Set-A 19

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (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:

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

5x1=5 Marks

Q-1. Out of the following options which one is not a heat Transfer Process...

a. Radiation.
b. Convection.
c. Liquefaction.
d. Conduction.

Q-2. In a Two cylinder two stroke engine the working cycle completes in...

a. Four revolution of crankshaft
b. Two revolution of crankshaft
c. One revolution of crankshaft
d. None of the above

Q-3. The function of a camshaft is to...

a. Convert the reciprocating motion into rotatory motion.
b. Transmit power from crankshaft to flywheel.
c. Operates the valves.
d. All of the above.

Q-4. Feeler gauge is used to...

a. Measure the distance between two points.
b. Measure thickness of parts.
c. Feel the vibration of parts.
d. Measure the clearance between two parts.

Q-5. The full form of CVT is:

a. Controlled variable transmission.
b. Continuous velocity transmission.
c. Continuously variable transmission.
d. None of the above.

Section-B

3x2=6 Marks

Q-6. What is an engine block? Write about the material used in an engine block.

Q-7. Mention Any six different type of fasteners.

Q-8. Write down the differences between a dry and a wet cylinder liner. (Any four)

Section-C

3x3=9 Marks

Q-9. What is a CV joints? Why do we use CV joints instead of variable velocity joints? Also write down the names of any four CV joints.

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

Q-11. What is a piston rings? Explain the functions of each type of piston rings.

Set -A Solution

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Section-A

5x1=5 Marks

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a. Radiation.
b. Convection.
c. Liquefaction.
d. Conduction.

Ans: (c) Liquefaction.

Q-2. In a Two cylinder two stroke engine the working cycle completes in...

a. Four revolution of crankshaft
b. Two revolution of crankshaft
c. One revolution of crankshaft
d. None of the above

Ans: (c) One revolution of crankshaft.

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Ans: (c) Operates the valves.

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b. Measure thickness of parts.
c. Feel the vibration of parts.
d. Measure the Clearance between two parts.

Ans: (d) Measure the Clearance between two parts.

Q-5. The full form of CVT is:

a. Controlled variable transmission.
b. Continuous velocity transmission.
c. Continuously variable transmission.
d. None of the above.

Ans: (c) Continuously variable transmission.

Section-B

3x2=6 Marks

Q-6. What is an engine block? Write about material used in an engine block.

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-7. Mention any six different type of fastners.

Ans:

a) Carriage bolt
b) Hex Head bolt
c) Machine bolt
d) Shoulder bolt
e) Deck screw
f) Self-drilling screw
g) Sheet metal screw
h) Wooden screw

Q-8. Write down the difference between a dry and a wet cylinder liners (Any four)?

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.

Section-C

3x3=9 Marks

Q-9. What is a CV joints? Why do we use CV joints instead of variable velocity joints? also write down the names of any four CV joints.

Ans: **Constant Velocity Joints:**
The constant velocity joints allow a drive shaft to transmit power through a variable angle, at different rotational speed, without an appreciable increase in friction or play. The constant velocity joints are protected by a Rubber boot, usually filled with Grease. Cracks and splits in the boot will allow contaminants in, which would cause the joint to wear quickly as grease leaks out. They are mainly used in front wheel drive vehicles. Modern Rear wheel drive cars with independent Rear suspension typically use the CV joints at the ends of Rear axle half shaft and increasingly use them on drive shaft.

Why we use CV joints instead of variable velocity or U-Joints:

The universal joint transmits an average speed to the opposite end, but fluctuates speed every 180 degrees of rotation. This cyclic axial velocity variation generates a vibration, and the greater the angle, the worse the vibration. Keeping these angles low and using a second universal joint offset by 90 degrees makes for smoother operation, but cannot eliminate axial velocity variations and vibration completely.

On the other hand, a true constant velocity joint can transmit torque with zero angular velocity variation and near-zero vibration at greater angles than universal joints. Early CVJ designs included the double cardan joint (two combined U-joints), the Weiss joint, the tripod joint and the Tracta joint. The **Rzeppa joint** is most often found in front-wheel-drive vehicles at the wheels, since they allow for shaft angles up to 54 degrees. Because they generate little vibration, CV joints can be found on drive shafts and drive axles in all kinds of vehicles.

Types of joints:

a) Rzeppa cv joint
b) Fixed and plunge joint
c) Plunge joint (Tripod and ball Type)
d) Inboard and outboard joints.
e) Tripod joints (fixed joints)
f) Inboard and outboard joints.

