

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

School of Automotive Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester,

1<sup>st</sup> In-Sem. Examination

Course Code: AUT1101

Time: 1 Hour

Course Name: Automotive Power Train Chassis &amp; Suspension

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

- 1) Full form of IC is .....
  - a) Internet control
  - b) Internal Combustion
  - c) Inlet combustion
  - d) All of the above
- 2) Which wheels rotates in the rear wheel drive system?
  - a) Front wheels
  - b) Rear Wheels
  - c) All wheels
  - d) None of these
- 3) Full form of ARAI is;
  - a) Automotive research association of India
  - b) Automotive research association of internet
  - c) All research association of India
  - d) Volume ratio
- 4) The word "Automobile" means:
  - a) Auto-drive
  - b) Self-Moving
  - c) Self-controlling
  - d) All of the above
- 5) Which of the following is not an internal combustion engine?
  - a) Petrol engine
  - b) Diesel engine
  - c) 4 stroke engine
  - d) Gas turbine

**Section – B**

03X02 = 06 Marks

- 6) Define the term "Automobile".
- 7) What are the advantages of IC engine?
- 8) Draw a labelled diagram of 4-wheel drive vehicle.



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Section – C

03X03 = 09 Marks

- 9) Discuss general service procedures of a vehicle.
- 10) What are the various safety practices that must be followed in an automobile workshop?
- 11) Explain the working of front wheel drive with the help of a diagram.

*Vijay*

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**Section – A****Directions:** Select any one correct answer from the given options: 05X01 = 05 Marks

- 1) Full form of IC is .....
  - a) Internet control
  - b) Internal Combustion
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  - a) Petrol engine
  - b) Diesel engine
  - c) 4 stroke engine
  - d) Gas turbine

**Section – B**

03X02 = 06 Marks

- 6) Define the term "Automobile".

**Ans:** An automobile is a self-moving vehicle driven by its own motive power. Eg. Car, bus jeep, truck, etc.

- 7) What are the advantages of IC engine?

**Ans.** Advantages of Reciprocating internal combustion engines over external combustion engines:

1. Overall all efficiency is high.

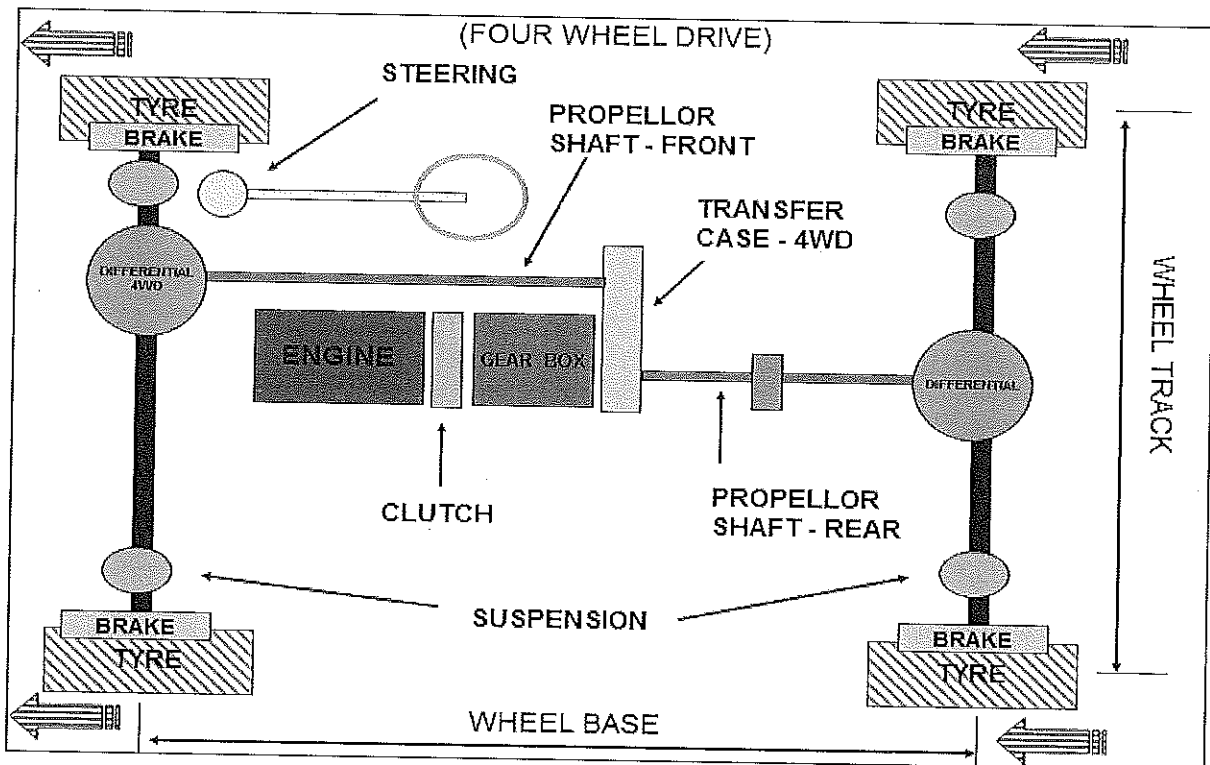
## BHARTIYA SKILL DEVELOPMENT UNIVERSITY

