



**School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc., III-Semester,  
1<sup>st</sup> In-Sem. Examination**

**Course Code: AUT1301**

**Time: 1 Hour**

**Course Name: Automotive Power Train**

**Max. Marks: 20**

**Instruction:** objective type questions, each question carries 01 mark.

short answer type questions, each question carries 02 marks.

essay type questions, each question carries 03 marks.

**Section – A**

05X01 = 05 Marks

Q1. Materials used to cast Engine?

- a) Aluminum
- b) Cast Iron
- c) Titanium
- d) Both a & b

Q2. Engine head bolts are torqued in \_\_\_\_\_?

- a) N/M<sup>2</sup>
- b) PSI
- c) PSIG
- d) Gram/inch<sup>2</sup>

Q3. Why engine block has Cylinder for piston moment, why not cube or cuboidal?

- a) The cylinder has good aesthetic
- b) Stresses are equally distributed in the cylinder
- c) Design rule
- d) The cylinder doesn't wear

Q4. Why liners are used in the cylinder?

- a) Having liner only with better-material can be more economical
- b) Having liner results in low cost
- c) Having liner only with better-material can be less economical
- d) Having liner results in high cost

Q5. The valve is opened as the cam lobe on the cam raises the

- a) Bearing
- b) Piston
- c) Valve lifter
- d) Valve seat

**Section – B**

03X02 = 06 Marks

Q6. Why are liners used in an I.C engines?

Q7. How do we classify engine based on structure?

Q8. Name the Tools & Equipment used for Engine overhauling?

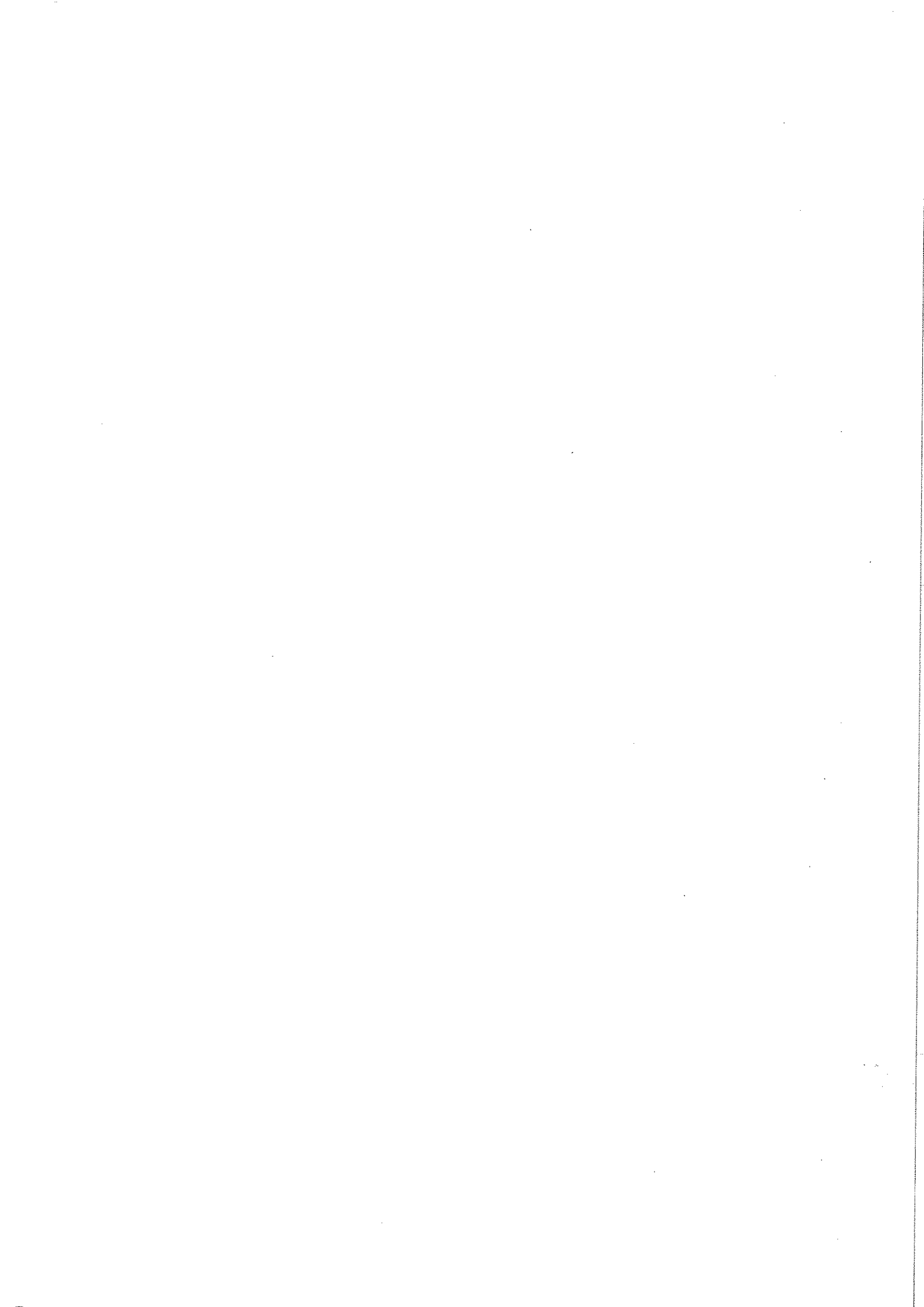
**Section – C**

03X03 = 09 Marks

Q9. Draw and explain the number of rings used in piston with their function?

Q10. What is cylinder warpage?

Q11. Write down the steps to overhaul head of engines?





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**Time: 1 Hour**

**Course Name: Automotive Power train**

**Max. Marks: 20**

**Instruction: Section A carries 1 marks each.**

**Section B carries 2 marks**

**Section C carries 3 marks**

**Section – A**

05X01 = 05 Marks

objective type questions, each question carries 01 mark.

- A1. d) Both a & b
- A2. a)  $N/M^2$
- A3. b) Stresses are equally distributed in the cylinder
- A4. b) Having liner results in low cost
- A5. c) Valve lifter

**Section – B**

03X02 = 06 Marks

short answer type questions, each question carries 02 marks.

Q6.