Q-10. What is a 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. What is a piston rings? Explain the functions of each type of piston rings.

Ans: Piston rings commonly used on small engines include the compression ring, wiper ring, and oil ring. A *compression ring* is the piston ring located in the ring groove closest to the piston head. The compression ring seals the combustion chamber from any leakage during the combustion process. When the air-fuel mixture is ignited, pressure from combustion gases is applied to the piston head, forcing the piston toward the crankshaft. The pressurized gases travel through the gap between the cylinder wall and the piston and into the piston ring groove. Combustion gas pressure forces the piston ring against the cylinder wall to form a seal. Pressure applied to the piston ring is approximately proportional to the combustion gas pressure.

1. Compression Ring

The compression ring is the top or closest ring to combustion gases and is exposed to the greatest amount of chemical corrosion and the highest operating temperature. The compression ring transfers 70% of the combustion chamber heat from the piston to the cylinder wall. Most Briggs & Stratton engines use either taper-faced or barrel-faced compression rings. A taper faced compression ring is a piston ring that has approximately a 1° taper angle on the running surface. This taper provides a mild wiping action to prevent any excess oil from reaching the combustion chamber.

A barrel faced compression ring is a piston ring that has a curved running surface to provide consistent lubrication of the piston ring and cylinder wall. This also provides a wedge effect to optimize oil distribution throughout the full stroke of the piston. In addition, the curved running surface reduced the possibility of an oil film breakdown due to excess pressure at the ring edge or excessive piston tilt during operation.

2. Wiper Ring

The wiper ring, sometimes called the scraper ring, Napier ring, or back-up compression ring, is the next ring away from the cylinder head on the piston. The wiper ring provides a consistent thickness of oil film to lubricate the running surface of the compression ring. Most wiper rings in Briggs & Stratton engines have a taper angle face. The tapered angle is positioned toward the oil reservoir and provides a wiping action as the piston moves toward the crankshaft.

The taper angle provides contact that routes excess oil on the cylinder wall to the oil ring for return to the oil reservoir. A wiper ring incorrectly installed with the tapered angle closest to the compression ring results in excessive oil consumption. This is caused by the wiper ring wiping excess oil toward the combustion chamber.

3. Oil Ring

An oil ring includes two thin rails or running surfaces. Holes or slots cut into the radial center of the ring allow the flow of excess oil back to the oil reservoir. Oil rings are commonly one piece, incorporating all of these features. Some on-piece oil rings utilize a spring expander to apply additional radial pressure to the piston ring. This increases the unit (measured amount of force and running surface size) pressure applied at the cylinder wall.

SET A

19

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT 1302 **Time: 1 Hour**

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

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

05X01 = 05 Marks

1. Which of the following steering system works on a turning mechanism?

   a) Ackermann b) a & b

   c) Davis d) None of the above

2. Which of these were or are used in automobiles to provide suspension

   a) Leaf springs b) Coil springs

   c) Torsion bars d) All of the mentioned

3. What is the full form of ABS system?

   a) Anti-lock braking system b) Anti-lock blocking system

   c) Auto-lock braking system d) None of above

4. Proper tire inflation pressure information is found _____.

a) On the driver's door or post
b) On the sidewall of the tire
c) In the owner's manual
d) Both a and b

5. How many master leaf is there in leaf spring suspension system?

a. 1
c. 3
b. 2
d. 8

Section – B

03X02 = 06 Marks

6. Classify the steering system on the basis of: -
   - Steering Geometry.
   - Steering mechanism.
   - Source of power.
7. Write a note on leaf spring suspension system
8. Write any two differences between shock absorbers and dampers.

Section – C

03X03 = 09 Marks

9. Write any six differences between Ackermann and Davis steering system.

10. Explain the working of a Rack and a Pinion steering mechanism.

11. Explain variable power steering ratio?

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Section – B

03X02 = 06 Marks

6. classify steering system on the basis of: -

a. Steering geometry.

b. Steering mechanism.

c. Source of power.

- Ans. **Steering geometry**
- Ackermann steering system
- Davis steering system
- **Steering mechanism:**
- According to gear box use
- Recirculating ball type
- Rack and pinion
- Worm and worm wheel
- **Source of power:**
- Hydraulic power steering system(HPS): Electric power hydraulic steering system
- Electric power steering system(EPS)

7. Write a note of leaf spring suspension system

Ans. typically when used in automobile suspension the **leaf** both supports an axle and locates/ partially locates the axle. This can lead to handling issues (such as 'axle tramp'), as the flexible nature of the **spring** makes precise control of the unsprung mass of the axle difficult. **Springs** are mechanical devices that are capable of storing mechanical energy because of their elasticity. **Springs** are often **made of** coiled, hardened steel, although non-ferrous metals such as bronze and titanium and even plastic are used.