2. Greater Mechanical Efficiency.
3. Weight to power ratio is generally low.
4. Generally lower initial cost.
5. Easy starting from cold conditions.

These units are compact and thus require less space

- 8) Draw a labelled diagram of 4-wheel drive vehicle.

**Ans:**



**Section – C**

03X03 = 09 Marks

- 9) Discuss general service procedures of a vehicle.

**Ans:** - The general service includes:

1. Engine oil change
2. Oil filter change
3. Replace the fuel filter
4. Air filter change
5. Check both rear and front brake
6. Check the level of brake and clutch fluid
7. Grease and lubricate components
8. Check the proper operation of all the lights, wiper etc.
9. Check the error code in ECU and take corrective action.
10. Wash the vehicle and clean the interiors.

- 10) What are the various safety practices that must be followed in an automobile workshop?

**Ans:**

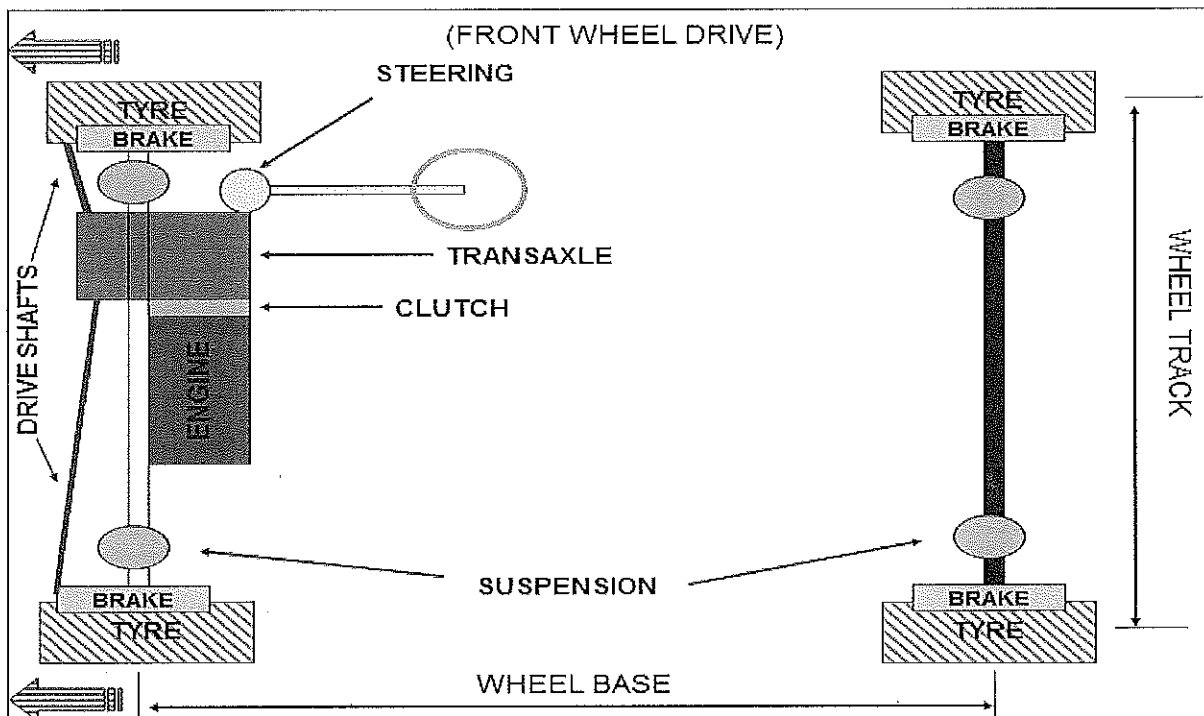
The various safety practices are as follows:

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- Always wear a safety helmet in the workshop, especially when working under the vehicle.
- Wear cotton hand gloves when working or carrying out repairs or service on a vehicle.
- Wear face masks to cover your nose and mouth.
- Wear safety goggles when working under the vehicle.
- Do not wear rings, watches and loose clothes when working on a vehicle.
- Keep the shop floor clean and tidy.
- Wear safety shoes in the workshop.
- Use specific and tool for a specific job.

11) Explain the working of front wheel drive with the help of a diagram.

Ans:







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School of Automotive Skill

Session: 2021-22 (Summer Semester)

B. Voc., 1<sup>st</sup> Semester

1<sup>st</sup> In-Sem Examination

Course Code : AUT102

Time : 1 Hour

Course Name: Automotive wheel care  
and steering system

Max. Marks : 20

## Instructions:

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

## Section – A

05X01 = 05 Marks

1. What safety Equipment is used to protect ears from loud noise: -
  - a. Headphone
  - b. Sound system.
  - c. Ear plugs.
  - d. None of the above.
2. What is the use of tire treads on tires?
  - a. For Aesthetics.
  - b. For grip.
  - c. For small chips and water excavation.
  - d. All of the above.
3. What does R stand in tire nomenclature?
  - a. Radial diameter of tire
  - b. Radius of rim
  - c. Road terrain
  - d. Option A and B
4. What is the unit of pressure?
  - a. Bar.
  - b. Psi.
  - c. Both A and B.
  - d. None of the above.
5. Is there any difference between wheel and Rim?
  - a. Yes
  - b. No



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### Section – B

03X02 = 06 Marks

1. Why tires play an important role in wheel for LMV and commercial vehicle?
2. What is the requirement of 5S?
3. What is the difference between tire and wheel?

### Section – C

03X03 = 09 Marks

1. Explain the role of tire changer machine?
2. Explain the nomenclature of tire.
3. What are the three basic difference between tube tire and tubeless tire?

*Vijay*

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

A-F

School of Automotive Skill

Session: 2021-22 (Summer Semester)

B. Voc., 1<sup>st</sup> Semester1<sup>st</sup> In-Sem Examination

Course Code : AUT102

Time : 1 Hour

Course Name: Automotive wheel care  
and steering system

Max. Marks : 20

**Instructions:**

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

**Section – A**

05X01 = 05 Marks

1. What safety Equipment is used to protect ears from loud noise: -
  - a. Headphone
  - b. Sound system.
  - c. **Ear plugs.**
  - d. None of the above.
2. What is the use of tire treads on tires?
  - a. For Aesthetics.
  - b. For grip.
  - c. For small chips and water excavation.
  - d. **All of the above.**
3. What does R stand in tire nomenclature?
  - a. Radial diameter of tire
  - b. Radius of rim
  - c. Road terrain
  - d. **Option A and B**
4. What is the unit of pressure?
  - a. Bar.
  - b. Psi.
  - c. **Both A and B.**
  - d. None of the above.
5. Is there any difference between wheel and Rim?
  - a. **Yes**
  - b. No