- 1) Sliding surface for the movement of piston: -
- 2) Helps to transfer heat: -
- 3) Provider better sealing: -
- 4) It withstands the combustion: -
- 5) The cylinder liner undergoes wear and tear to protect the cylinder block from damages.

A7

Engine

- Open deck- found in lower horsepower aluminum blocks. It is the easiest to manufacture and provides the overall best cooling efficiency
- Closed deck- Structurally strong and stable.
- Semi Open Deck-turbocharged aluminum blocks, and is stronger than an open deck by adding structural support to the top of the cylinders at four points.

A8.

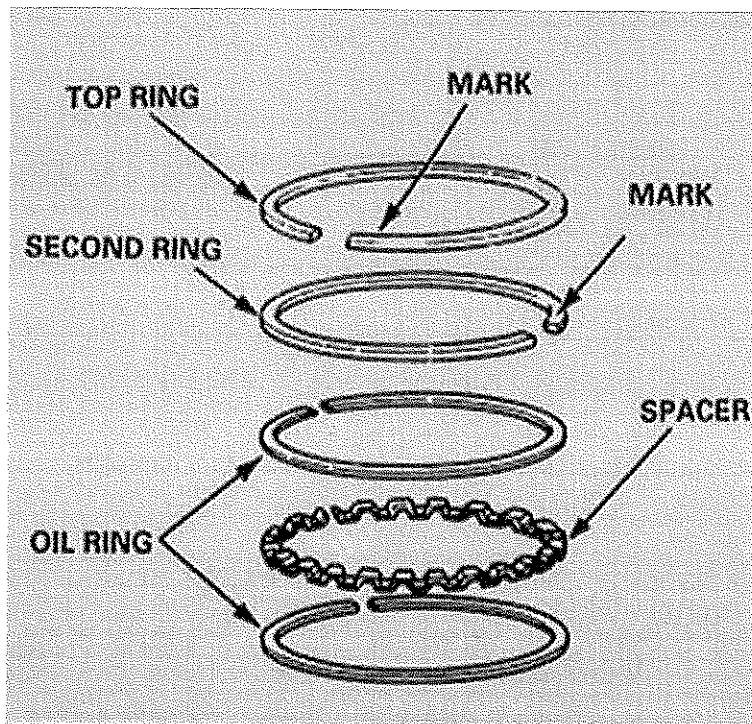
SR.NO	TOOLS	Equipment
1	Wrenches- closed, open and Combination	Bench vice hoist
2	Millimeter	Bins for screw and bolts
3	Pliers-	Ratchets
4	Crow foot tools	Screw drivers
5	Torque wrenches	Valve Compression kits
6	Socket box-medium, short and large	
7	L and T tommy	

### Section – C

03X03 = 09 Marks

essay type questions, each question carries 03 marks.

Q9. Draw and explain the number of rings used in piston with their function?



Top ring-seal compression leakage  
 Oil ring-Provide lubrication to cylinder.  
 Scrapper ring- wiper of excessive oils inside of cylinder.

A10. Warpage means your cylinder head is misshapen enough that it can cause leaks under your hood because it does not seal and sit in place like it was originally shaped to do.

A11

1. With a help of torque wrench remove the engine cover.
2. Take a t tommy unscrew the bolts in zig zag direction and open head of the engine.
3. With a help of torque wrench set the torque of engines to desired range.
4. Open the head bolt.
5. With the usage of Screw driver adjust the compression of spring.
6. Remove the compression valve head set.
7. Remove cam in zigzag format with a help of socket of 8mm put it in bins.
8. Inspect cam and bearing of cam split ends.

*Vijay*



Registration No.: .....

# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

**School of Automotive Skills**  
**Session: 2021-22 (Winter Semester)**  
**B. Voc. Program, 3rd Semester,**  
**1<sup>st</sup> In-Sem. Examination**

**Course Code: AUT 1302**

**Time: 1 Hour**

**Course Name: Automotive Braking, 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 turning and sliding mechanism?
  - a) Ackermann
  - b) a & c
  - c) Davis
  - d) None of the above
2. Which of these are being 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 ESP system?
  - a) Electronic Stability Program
  - b) Engine Stability Program
  - c) Electronic Steering Program
  - d) None of above





Registration No.: .....

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## Section – A

05X01 = 05 Marks

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- |              |                      |
|--------------|----------------------|
| a) Ackermann | b) a & c             |
| c) Davis     | d) None of the above |

2. Which of these ~~were~~ are being 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 ESP system?

- |                                 |                             |
|---------------------------------|-----------------------------|
| a) Electronic Stability Program | b) Engine Stability Program |
| c) Electronic Steering Program  | d) None of above            |



**BHARTIYA SKILL DEVELOPMENT UNIVERSITY****Section – C**

03X03= 09 Marks

9. Write down the process of overhauling of mechanical steering system?

Ans.

- Disassembling steering system from vehicle by dismounting U Joint from column and removing suspension connection from steering.
- Removing tie ends from steering.
- Removing both side tie rods from steering system.
- Removing pinion arrangement.
- Removing rack from steering.
- Reversing the process for assembly.

10. Explain the components of Hydraulic electric steering system mechanism.

Ans. Components of HEPS are as follows:

1. Hydraulic pump
2. Electric motor
3. Fluid lines
4. Steering gearbox
5. Steering and speed sensor
6. Reservoir
7. Steering column

11. What is a four wheel steering system? What is the requirement of four wheel steering system?

Ans. Four-wheel steering is a method developed in automobile industry for the effective turning of the vehicle and to increase the manoeuvrability. In a typical front wheel steering system the rear wheels do not turn in the direction of the curve and thus curb on the efficiency of the steering. In four wheel steering the rear wheels turn with the front wheels thus increasing the efficiency of the vehicle. The direction of steering the rear wheels relative to the front wheels depends on the operating conditions. At low speed wheel movement is pronounced, so that rear wheels are steered in the opposite direction to that of front wheels. At high speed, when steering adjustments are subtle, the front wheels and the rear wheels turn in the same direction.

By changing the direction of the rear wheels there is reduction in turning radius of the vehicle which is efficient in parking, low speed cornering and high speed lane change.

*Vijay*





Registration No.: .....