8. Write any two differences between a shock absorbers and a damper.

Ans. The proper name for shock absorbers is "damper" as it serves to dampen motion. While shock is absorbed by the spring, the damper functions to modulate the oscillations (bouncing). The unique feature of a damper is that its resistance

to motion is proportional to how fast the motion occurs. A shock absorber or damper is a mechanical or hydraulic device designed to absorb and damp shock impulses. ... Most shock absorbers are a form of dashpot (a damper which resists motion via viscous friction).

Section – C

03X03 = 09 Marks

9. Write any six differences between Ackermann and Davis steering system.

Ans. **Ackermann steering system**

1.In Ackermann steering gear mechanism is on the back of the wheel axle.

2.It consist only turning pair.

3.Less wear and tear is involved.

4.Less effort is required while turning.

5. Space required is less.

6.Skidding is more compare to davis.

7. Wearing OF tires and skidding effects for analysis is less considerable.

8.It is an approximate steering gear mechanism.

9. Maintenance is simple and low in cost.

Davis Steering system

1.The Davis steering gear mechanism is on the front of the wheel axle.

2.It consist of turning as well as sliding pair.

3. More wear and tear is involved.

4.more effort is required turning.

5. it require more space.

6.Skidding is relatively less.

7.Effects of wearing and skidding for analysis is more considerable.

8. It is an exact steering gear mechanism.

9. It is high in maintenance complex and cost.

10. Explain the working of Rack and Pinion steering mechanism.

Ans. A rack and pinion is a type of linear actuator that comprises a circular gear engaging a linear gear, which operate to translate rotational motion into linear motion. Driving the pinion into rotation causes the rack to be driven linearly. Driving the rack linearly will cause the pinion to be driven into a rotation

the **rack and pinion** gear set has two main functions: Conversion of the steering wheel's rotational motion into the linear motion needed for the vehicle's wheels to turn. Reduction of gears, which makes it easier for the steering wheel to turn the wheels.

Symptoms of a bad or failing steering rack/gearbox

- Very tight steering wheel. Today's rack and pinion steering systems are supported by a power steering unit that utilizes hydraulic pressure to allow easy and quick steering wheel handling.
- Leaking power steering fluid.
- Grinding noise when steering.
- Burning oil smell.

11. Explain variable power steering ratio?

Ans. Variable-ratio steering is a system that uses different ratios on the rack in a rack and pinion steering system. At the center of the rack, the space between the teeth are smaller and the space becomes larger as the pinion moves down the rack. Steering ratio can be obtained by rotating the steering wheel till the steered wheel deviates by a known angle from straight ahead. We know the number of turns the steering wheel has taken. So steering ratio = Number of turns of steering wheel / Number of degrees of deviation from straight ahead.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set – A

Registration No.:.....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

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

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

Instruction: Attempt all questions.

Section – A

05X01 = 05 Marks

1. What combines its light weight with an inherent strength to provide a weather resistant finish with a variety of surface textures?
    a. Body Filler
    b. Putty
    c. Fiber Glass
    d. All of the Above

2. A spray gun with nozzle tip of 2.2 mm or larger for application of.....
    a. Primer Surfacer
    b. Seam Sealer
    c. Polyester Spray Body Filler
    d. Panel Bonding Adhesive

3. Which power tool with a spinning abrasive disc, is used for grinding, smoothing, and shaping materials, usually metal?
    a. Sander
    b. Angle Grinder
    c. Chemical Stripper
    d. None of the above

4. In TIG welding the tip of tungsten can disintegrate and get trapped in the weld bead such kind of defect is called-
    a. Bead Inclusion
    b. Tungsten Impurity
    c. Tungsten Inclusion
    d. None of the Above

5. Consider/Read the given statements A & B and then choose from the correct options:
   A. MIG welding is commonly carried out either in AC or in DCEP polarity so that electrode can be melted and deposited at a faster rate.
   B. TIG welding is commonly carried out either in AC or DCEN polarity to increase electrode life.
      a. Only A
      b. Only B
      c. Both A and B
      d. Neither A nor B

Section – B

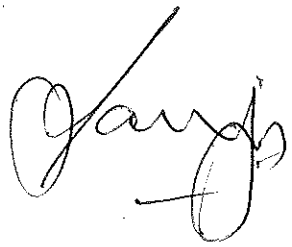
03X02 = 06 Marks

6. What is Chemical Stripping?
7. What are the applications of Primer Surfacer in body repairs?
8. What do you understand by SMAW?

