one correct answer from the given options: 05X01 = 05 Marks

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(b) Problem– Diagnosis – Cause – Rectification
(d) Problem– Diagnosis – Measure – Rectification

Section – B

03X02 = 06 Marks

Q.6 How Often A Car Does Requires Services?

Answer- Car requires services yearly and major maintenance at 5,000 Km.

Q.7 What is Preventive Maintenance?

Answer- Preventive Maintenance is a comprehensive maintenance program of scheduled service requirements designed specifically for the customer, type of vehicle, and application

Q.8 What is Break down Maintenance?

Answer- When any system breaks the check, service and replacement done is called breakdown maintenance.

Section – C

03X03 = 09 Marks

Q. 9 Why should your dealership perform the Preventive Maintenance on your vehicle?

Answer- There are several advantages to turning to your dealer for Preventive Maintenance. No one is more qualified to inspect, maintain, and repair your vehicle. Your dealer's technicians are trained specifically for the product and are kept up to date on all aspects of service and repair as recommended by the manufacturer. The service department has the latest in diagnostic equipment and a direct link to tech support when needed. Your dealer's service shop uses approved original equipment replacement parts that carry an OEM, no hassle, parts and labour warranty. The dealer can perform all aspects of repair including warranty work, recalls, and service programs. This means that when your vehicle is in for a scheduled PM, all necessary service items can be performed, thus providing a one-stop shop avoiding the additional downtime of having to take your vehicle to another shop for follow-up work. You can't get this level of service from an independent shop.

Q.10 What benefits can you realize with a dealer Preventive Maintenance Program?

Answer-

1. Personalized, trustworthy service
2. Lowest possible operating cost
3. Maximized uptime.
4. Minimized unscheduled stops
5. No unnecessary delays or fines at roadside inspection
6. One-stop service

7. Maximized warranty entitlements
8. Increased competitiveness by having fleet maintenance

9. Infrastructure provided by your dealer
10. Efficient scheduling
11. Contracted terms
12. Regulatory compliance
13. Complete records/history
14. Budget effectively
15. Maximized residual value on your investment
16. Best possible ownership experience

Q.11 How you can keep your car in good condition?

Answer- Regular check-up of parts like

1. Check battery
2. Tyres and brakes
3. Fluid levels (Coolant, Washer fluid, Brake fluid, Oil, Power steering, etc.)
4. Fuel filters and Injectors
5. Belts and hoses
6. Alternator
7. Lubrication of wheel
8. Bearing and ball joints