**School of Automotive Skills**  
**Session: 2021-22 (Winter Semester)**  
**B. Voc. Program, 3<sup>rd</sup> Semester**  
**1<sup>st</sup>In-Sem. Examination**

**Course Code: AUT1303**

**Time: 1 Hour**

**Course Name: Automotive Body Works**

**Max. Marks: 20**

**Instructions:**

1. Attempt all questions from section-A and each question carries 1 mark.
2. Attempt all questions from section-B and each question carries 2 marks.
3. Attempt all questions from section-C and each question carries 3 marks.

**Section – A**

**05X01 = 05 Marks**

Q1. The gap between the electrode rod and the work piece should be about .....

- |                             |                           |
|-----------------------------|---------------------------|
| a) The electrode diameter   | c) 5 mm                   |
| b) The work piece thickness | d) the core wire diameter |

Q2. .... 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) Nibbler

Q3. .... remover is essential for cleaning the surface prior to sanding or spraying undercoats or to coats.

- |                   |                |
|-------------------|----------------|
| a) Wax and grease | c) Body filler |
| b) Putty          | d) Seam sealer |

Q4. .... is used to prevent moisture from getting into seams of a car.

- |              |                |
|--------------|----------------|
| a) Degreaser | c) Body filler |
| b) Putty     | d) Seam sealer |

Q5. .... is a lightweight, extremely strong, and robust material.

- a) Sheet metal
- b) Diamond
- c) Chassis
- d) Fiberglass

**Section – B**

**03X02 = 06 Marks**

Q6. Discuss the different categories of body filler.

Q7. Write the names of different tools used in auto bodywork.

Q8. What are the advantages of using sanding blocks during dry sanding?

**Section – C**

**03X03 = 09 Marks**

Q9. Write short notes on:

- a) Epoxy Primer
- b) Sand paper

Q10. Write tips and tricks to apply body filler.

Q11. Write short note on fiberglass and its applications.

*Vipin*



Registration No.: .....

**School of Automotive Skills**  
**Session: 2021-22 (Summer Semester)**  
**B. Voc. Program, 3<sup>rd</sup> Semester**  
**Answer sheet 1<sup>st</sup>In-Sem. Examination**

**Course Code: AUT1303**

**Time: 1 Hour**

**Course Name: Automotive Body Works**

**Max. Marks: 20**

**Instructions:**

1. Attempt all questions from section-A and each question carries 1 mark.
2. Attempt all questions from section-B and each question carries 2 marks.
3. Attempt all questions from section-C and each question carries 3 marks.

**Section – A**

**05X01 = 05 Marks**

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- |                             |                           |
|-----------------------------|---------------------------|
| a) The electrode diameter   | c) 5 mm                   |
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Q2. .... 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) Nibbler

Q3. .... remover is essential for cleaning the surface prior to sanding or spraying undercoats or to coats.

- |                          |                |
|--------------------------|----------------|
| a) <b>Wax and grease</b> | c) Body filler |
| b) Putty                 | d) Seam sealer |

Q4. .... is used to prevent moisture from getting into seams of a car.

- |              |                       |
|--------------|-----------------------|
| a. Degreaser | c. Body filler        |
| b. Putty     | d. <b>Seam sealer</b> |

Q5. .... is a lightweight, extremely strong, and robust material.

- a) Sheet metal
- b) Diamond
- c) Chassis
- d) Fiberglass

**Section – B**

**03X02 = 06 Marks**

Q6. Discuss the different categories of body filler.

Ans: - Body fillers are generally polyester resin based filler with a cream hardener that can be used to even out dents and cover blemishes on vehicles.

- Body fillers all fall into three general categories: standard, mid-range, and premium, and are generally available in a two-part material consisting of a polyester resin and a cream hardener.
- The filler grade you select will depend on the scope of the project and the size of the damaged spots needing to be repaired.
- Standard grade is a great option for minimal hail damage and small rust spots, while premium grade should be used for actual tears or a large surface area.

Q7. Write the names of different tools used in auto bodywork.

Ans: - Basic tools like hammers, mallets, dollies, sanding blocks, spoons, portable grinders and sanders, stud welders and slide hammers, panel flangers, pneumatic tools, chisel, nibblers, clamps, etc.

Q8. What are the advantages of using sanding blocks during dry sanding?

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**

Q9. Write short notes on:

- a) Epoxy Primer
- b) Sand paper

Ans:-

**Etching or Epoxy Primer**

- Paint applied with no primer after finishing bodywork will most likely peel off in large sections. Many American automobiles manufactured in the late 1980s and early 1990s are common examples of this effect: these vehicles were primered before paint was applied, but the primer

was not compatible with the surface. Vehicles from this era saw paint peeling off in sheets, exposing the surface below to the weather.

- The main purpose for primer is to promote adhesion between the surface repaired and the subsequent top coats, whether body filler or paint. No one universal primer product will adequately prepare every surface for paint. Choose primer for the material that it is intended to cover. Fiberglass call for different primer than aluminum, which require different primer than galvanized steel. Some material can be primed with regular primer, while other are better suited for epoxy primer.
- Two main reasons for using epoxy primer are its superior corrosion protection and excellent adhesion qualities, yet epoxy primer cannot be used for every application. Consult your local pain jobber for recommendations on the best primer for your particular needs. Any time a sheet metal panel is stripped (whether chemically or mechanically) to bare metal, it should be clean and coated with etching or epoxy primer as soon as possible, to avoid the formation of surface rust. Most body fillers can be applied over etching or epoxy primer, so there will be no reason to go back to bare metal during the repair process.

### **Sand Paper**

- Sandpaper and Glass-paper are names used for a type of coated abrasive that consists of sheet of paper or cloth with abrasive material glued to one face.
- Despite the use of names sand or glass, they have been replaced by other abrasives such as aluminium oxide or silicon carbide.
- Sandpaper is produced in a range of grit sizes and is used to remove material from surfaces, either to make them smoother (for example, in painting and wood finishing), to remove a layer of material (such as old paint), or sometimes to make the surface rougher (for example, as a preparation for gluing).
- A small number such as 20 or 40 indicates a coarse grit, while a large number such as 1500 indicates a fine grit.

Q10. Write tips and tricks to apply body filler.