Section – C

03X03 = 09 Marks

9. What are the differences between MMAW and GMAW? (atleast 6)
10. Discuss the types of abrasive materials used in sand paper.
11. Write the Standard Operating Procedure for removal of Front Bumper Assembly.



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   B. TIG welding is commonly carried out either in AC or DCEN polarity to increase electrode life.
      a. Only A
      b. Only B
      c. Both A and B
      d. Neither A nor B

Section – B

03X02 = 06 Marks

6. What is Chemical Stripping?
   Chemical stripping is a process of removing paint and rust from metal surface by the help of chemical. If you have several parts or a number of large pieces to be stripped, it will be more practical to strip them commercially.
7. What are the applications of Primer Surfacer in body repairs?

Offering a high solids content, primer-surfacers (also known as high build primer) are used to cover slight imperfections such as sanding scratches. These products should not be confused with or used as a filler, as they are not intended to fill more than slight scratches. Primer-surfacer is an under coat product designed to be sanded smooth.

8. What do you understand by SMAW?

Shielded metal arc welding (SMAW), also known as manual metal arc welding (MMA or MMAW), flux shielded arc welding or informally as stick welding, is a manual arc welding process that uses a consumable electrode covered with a flux to lay the weld.

Section – C

03X03 = 09 Marks

9. What are the differences between MMAW and GMAW? (atleast 6)

Table: Differences between MMAW and GMAW welding proc

Manual Metal Arc Welding	Gas Metal Arc Welding
MMAW utilizes a consumable electrode in the form of short small diameter rod. So it is an intermittent process as electrode is required to change at certain interval.	GMAW utilizes a consumable electrode continuously supplied from a wire spool. So no intermittent pause is required to replace electrode.
MMAW utilizes flux coated electrode where coating disintegrates to produce shielding gas. No additional gas is applied for shielding purpose.	In GMAW, inert or active shielding gas is supplied at the welding zone. Electrode contains no flux to produce gas.
The flux (electrode coating) produces slag on weld bead. This slag can lead to defects or can hamper appearance. Post processing is desired to remove slag.	No flux is associated with this process. So no slag deposition is observed. Thus it eliminates requirement of post processing.
MMAW process is highly flexible and can be applied in most locations, in all positions, and for most materials.	GMAW uses more accessories and thus are not suitable for outdoor applications. It cannot be carried out in overhead position also.
It is usually carried out by human operator. So joint quality depends on skill of welder.	It can be automated requiring minimum intervention from operator. So it has less tendency of human error.

10. Discuss the types of abrasive materials used in sand paper.

<u>Types of abrasive materials include</u>:

- **Garnet:** commonly used in woodworking
- **Emery:** commonly used to abrade or polish metals
- **Aluminium oxide:** The most common in modern use, with the widest variety of grits, lowest unit cost; can be used on metal (i.e. body shops) or wood
- **Silicon carbide**: available in very coarse grits all the way through to micro-grits, common in wet applications
- **Alumina-zirconia:** (an aluminium oxide–zirconium oxide alloy), used for machine grinding applications
- **Chromium(III) oxide:** used in extremely fine micron grit (micrometre level) papers
- **Diamond:** used for finishing and polishing hard metals, ceramics and glass
- **Ceramic aluminium oxide**: used in high pressure applications, used in both coated abrasives, as well as in bonded abrasives.

11. Write the Standard Operating Procedure for removal of Front Bumper Assembly.

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 as pictured.

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.
- 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.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET - A

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT 1304 **Time: 1 Hour**

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

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

05X01 = 05 Marks

1. How many neutral colors are there in paint?
   a. 2 c. 4
   b. 3 d. 1
2. Which light is best for inspection of Automotive Paint?
   a. LED light c. Halogen lamp
   b. U-V light d. sunlight
3. What size of nozzle in a spray paint gun is used for primer application as per standards?
   a. 1.4 mm c. 1.8 mm
   b. 1.2 mm d. 0.8 mm
4. What do you mean by tinting process?
   a. Mixing with white color c. Mixing with grey color
   b. Mixing with black color d. None of the above
5. What do you mean by toning process?
   a. Mixing with grey color c. Mixing with white color
   b. Mixing with black color d. None of the above

Section – B

03X02 = 06 Marks

6. Draw hue circle diagram
7. Define combination hues with an example
8. What do you mean by color spectrum?

Section – C

03X03 = 09 Marks

9. What do you mean by Chroma, Value and Hue?
10. How can we convert AM11 tinter into AM 16? Write down its formula.
11. Write two difference between head on angle and side on angle.