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## Section – B

03X02 = 06 Marks

1. Why tires play an important role in wheel for LMV and commercial vehicle?

Ans. A tire (American English) or tyre (British English) is a ring-shaped component that surrounds a wheel's rim to transfer a vehicle's load from the axle through the wheel to the ground and to provide traction on the surface over which the wheel travels. It's composed of bead wire, steel and rubber, and works to keep the tire and rim fastened together in the event of sudden air pressure reduction. The sidewall is located between the tread and the bead and has several functions.

2. What is the requirement of 5S?

Ans. 5s, or any lean system, helps to eliminate waste, streamline production, and optimize efficiencies. When you adopt 5s thinking, you make a commitment to put safety, organization and effectiveness ahead of production deadlines, profits and output.

3. What is the difference between tire and wheel?

Ans. A wheel is the part of the car that is known as the part that is rounded and is attached to an axle and a hub. ... The tyre is simply the part that is made out of rubber and assists the car with more practical movement. The rubber grips the road to avoid a no-friction experience.

## Section – C

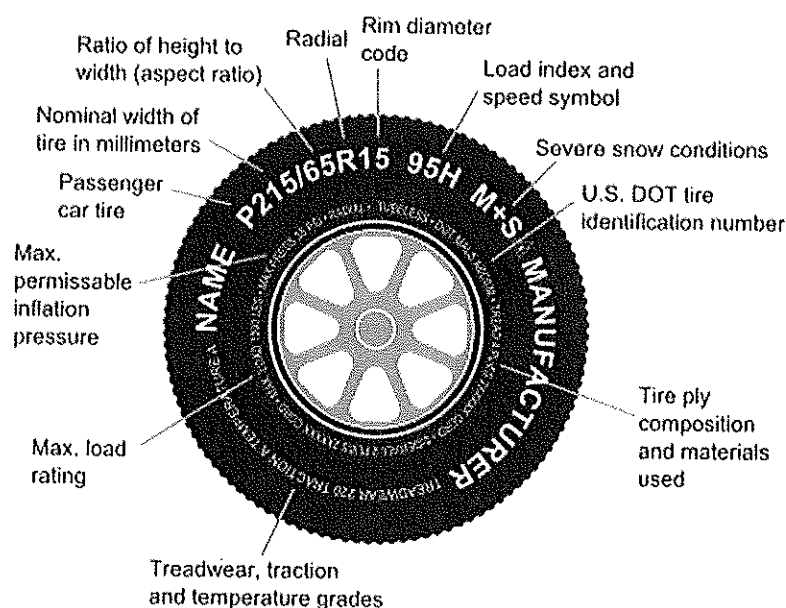
03X03 = 09 Marks

1. Explain the role of tire changer machine?

Ans. After the wheel and tyre assembly are removed from the automobile, the tyre changer has all the components necessary to remove and replace the tire from the wheel. This machine allow technicians to replace tyres on automobiles, motorcycles and heavy-duty.

2. Explain the nomenclature of tire.

Ans.





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3. What are the three basic difference between tube tire and tubeless tire?

Ans. The construction of a **tubeless tyre** is similar to that of a **tube tyre**. The **only difference is** that they do not have the inner **tube** to hold

**Tubeless tyres** are generally considered safer because they don't lose air suddenly in case of a puncture. Air loss is gradual. ... Also since there is no tube within the tyre, there is less friction and the tyre tends to stay cooler. It's also easier to balance a tubeless tyre as there's less uneven weight in the tyre.

1st. In-Sem.