### **Ans. Tips and Tricks for Using Auto Body Fillers**

Always combine the exact amounts of filler and creme hardener as instructed on the packaging to achieve the best results. Too much hardener to filler ratio and the filler will be brittle and crack, and too little will delay drying and hardening almost indefinitely.

Use a non-cardboard mixing board when combining the filler and hardener. Because of its absorbent properties, cardboard can affect the chemistry of the filler. Auto Body Toolmart sells disposable mixing boards that are designed specifically for mixing body filler. Completing any filler projects on a warm dry day, as opposed to a humid day, will help the filler cure faster.

NEVER use filler over an area that has pre-existing rust. When rusty spots are not removed first, there is higher potential for staining and discoloration, and the filler will not adhere completely. For best results, remove the rust and then proceed. Filler adheres best to non-smooth surfaces, so sanding the area that needs improvement

to roughen the surface is essential to achieving the best results possible.

Because of its chemical make-up, make sure you're in a well-ventilated area when using filler. Wearing a dust mask is recommended.

Occasionally, your filler will feel as if it's hardening too quickly during the application process. You avoid this problem by having a filler thinner on hand. Sometimes called "Honey", Ever-coat's filler thinner is fiberglass-reinforced — much like a medium grade filler — and helps keep the filler spreading evenly and smoothly.

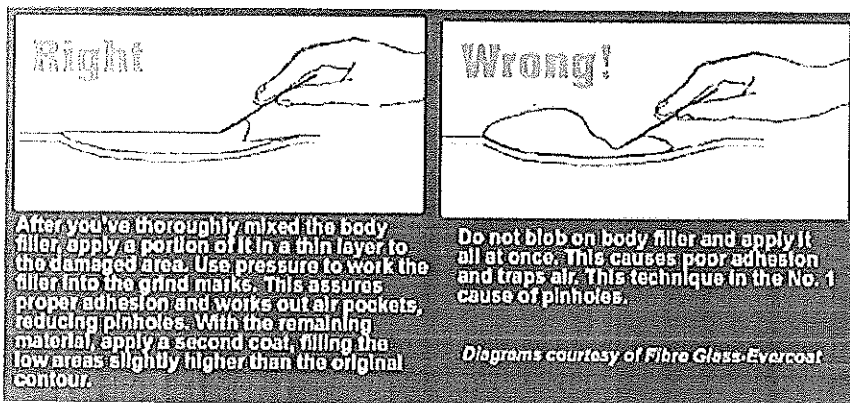
No matter how good you may be with a body hammer, if you may have straightened any sheet metal or installed patch panels, you will probably need to apply at least a skim coat of body filler. True, there are some craftsmen who can finish metal on a vehicle so perfectly that they don't need filler. However, you probably aren't working at that level of expertise yet. Before applying any filler, take the time to consult an expert and verify that you are using compatible materials. You'll be much better off if you determine the appropriate filler product for your use before starting work.

Consider the material to which you're applying the body filler: sheet metal, galvanized steel, fiberglass, or aluminum. It's always better to do the work correctly the first time than have to do it a second (or third) time or have to live with results that leave a lot to be desired.

If you purchase your bodywork supplies at a dealer who sells to professionals, the person behind the counter most likely knows which product are best for your particular application. However, if you look for body filler at the local discount retailer, you may be hard-pressed to find someone who even knows how to use this product. While the label of most body fillers will indicate how they are used on bare metals, that information will probably not explain how to apply the product on your particular project.

Plastic body fillers have evolved greatly since they appeared on the market as an alternative to lead. Several different companies now make plastic body filler, and most offer a variety of products to choose from, depending on your application. Some fillers are designed for use over fiberglass, while others are designed for sheet metal; still others call for an undercoat of epoxy primer to increase adhesive or an application performed directly on bare metal. Like many primer products, some fillers smooth out rough bodywork, while others are used for finish coats. Put simply, not all body fillers are created equal or even to perform the same task. If you use the wrong type of filler, this will show soon after the vehicle is parked in the sun. And I doubt you plan on keeping your car parked in the garage forever.

Nearly all the body fillers require the same method for application, but you should read the directions for the particular product to be sure. Typically, the surface to be filled is sanded down to bare metal before applying filler. Some fillers suggest that the surface be stripped of any paint and a coat of epoxy primer applied before starting with filler. Most auto body paint and supply stores can provide printed information that indicates the compatibility of their products.



Whether you're applying filler to bare metal or fiberglass, or to a primed surface, some amount of filler material is spread onto a mixing board or mixing sheet and then mixed thoroughly with a proportionate amount of hardener, using a flexible spreader. The amount of hardener needed depends on your shop conditions, such as the temperature and humidity. Practice is the best way to determine how much to use. As a start, though, add a proportionate amount of hardener to the filler (i.e., a quarter tube of hardener to a quarter of the container of filler). Use too little hardener and it will not set up properly, while too much hardener will set up right on your mixing board. Don't be surprised if it takes the entire project before you get the amounts right. If it gets a little too cool as you mix it, speed the curing process slightly by placing a portable heater or heat lamp nearby. If the filler begins to "kick" before you have it spread out, scrape it off the mixing board and throw it away: you won't be able to spread it properly.

Most body fillers use a hardener that is distinctly different in colour than the filler itself: this makes it easy to tell when the two are mixed thoroughly. When the mix is the same color throughout, it is well mixed; if there are streaks of color, keep on mixing. Once the filler and the hardener are mixed thoroughly (i.e., the material is all one color), scoop some filler onto a flexible spreader and spread the filler on the target area, then make a couple of light passes with an empty spreader to even out the filler.

For best results, don't apply body filler more than 1/8 inch thick total. If you need more than this, try to metalwork the area being repaired slightly more before applying any filler. If the hammer and dolly work

isn't feasible, and the area to be filled is deeper than 1/8 inch, use two applications of filler rather than attempting to fill it all at one time. Like most auto body repair products, filler cures as its various chemical components react and escape from the remaining material. Too thick an application will often cure on the outside before the chemical reaction takes place on the inside, trapping uncured material inside the repair. When this happens, the repair won't be durable and will ultimately show up in the finished paint job.