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Section – A

05X01 = 05 Marks

1. How many neutral colors are there paint?
   a. 2
   b. 3
   c. 4
   d. 1
2. Which light is best for inspection of Automotive Paint?
   a. LED light
   b. U-V light
   c. Halogen lamp
   d. sunlight
3. what size of nozzle in spray paint gun is used for primer application as per standards?
   a. 1.4 mm
   b. 1.2 mm
   c. 1.8 mm
   d. 0.8 mm
4. What do you mean by tinting process?
   a. Mixing with white color
   b. Mixing with black color
   c. Mixing with grey color
   d. None of the above

5. What do you mean by toning process?
   a. Mixing with grey color
   b. Mixing with black color
   c. Mixing with white color
   d. None of the above

Section – B

03X02 = 06 Marks

6. Draw hue circle diagram.

   Ans. The unique hues are shown at cardinal location. That is like compass

   East=red

   North=yellow

   West=green

   South=blue

The combination colors are shown between their unique hues

7. Define combination hues with an example

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

8. What do you mean by color spectrum?

   Ans. Every individual wavelength of visible light is perceived as a spectral color, in a continuous spectrum; the colors of sufficiently close wavelengths are indistinguishable for the human eye. The spectrum is often divided into named colors, though any division is somewhat arbitrary; the spectrum is continuous.

Section – C

03X03 = 09 Marks

9. What do you mean by Chroma, Value and Hue?

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

- The attribute with which we can classify color on the basis of their Brightness and dullness is called chroma.
- Hue is the most important property of color as it simply described by simply names of color.
- Colour names like red, blue , yellow etc. all are hue names.

10. How can we convert AM11 tinter into AM 16? Write down its formula.

Ans. AM 11 can be converted into AM16 by increasing the concentration ratio of AM11 by 10%.

— AM16 = AM11 + 10%

11. Write two difference between head on angle and side on angle.

Ans. Head in angle is defined as the vision of the object when the object is placed at 90 degrees to sight of vision, where side on angle is when It as at some angle where reflection can also take place.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set - A

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1305 **Time: 1 Hour**

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

Instruction: Attempt all questions.

Section – A

05X01 = 05 Marks

1. The amount of work needed to move a unit of positive charge from a reference point to a specific point inside the field without producing an acceleration is called:
    a. Electrostatic Potential
    b. Potential Difference
    c. Electric Power
    d. Charge

2. The amount of work done to carrying a unit charge from one point to another in an electric field.
    a. Electrostatic Potential
    b. Potential Difference
    c. Charge
    d. Electric Power

3. Electric current and the magnetic moments of elementary particles give rise to the magnetic fields.
    a. True
    b. False

4. The property of an electrical conductor by which a change in electric current through it induces an electromotive force (voltage) in the conductor is called-
    a. Capacitance
    b. Resistance
    c. Current
    d. Inductance

5. Consider/Read the given statements A & B and then choose from the correct options:
   A. The neutral earthing is also called the system earthing. Such type of earthing is mostly provided to the system which has delta winding.
   B. In Equipment earthing, If any fault occurs in the apparatus, the short-circuit current to pass the earth by the help of wire. Thus, protect the system from damage.
      a. Only A
      b. Only B
      c. Both A and B
      d. Neither A nor B

Section – B

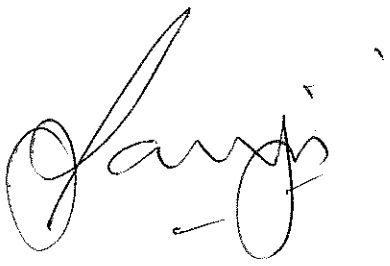
03X02 = 06 Marks

6. What is Ohm's Law? Write the expression for Ohm's law.
7. What is a battery? What are the different types of batteries?
8. What is Earthling? Which terminal of battery must be removed first in a car and why?

Section – C

03X03 = 09 Marks

9. Explain the phenomena of Electromagnetism and Fleming's Right hand thumb rule.
10. Explain the process of testing a Battery using a Multimeter.
11. Write Short notes on:
    a. Voltage Generation by Crystal
    b. Capacitors



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: AUT1305 **Time: 1 Hour**

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

Instruction: Attempt all questions.