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

**Course Code: AUT1103**

**Time: 1 Hour**

**Course Name: Automotive Body Repair**

**Max. Marks: 20**

**Instruction:**

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

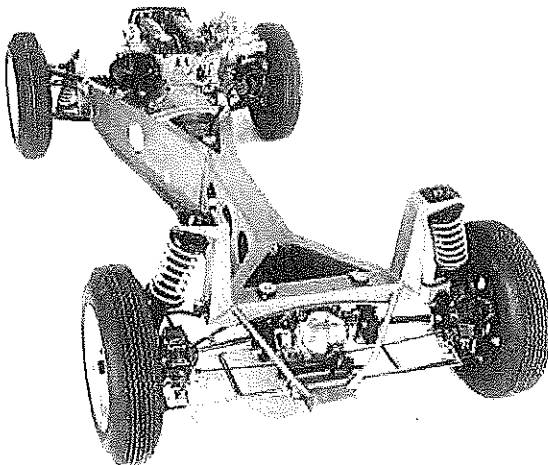
**Section – A**

**05X01 = 05 Marks**

Q1. Front - section of a car body also called:

- a) Doghouse
- b) Cathouse
- c) Greenhouse
- d) None of the above

Q2. Name the type of chassis:



- a) Monocoque
- b) Ladder
- c) Backbone
- d) None of the above



Q3. Name the type of Car Body style?

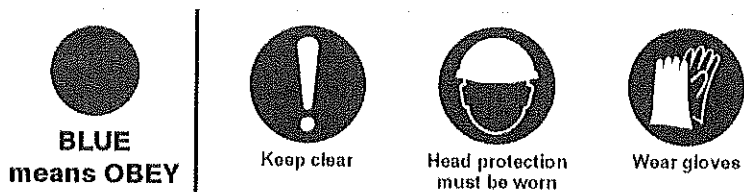


- a) Convertible
- b) SUV
- c) MUV
- d) Van

Q4. How many panels are there in a car body?

- a) 13
- b) 15
- c) 06
- d) 12

Q5. What blue colour shows in a safety sign?



- a) Warning
- b) Mandatory
- c) Safe condition
- d) Prohibition

**Section – B**

**03×02 = 06 Marks**

Q6. Name tools and safety equipment's used in automotive body repair.

Q7. Write short note Car body pillars.

Q8. What operations do we perform in a body shop?

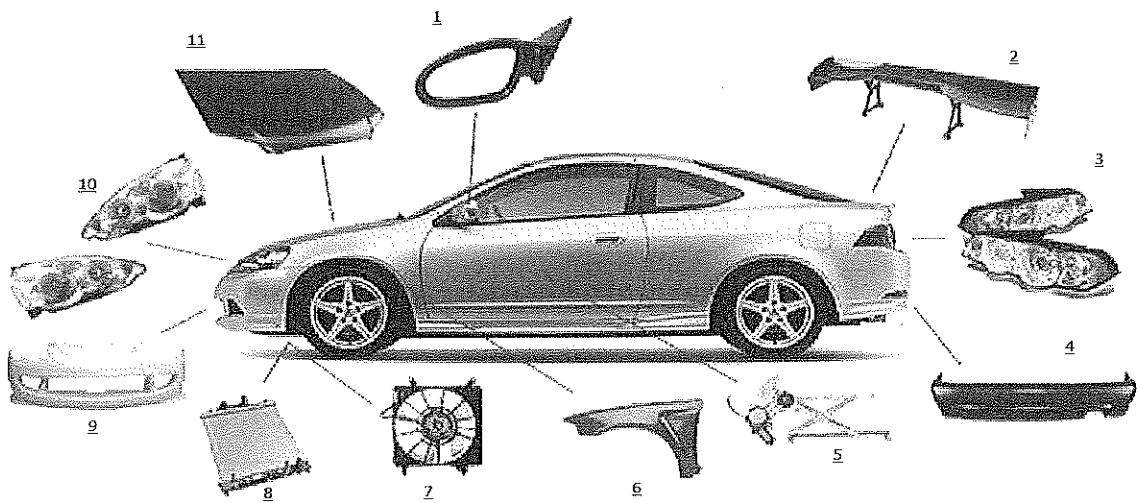
**Section – C**

**03×03 = 09 Marks**

Q9. Explain 5S technique.