Some older types of filler require initial smoothing, with a cheese-grater type file, while most newer products can be smoothed initially with 80-grit sandpaper. Check with the person behind the counter where you purchase your products to determine the best method for smoothing. If you are using any type of filler that requires a cheese-grater, initial smoothing should take place right before the filler cures completely. Watch the edge of the filler to get a feel for whether it has cured enough. If the filler starts breaking away at the edges, or if the sandpaper starts loading up, the filler has not cured sufficiently.

While it's hard to say what the correct time for curing will be, a little practice will reveal how long you need to wait. Knock off the height spots before the filler gets rock-hard, but don't try this too soon or you'll likely gouge out more material than desired. As you begin working the filler, sand the entire filled area first with 80- or 100- grit sandpaper, then switch to 200- or 240-grit to blend the filler into the surrounding area. Once you're finished sanding with 240-grit, you will have a good idea if you need more filler before you apply primer.

When you finish sanding, blow all of the dust away with an air nozzle. If there are still low spots, rough up the area lightly with the previous grit of sandpaper, then mix an appropriate amount of body filler and apply as before. Work the second and successive layers of filler (if required) just as the first, until all low areas are filled.

Q11. Write short note on fiberglass and its applications.

Ans. **Fiberglass**

Fiberglass is a lightweight, extremely strong, and robust material. Fiberglass combines its light weight with an inherent strength to provide a weather resistant finish with a variety of surface textures.

Fiberglass really is made of glass, similar to windows or the drinking glasses in the kitchen. The glass is heated until it is molten, then it is forced through superfine holes, creating glass filaments that are very thin. fiberglass itself may be manufactured from recycled glass. Originally, fiberglass was a glass wool with fibers entrapping a great deal of gas, making it useful as an insulator, especially at high temperatures.

The basic raw materials for fiberglass products are a variety of natural minerals and manufactured chemicals. The major ingredients are silica sand, limestone, and soda ash. Silica sand is used as the glass former, and soda ash and limestone help primarily to lower the melting temperature. Waste glass, also called cullet, is also used as a raw material. The raw materials must be carefully weighed in exact quantities and thoroughly mixed together (called batching) before being melted into glass.

For custom work or bodywork repair, you can easily learn to work with fiberglass, a material doesn't require specialized equipment. Obviously, fiberglass can be used to repair components made of the same material, but it can also be used as an alternative to welding in sheet metal patch panels.

Fiberglass mat is commonly used when repairing holes or anywhere you need to build up bulk. Composed of short stands of glass fibers bound together, not woven, the mat is saturated with fiberglass resin, making it quite pliable and easy to form into complex shapes. As each layer of fiberglass mat is added, the laminate becomes thicker and stiffer.

Fiberglass cloth is more suitable to repairing cracks, breaks, or holes where there are few complex shapes. Since fiberglass cloth is made of woven glass thread, it is difficult to mold to curved shapes without wrinkling. To get the cloth to lie flat on a curved surface, several small cuts can be made in the cloth before the resin is applied. Fiberglass cloth is thinner than fiberglass mat, so avoid using cloth when your goal is to build up bulk in the repair area. However, a repair made with cloth will be stronger than a repaired area made with an equal thickness of mat, since the cloth contains a larger amount of glass.

Vipin





# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

**School of Automotive Skills**  
**Session: 2021-22 (Winter Semester)**  
**B. Voc. Program, 3<sup>rd</sup> Semester,**  
**1<sup>st</sup> In-Sem. Examination**

**Course Code: AUT1304**

**Time: 1 Hour**

**Course Name: Automotive Refinish Painting**

**Max. Marks: 20**

**Instruction: Attempt all Questions.**

## Section – A

05X01 = 05 Marks

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

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

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

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

Q-3. What does 1k represent?

- a. 1000
- b. Product with hardener
- c. Product without hardener
- d. None of the above

Q-4. What is solid a color?

- a. Color having particles
- b. Color requires clear coat
- c. Color don't have particles
- 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
- b. Epoxy primer
- c. Polyester putty
- d. Body filler