Section – A

05X01 = 05 Marks

1. The amount of work needed to move a unit of positive charge from a reference point to a specific point inside the field without producing an acceleration is called:
   a. **Electrostatic Potential**
   b. Potential Difference
   c. Electric Power
   d. Charge

2. The amount of work done to carrying a unit charge from one point to another in an electric field.
   a. Electrostatic Potential
   b. **Potential Difference**
   c. Charge
   d. Electric Power

3. Electric current and the magnetic moments of elementary particles give rise to the magnetic fields.
   a. **True**
   b. False

4. The property of an electrical conductor by which a change in electric current through it induces an electromotive force (voltage) in the conductor is called-
   a. Capacitance
   b. Resistance
   c. Current
   d. **Inductance**

5. Consider/Read the given statements A & B and then choose from the correct options:
   A. The neutral earthing is also called the system earthing. Such type of earthing is mostly provided to the system which has delta winding.
   B. In Equipment earthing, If any fault occurs in the apparatus, the short-circuit current to pass the earth by the help of wire. Thus, protect the system from damage.
      a. Only A
      b. **Only B**
      c. Both A and B
      d. Neither A nor B

Section – B

03X02 = 06 Marks

6. What is Ohm's Law? Write the expression for 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.
7. What is a battery? What are the different types of batteries?

It is a source which converts chemical energy into electrical energy and vice-versa. Cell is building block of battery. Battery is a combination of cell in series.

1. Primary cell

Cannot be recharged. Chemical process cannot be reversible. Chemical reaction totally destroys one of the metal after a period of time

Example: - zin carbon, alkaline

2. Secondary cell

Can be recharged, Chemical reaction reversible. The electrode and acid mixture changes as the battery supplies. This is called discharging by applying current to cell in opposite direction, the battery material is restored. This is called charging

8. What is Earthling? Which terminal of battery must be removed first in a car and why?

The electrical earthling is done by connecting the non-current carrying part of the equipment or neutral of supply System to the ground. The process of transferring the immediate discharge of the electrical energy directly to the earth by the help of the low resistance wire is known as the electrical earthling.

Negative Terminal is Earthing and whole body of car acts as negative terminal. Positive terminal should be removed first to avoid short circuit which can damage the electronic equipments.

Section – C

03X03 = 09 Marks

9. Explain the phenomena of Electromagnetism and Fleming's Right hand thumb rule.

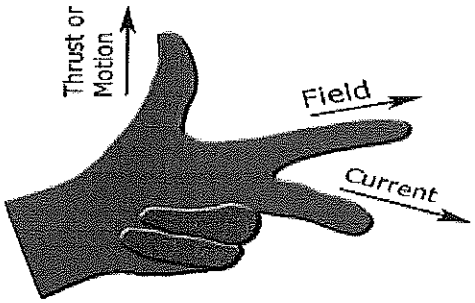
Electromagnetism is the process where magnetic field is created by introducing the current in the conductor. It generated magnetic field lines of force of conductor.

Current moving in a wire, produces magnetic field lines along the wire.

Direction of magnetic field lines and force can be determined by using right hand rule.

Fleming's 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) .



10. Explain the process of testing a Battery using a Multimeter.

The first test with your multimeter will measure DC voltage, indicated with a solid line and a dashed line above a letter V. Set the dial to 20, which will allow you to accurately measure between 0-20 Volts.

Touch the red probe to the positive terminal, and the black probe to the negative terminal. The terminals will be marked + and -, and often color coded red for positive and black for negative. If you're getting a reading with a minus in front of it (-12.6 rather than 12.6) you've got the probes the wrong way round!

As we've discussed the resting voltage should ideally be no lower than 12.6V. Bear in mind that when a battery goes down to 12.2V it's actually only 50% charged, and below 12V it's classed as discharged!

One thing to bear in mind is that all modern cars experience 'parasitic loss' where something electrical drains the battery even with the engine turned off. Even with all the lights and engine turned off, the digital clock, computer, and several other systems use some power. If you suspect this is killing your battery during storage, you can either disconnect the battery, or remove the battery from the car entirely.

If you get less than 12.6 volts, disconnect the battery and fully charge it with a battery charger. Then test after an overnight rest. If the battery holds a charge when it's not connected to the car – something is draining the battery far faster than the computer memory and digital clock.