Q10. Specify different types of car bodies with example.

Q11. Name the parts of car body shown in diagram -



*Vijay*





**School of Automotive Skills**  
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**B. Voc. Program, 1<sup>st</sup> Semester**  
**Answer sheet 1<sup>st</sup> In Sem. Examination**

**Course Code: AUT1103**

**Time: 1 Hours**

**Course Name: Automotive Body Repair**

**Max. Marks: 20**

**Instruction:**

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

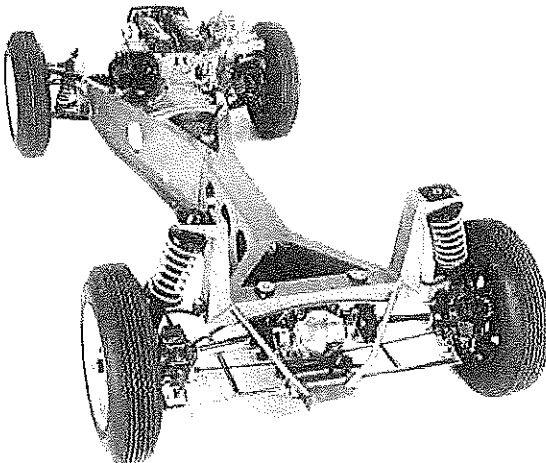
**Section – A**

**05X01 = 05 Marks**

Q1. Front - section of a car body also called

- a) Doghouse
- b) Cathouse
- c) Greenhouse
- d) None of the above

Q2. Name the type of chassis.



- a) Monocoque
- b) Ladder
- c) Backbone
- d) None of the above



Q3. Name the type of Car Body style?

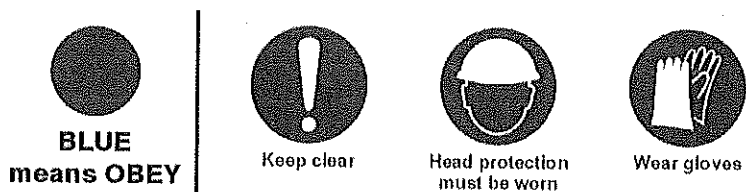


- a) Convertible
- b) SUV
- c) MUV
- d) **Van**

Q4. How many panels are there in a car body?

- a) **13**
- b) 15
- c) 06
- d) 12

Q5. What red colour shows in a safety sign?



- a) Warning
- b) **Mandatory**
- c) Safe condition
- d) Prohibition



## Section – B

03×02 = 06 Marks

Q6. Name tools and safety equipment's used in automotive body repair

Ans.

The following tools and equipment are used in Body Repair Shop:

- Pneumatic tools
- Dent puller
- Grinder
- Metal-cutting guns
- Plasma cutters
- Heavy-duty hydraulic jacks
- Hammers & Mallet
- Files, pliers, wrenches, and screwdrivers.

The major safety equipments are;

- Helmet
- Safety goggles
- Safety shoes
- Nose masks
- Gloves
- Ear plug(while grinding)