## Section – B

03X02 = 06 Marks

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

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

Q-8. What is Paint? Name different components of paint

## Section – C

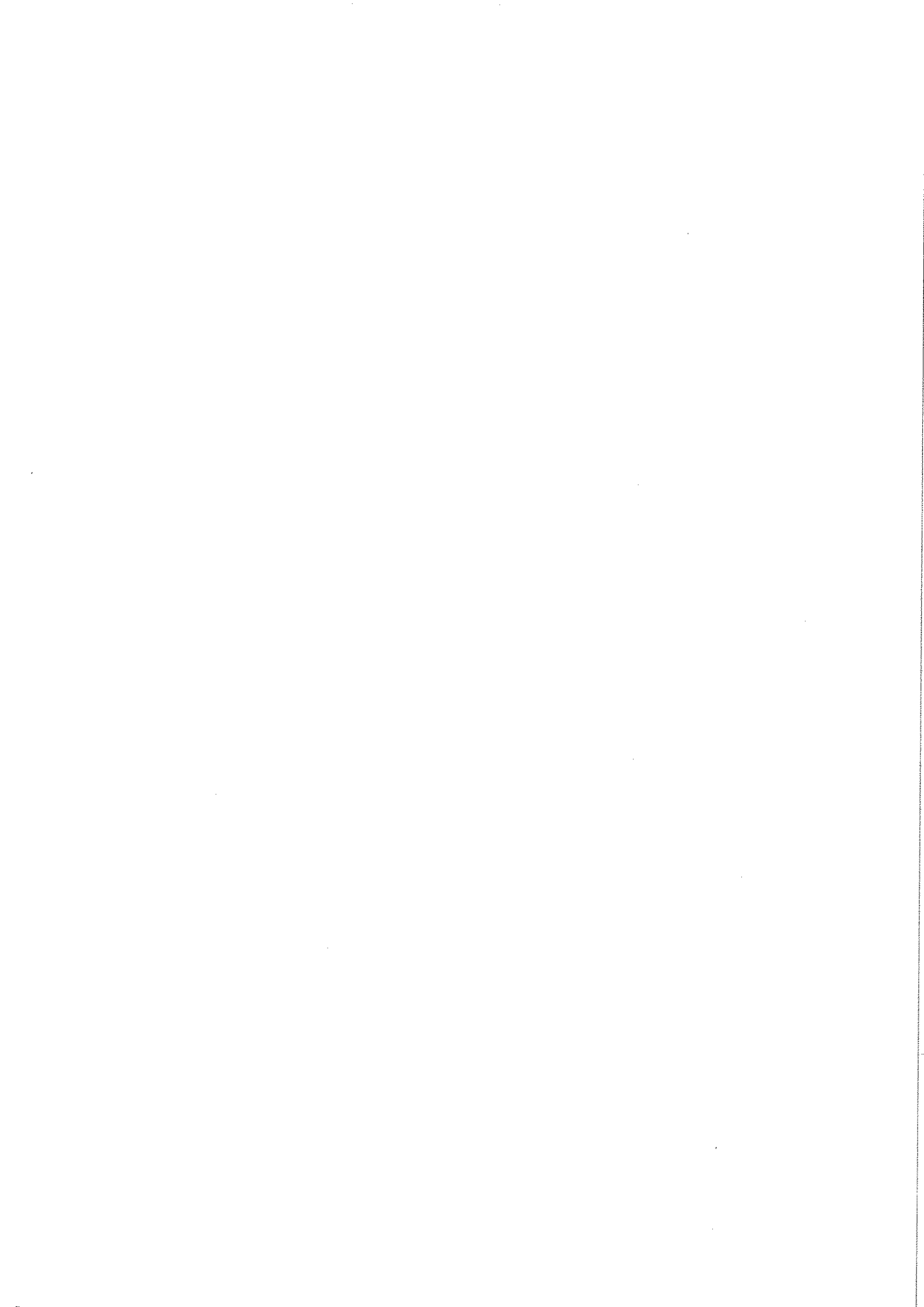
03X03 = 09 Marks

Q-9. Write down the correct parameters of spray gun handling.

Q-10. Draw and explain Hue circle diagram.

Q-11. Explain about Inspection angles of paint.

*Vipin*





# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc. Program, 3<sup>rd</sup> Semester,  
1<sup>st</sup> In-Sem. Examination

Course Code: AUT1304

Time: 1 Hour

Course Name: Automotive Refinish Painting

Max. Marks: 20

Instruction: Attempt all Questions.

## Section – A

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- d. Body filler

## 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.

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.



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4. It decreases the wastage of paint.

Q-8. What is 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

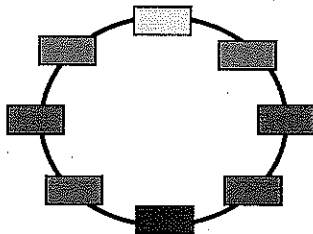
03X03 = 09 Marks

Q-9. Write down the correct parameters of spray gun handling.

- 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.

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 any other. To show this on the hue circle diagram, we place neutral colors at the center

Q-11. Explain about Inspection angles of paint.

**Ans** 1.

HEAD ON



light source is

NEAR SPEC



light is in face  
of observer

SIDE ON



light is in back



School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc. Program, 3<sup>rd</sup> Semester,  
1<sup>st</sup> In-Sem. Examination

Course Code: AUT1305

Time: 1 Hours

Course Name: Automotive Electrical & A.C.

Max. Marks: 20

**Instruction:**

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

**Section – A**

5X01 = 5 Marks

1. The electrons present in the outermost shell are called:
  - a) Valency electrons
  - b) Octate electrons
  - c) Duplet electrons
  - d) Valence electrons
2. The nucleons are:
  - a) Protons and electrons
  - b) Neutrons and electrons
  - c) Protons and neutrons
  - d) None of these
3. Electrical current can only flow in \_\_\_\_\_ electric circuit.
  - (a) Closed
  - (b) Open
  - (c) Both A and B
  - (d) None of these
4. Atomic number (Z) is equal to:
  - (a) Number of protons in the nucleus
  - (b) Number of electrons in a neutral atom
  - (c) Both A and B
  - (d) None of the above
5. 1 microvolt is equal to:
  - a)  $1 \times 10^{-3}$  V
  - b)  $1 \times 10^{-4}$  V
  - c)  $1 \times 10^{-5}$  V
  - d)  $1 \times 10^{-6}$  V

**Section – B**

02X03 = 06 Marks

1. Explain Ohms Law with neat diagram.
2. Draw series and parallel connection of resistance?
3. Write down the definition of current and voltage.

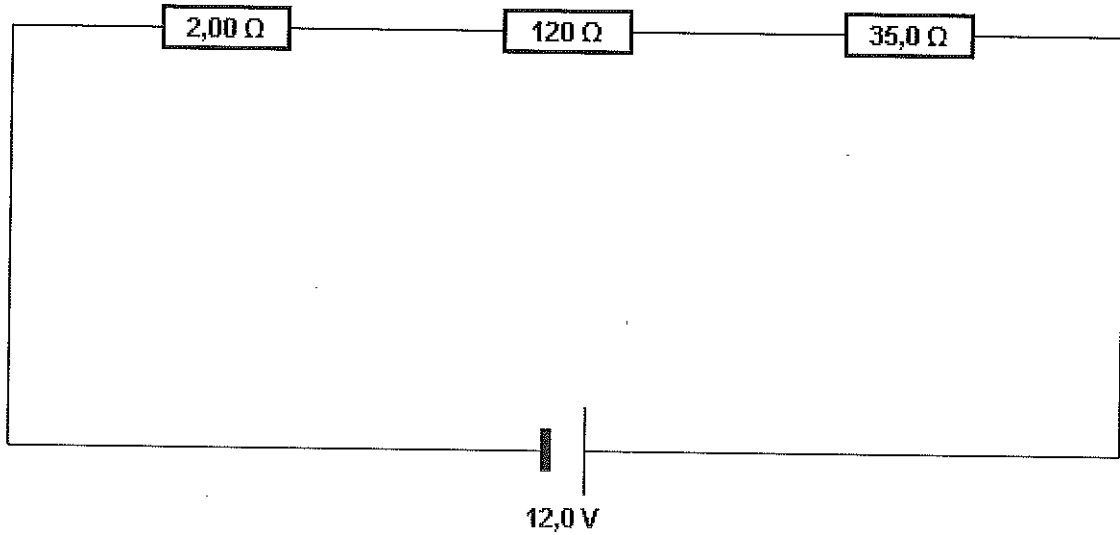
**Section – C**

03X03 = 09 Marks



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1. Explain structure of atom.
2. Draw various electrical symbols used in Automotive electrical.
3. Calculate total resistance, total current and voltage consumption in R1, R2 and R3 of below figure arrangement.  $R_1 = 200 \Omega$ ,  $R_2 = 120 \Omega$ ,  $R_3 = 350 \Omega$ , Voltage = 12 Volt.