11. Write Short notes on:

    a. Voltage Generation by Crystal

The crystal element which is use for generating voltage is known as Piezo Element. This consists of a crystal (e.g. silicon dioxide), voltage generators are used as sensors in fast-changing pressure processes, e.g. as knock-sensors on combustion engines.

    b. Capacitors

A capacitor consists of two metallic conductors, between which there is an insulator.

It is used to store electric charge, effect of capacitor is known as capacitance.

Voltage to be present across the plates in the form of electric charge.

It charges up to supply voltage but blocks the flow of electric current through it because of insulated(dielectric) layer between two conductive plates.

In AC source it allows the current to pass through the capacitor with little or n resistance.

Conductive plates are electrically separated by waxed paper, ceramic, plastic, mica or some form of liquid gel as used in electrolytic capacitor.

Amount of potential difference present across the capacitor depends on how much charge was deposited onto the plates by the work being done by the source voltage .

BHARTIYA SKILL DEVELOPMENT UNIVERSITY (I-Set A)

Registration No.: .....

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School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: GEN1307 **Time: 1 Hour**

Course Name: Basics of AutoCAD & SolidWorks **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

05X01 = 05 Marks

Q1. What does UCS means? *(In the context of CAD)*

a) User Coordinate System.
b) United CAD Software.
c) Unite, Cut and Select.
d) Unique Coordinate System.

Q2. If the following actions are taken (***Dynamic input,*** *turned OFF*)

1. Write **CIRCLE** and hit Enter
2. Write **0,0** and hit Enter
3. Write **D** and hit Enter
4. Write **20** and hit Enter, then what of the following will happen?

a) AutoCAD will draw a circle of R=20.
b) AutoCAD will draw a circle of R=10 and the center of the circle will be placed at 0,0.
c) AutoCAD will draw a circle of D=10 and the center of the circle will be placed at 0,0.
d) None of the above.

Q3. What is the keyboard shortcut to turn ON/OFF the **Object Snap (OSNAP)** in AutoCAD?

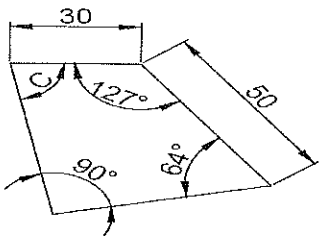
a) F3.
b) F8.
c) F7.
d) F1.

Q4. The primary difference between the Model tab and the Layout tab(s) is ____.

a) the Model tab is used for drawing in 3D and a Layout is used for drawing in 2D.
b) the Model tab is where you create the drawing and a Layout tab represents the sheet that you will plot or print on.
c) the color of the background.
d) the Model tab displays the drawing you are copying from and the Layout tab is where you lay out the new drawing.

Q5. What is the value of C in the following image?

a) 70°.
b) 69°.
c) 79°.
d) 88°.



Section – B

03X02 = 06 Marks

Q6. What are grips, cross hairs & rubber band line?

Q7. What is the purpose of AutoCAD Software?

Q8. What is the file formats used in AutoCAD?

Section – C

03X03 = 09 Marks

Q9. Explain the followings commands:

a) Offset.
b) Trim.
c) Copy.
d) Move.
e) Extend.
f) Mirror.

Q10. What is the Procedure to Draw a Line More Than One Time and Save It Automatically?

Q11. Explain the six-methods through which Circle can be created in AutoCAD?

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

U-Set A
Answer Key

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

1st In-Sem. Examination

Course Code: GEN1307 **Time: 1 Hour**

Course Name: Basics of AutoCAD & SolidWorks **Max. Marks: 20**

Section – A

05X01 = 05 Marks

Q1. What does UCS means? *(In the context of CAD)*

a) User Coordinate System.
b) United CAD Software.
c) Unite, Cut and Select.
d) Unique Coordinate System.

Answer: a. User Coordinate System.

Q2. If the following actions are taken (***Dynamic input,*** *turned OFF*)

1. Write **CIRCLE** and hit Enter
2. Write **0,0** and hit Enter
3. Write **D** and hit Enter
4. Write **20** and hit Enter, then what of the following will happen?

a) AutoCAD will draw a circle of R=20.
b) AutoCAD will draw a circle of R=10 and the center of the circle will be placed at 0,0.
c) AutoCAD will draw a circle of D=10 and the center of the circle will be placed at 0,0.
d) None of the above.

Answer: b. AutoCAD will draw a circle of R=10 and the center of the circle will be placed at 0,0.