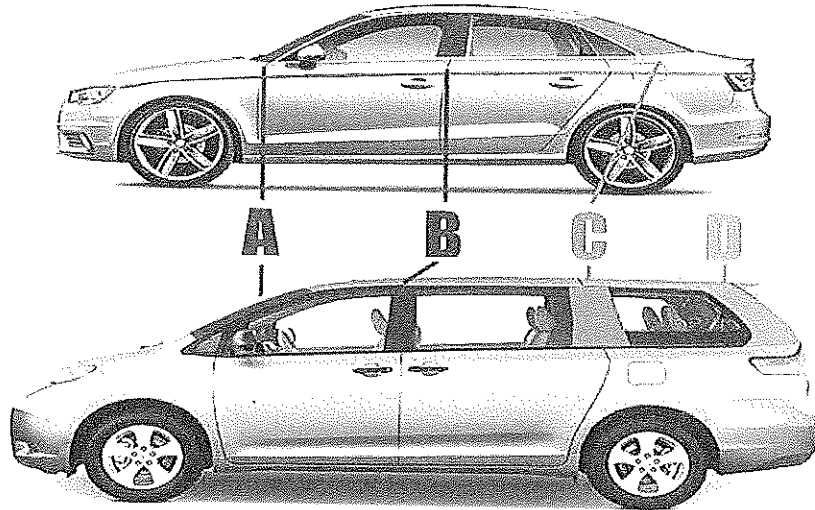
Q7. Write short note Car body pillars

Ans.

### Car Body pillar

Just like in civil construction, a car's pillars support its roof. To identify them, one needs to look at the car from one of its sides. The sloping pillar between which the windshield glass is fixed is the A Pillar. The second pillar from the front is the B Pillar, onto which the front doors click shut. The rear doors are hinged to the B Pillar as well. The C Pillar is behind the rear seat, and is the third and final pillar when it comes to hatchbacks, sedans, and small SUV's. Larger cars with a third row of seating, like Minivans and Large SUV's, have a fourth D Pillar, which is behind the third row.

Typically, thicker A and C Pillars (D, in case of Minivans and SUV's) are disliked as they block the driver's field of vision at the front and back respectively.



Q8. What operations do we perform in a body shop?

Ans. Operations -

- Review damage reports, prepare cost estimates, and plan work.
- Remove damaged body parts, including bumpers, fenders, hoods, grilles, and trim.
- Realign car frames and chassis to repair structural damage.
- Hammer out or patch dents, dimples, and other minor body damage.
- Fit, attach, and weld replacement parts into place.
- Install and weatherproof windows and windshields.
- Grind, sand, buff, and prime refurbished and repaired surfaces.
- Apply new finish to restored body parts.

Section – C

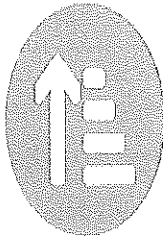
03×03 = 09 Marks

Q9. Explain 5S technique



5S

5S is a five-step organization technique to create and maintain an intuitive workspace.



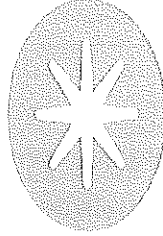
**Sort**

Keep only necessary items in the workplace.



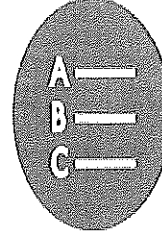
**Set In Order**

Arrange items to promote efficient workflow.



**Shine**

Clean the work area so it is neat and tidy.



**Standardize**

Set standards for a consistently organized workplace.



**Sustain**

Maintain and review standards.

Q10. Specify different types of car bodies with example.

Ans

**Hatchback**

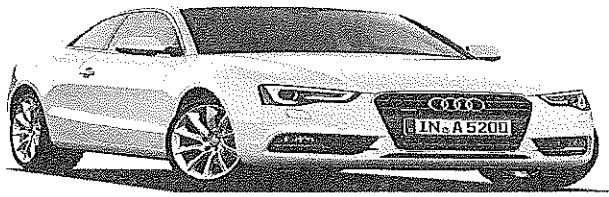
A hatchback is a car with a sloping back and a hinged rear door that opens upwards. These cars differ from SUVs, MPVs or vans in that they are usually much more compact. Hatchbacks usually have seating for four-five people is almost always a tight squeeze. An example of a hatchback is the Maruti Suzuki Swift.