*Vishin*



School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc. Program, 3<sup>rd</sup> Semester,  
1<sup>st</sup> In-Sem. Examination

Course Code: AUT1305

Course Name: Automotive Electrical & A.C.

Time: 1 Hours

Max. Marks: 20

**Instruction:**

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

**Section – A**

5X01 = 10 Marks

1. d
2. c
3.  
(A)
4.  
(B)
5. 1 microvolt is:  
 $1 \times 10^{-6} \text{ V}$

**Section – B**

02X03 = 6 Marks

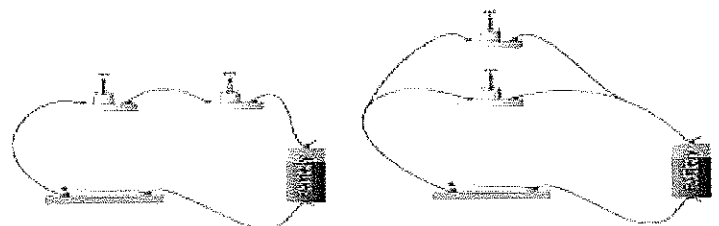
1. **Ohm's law** states that the current through a conductor between two points is directly proportional to the voltage across the two points. Introducing the constant of proportionality, the resistance.
2. Circuits

**Series Circuit**

**Parallel Circuit**

There are two types of circuits: -

1. Series circuit
2. Parallel circuits



3. Voltage  
Voltage



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The pressure that is put on free electrons that causes them to flow is known as electromotive force (EMF). The volt is the unit of pressure, i.e., the volt is the amount of electromotive force required to push a current of one ampere through a conductor with a resistance of one ohm.

## Ampere/current

The ampere defines the flow rate of electric current. For instance, when one coulomb (or  $6 \times 10^{18}$  electrons) flows past a given point on a conductor in one second, it is defined as a current of one ampere.

### Section – C

03X03 = 09 Marks

#### 1. Structure of atom

Atoms consist of three main particles: -

##### 1. Electron

Electron is subatomic particle whose charge is negative, they have no known components and substructure.

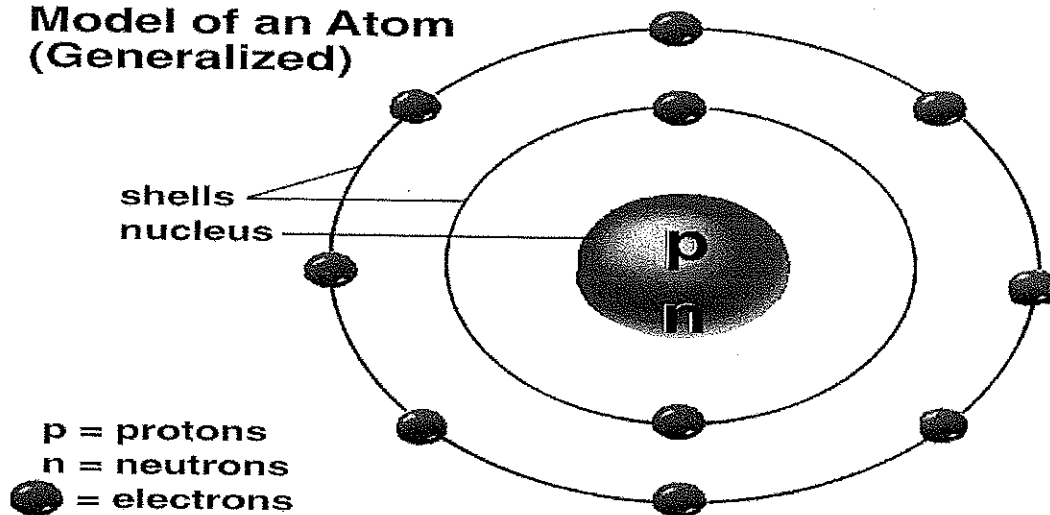
##### 2. Proton

Proton is a sub atomic particle with a positive charge and a mass slightly less than that of neutron.

##### 3. Neutron

A subatomic particle of about the same mass as a proton but without an electric charge, present in all atomic nuclei except those of ordinary hydrogen.