Q3. What is the keyboard shortcut to turn ON/OFF the **Object Snap (OSNAP)** in AutoCAD?

a) F3.
b) F8.
c) F7.
d) F1.

Answer: a. F3.

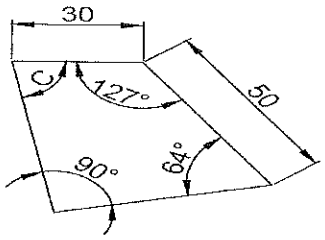
Q4. The primary difference between the Model tab and the Layout tab(s) is ____.

a) the Model tab is used for drawing in 3D and a Layout is used for drawing in 2D.
b) the Model tab is where you create the drawing and a Layout tab represents the sheet that you will plot or print on.
c) the color of the background.
d) the Model tab displays the drawing you are copying from and the Layout tab is where you lay out the new drawing.

Answer: b. the Model tab is where you create the drawing and a Layout tab represents the sheet that you will plot or print on.

Q5. What is the value of C in the following image?

a) 70°.
b) 69°.
c) 79°.
d) 88°.



Answer: c. 79°.

Section – B

03X02 = 06 Marks

Q6. What are grips, cross hairs & rubber band line?

Answer: Grips are small boxes that appear on the objects you select. You can move or edit an object by dragging a grip.

Cross hairs are the point from which any command starts to draw on the workspace.

Rubber band line is a free line which shows the direction and virtual line which starts from cross hair location point.

Q7. What is the purpose of AutoCAD Software?

Answer:

- AutoCAD software provides the design and the shape for the products that needs to be created.
- It provides flexible and user friendly features with the tools to design the applications and document the workflows.
- This involves aggregate and import models for the formats and usually allows the design to get created without any change in source model.
- It provides tools to provide the formats by detailed designing the layouts and drawings using the views automatically.
- It also has the provision to create detailed design layouts and views can be drawn automatically using the source model.

Q8. What is the file formats used in AutoCAD?

Answer: In AutoCAD, **".dwg"** file format is used for design, it can be an interchangeable format. The file format which is interchangeable has the extension as DXF and operates data operability. It provides different languages which can be used as per the requirement.

Section – C

03X03 = 09 Marks

Q9. Explain the followings commands:

a) Offset.
b) Trim.
c) Copy.
d) Move.
e) Extend.
f) Mirror.

Answer:

a) **Offset:** This command is used to create concentric circles, parallel lines & parallel curves.
b) **Trim:** This command is used to allow you to shorten an entity to an intersection or remove a section of an entity between two intersections. In order to trim an object, you must draw a second object which forms the "cutting edge". Cutting edges can be lines, x lines, rays, polyline, circles, arcs or ellipses. Blocks and text cannot be trimmed or used as cutting edge.
c) **Copy:** This command can be used to create one or more duplicates of any drawing object or objects which you have previously created. Copy is a very useful and time-saving command because you can create very complex drawing elements & then simply copy them as many times as you like.
d) **Move:** This command is used to displace object from one location to another location.
e) **Extend:** This command can be used to extend a part of an object. In order to extend an object, you must draw a second object which forms the "boundary edge". Boundary edges can be lines, x lines, rays, polylines, circles, arcs or ellipses. Blocks & text cannot be extended or used as boundary edges.
f) **Mirror:** This command is used to create mirrored copy of selected object.

Q10. What is the Procedure to Draw a Line More Than One Time and Save It Automatically?

Answer:

- AutoCAD allows the file to be written in multiple instances of the processes and it limit the resources that needs to be used as well.
- When a new line needs to be drawn the process opens up another file in a new session to write the file.
- AutoCAD allows saving multiple drawings to be saved for each session and it can be used to create the application.
- The files are saved by using the file extension as .dwg and it can be modified using the browser.
- The file extension needs to be hidden and it needs to show allowing the selection of the option as well.
- The file modification takes place by checking the AutoCAD operations and opening up of the drawing.

Q11. Explain the six-methods through which Circle can be created in AutoCAD?

Answer:

1. Centre radius: Draws a circle based on a centre point and a radius.
2. Centre diameter: Draws a circle based on a centre point & a diameter.
3. 3 Point: Draw a circle based on three points on the circumference.
4. 2 Point: Draw a circle based on two endpoints of the diameter.
5. TTR (Tangent,Tangent, Radius): Draws a circle with a specified radius tangent to two objects.
6. TTT (Tan, Tan, Tan): Draws a circle tangent to three objects.