### Model of an Atom (Generalized)

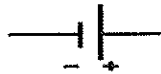


#### 2. Symbols

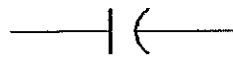


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## Schematic Symbols



Battery



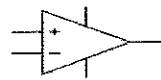
Capacitor



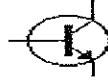
Resistor



Potentiometer



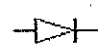
Op Amp



Transistor



FET



Diode



Tube



Ground



Switch



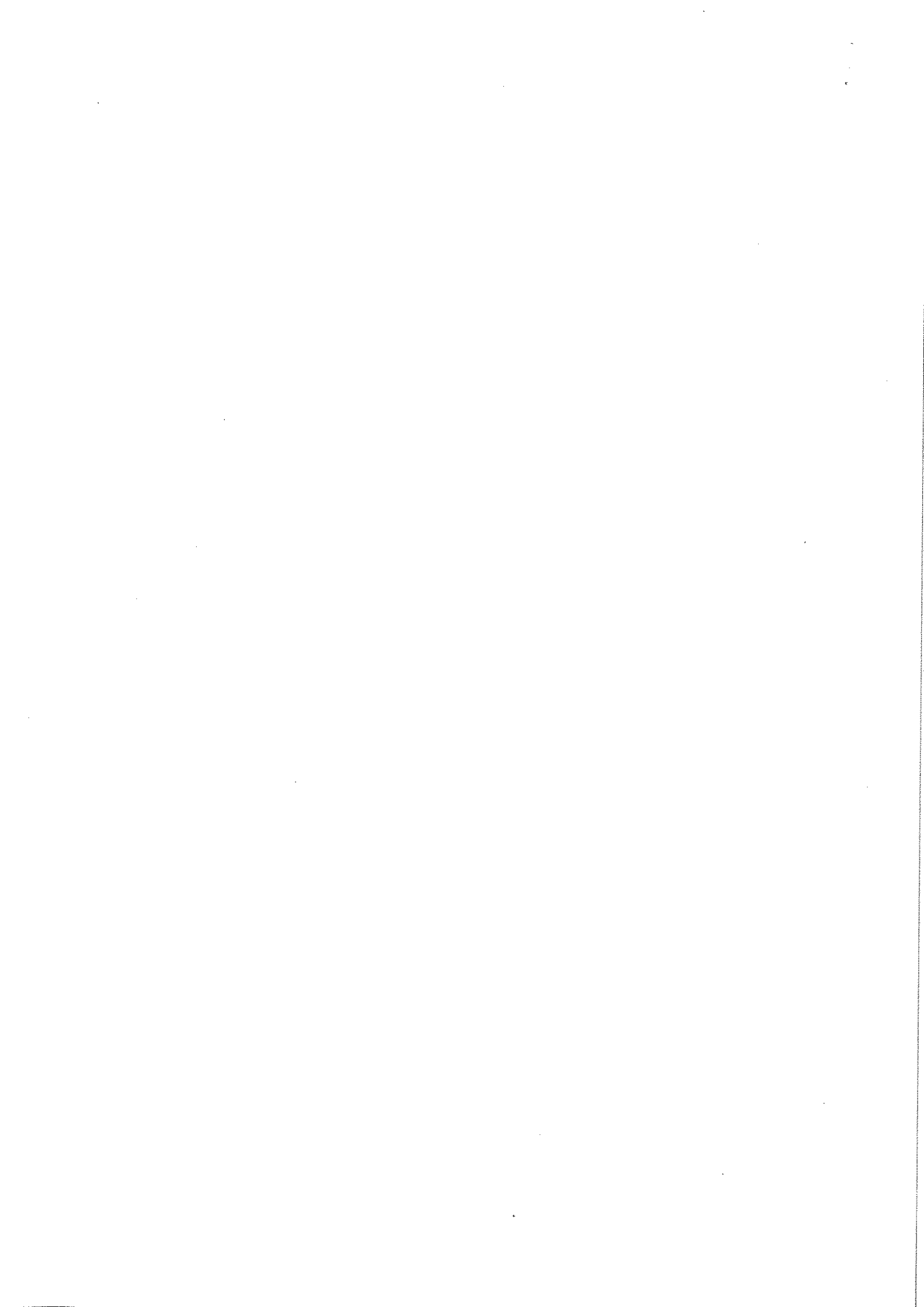
LED

3. Total resistance  $200 + 120 + 350 = 670$

Total current =  $0.06 + 0.1 + 0.03 = 0.19$

Voltage =  $0.06 * 200 + 0.1 * 120 + 0.03 * 350 = 12 + 12 + 10.50 = 34.5$  Volt

*Nylin*





School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc. Program, 3<sup>rd</sup> Semester,  
1<sup>st</sup> In-Sem. Examination

Course Code: GEN1308

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. When drawing is in 2D, what axis you NOT work with?

- a) X.
- b) Y.
- c) Z.
- d) WCS.

Q2. Polar coordinates are used mostly for drawing:

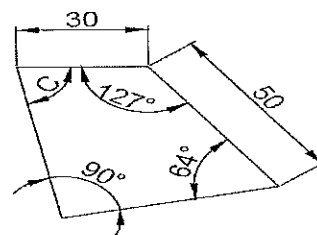
- a) Arc.
- b) Ellipse.
- c) Angular Lines.
- d) None of the above.

Q3. What is the keyboard shortcut to turn ON/OFF the **Ortho Mode** in AutoCAD?

- a) F3.
- b) F8.
- c) F7.
- d) F9.

Q4. What is the value of C in the following image?

- a) 70°.
- b) 69°.
- c) 79°.
- d) 88°.





**Q5.** 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.

**Section – B**

03X02 = 06 Marks

**Q6.** What is the file formats used in AutoCAD?

**Q7.** What is the purpose of AutoCAD Software?

**Q8.** Name the four work spaces of AutoCAD.

**Section – C**

03X03 = 09 Marks

**Q9.** Explain Absolute Co-ordinate System for Point Fixing Method in AutoCAD with an example?

**Q10.** Explain the followings commands:

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

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

*Vipin*



School of Automotive Skills  
Session: 2021-22 (Winter Semester)  
B. Voc. Program, 3<sup>rd</sup> Semester,  
1<sup>st</sup> In-Sem. Examination

Course Code: GEN1308

Course Name: Basics of AutoCAD & SolidWorks

Time: 1 Hour

Max. Marks: 20

### Section – A

05X01 = 05 Marks

Q1. When drawing is in 2D, what axis you NOT work with?

Answer: c) Z.

Q2. Polar coordinates are used mostly for drawing:

Answer: c) Angular Lines.

Q3. What is the keyboard shortcut to turn ON/OFF the **Ortho Mode** in AutoCAD?

Answer: b) F8.

Q4. What is the value of C in the following image?

Answer: c) 79.

Q5. What does UCS means? *(In the context of CAD)*

Answer: a) User Coordinate System.

### Section – B

03X02 = 06 Marks

Q6. 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.

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.** Name the four work spaces of AutoCAD.

Answer:

- a) Drafting & Annotation.
- b) 3D Basics.
- c) 3D Modeling.
- d) AutoCAD Classic.

## Section – C

03X03 = 09 Marks

**Q9.** Explain Absolute Co-ordinate System for Point Fixing Method in AutoCAD with an example?

Answer: Absolute coordinates refer to a Cartesian System that uses x-axis, y-axis, and sometimes a z-axis to establish a point some distance from a common origin.

Example: L enter,  
Specify first point: 2,2 enter,  
Specify next point (Undo): 7,2 enter,  
Specify next point (Undo): 7,4 enter,  
Specify next point (Close/Undo): 2,4 enter,  
Specify next point (Close/Undo): 2,2 or C enter.

In the example given above, we drew the rectangle (5x2) by line. We gave the point information that is asked by AutoCAD by entering real coordinates in form of x, y.

**Q10.** 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.

**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.

*Vipin*