**Sedan**

A sedan, also called a saloon, is a passenger car with a bonnet covering the engine and a separate boot for luggage at the rear. This is one of the most popular body styles of cars today, with seating for at least four people. A sedan design is also known as a 'three-box' design. An example of a sedan is the Honda City.

**Coupe**

Coupes are often the sporty variants of saloon cars, with doors reduced from 4 to 2. However, the coupe body style varies from carmaker to carmaker, and now there are even four-door coupes like the Mercedes-Benz CLS-Class. The name 'coupe' comes from the French verb 'Couper', which means 'to cut'. An example of a two-door coupe is the Audi A5.



## Estate

Estates, or station wagons, have a body style similar to a sedan, but with an extended rear luggage or cargo area. These cars have a two-box design with the passenger compartment extending over where the boot would have been in a saloon. They are usually based on sedans and often share the same frontal design. Estates are not very common in India, but an example is the Skoda Octavia Combi.



## SUV

An SUV, or Sports Utility Vehicle, is similar to an estate, but usually bigger and higher off the ground. SUVs are often offered with four-wheel-drive and are designed for both on- and off-road use. Some have the towing capacity of a pickup, and offer the passenger carrying capacity of a minivan or large sedan. An example of an SUV is the Ford Endeavour.

## MPV

MPVs, or Multi-Purpose Vehicles, feature a one- or two-box design and are taller than station wagons. They often see estate-like interior appointments and are also called people-carriers, people-movers, minivans, or MUVs (Multi-Utility Vehicles). They are designed to be spacious and usually get three rows of seats with seating for 7 or more. An example of an MPV is the Toyota Innova.

## Crossover

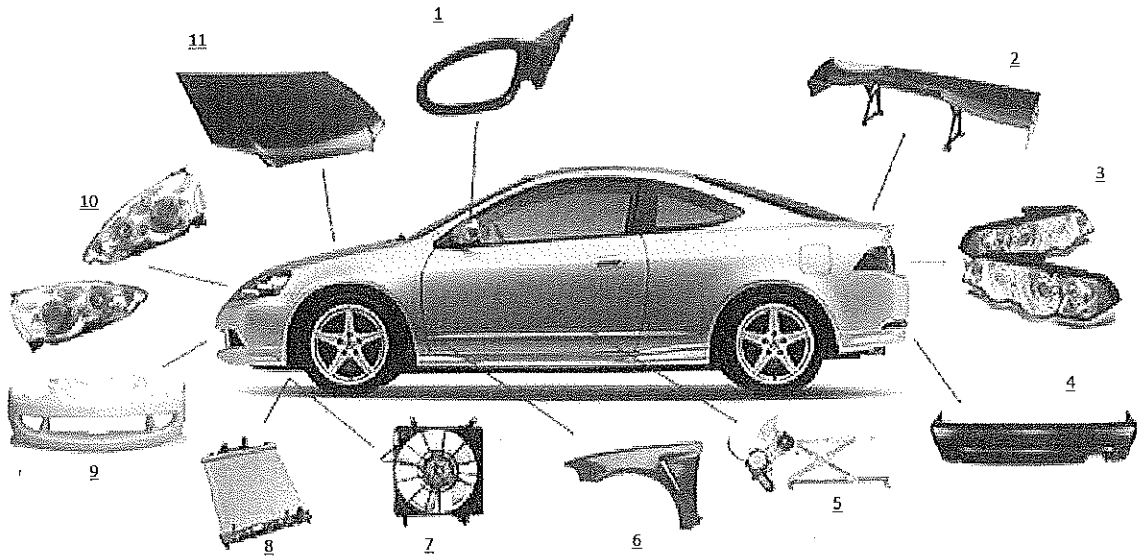
A crossover is a vehicle built on a car platform but often with features of an SUV like increased ground clearance and a higher seating position. Crossovers are typically designed only for light off-roading. An example of a crossover is the recently-launched Fiat Avventura.



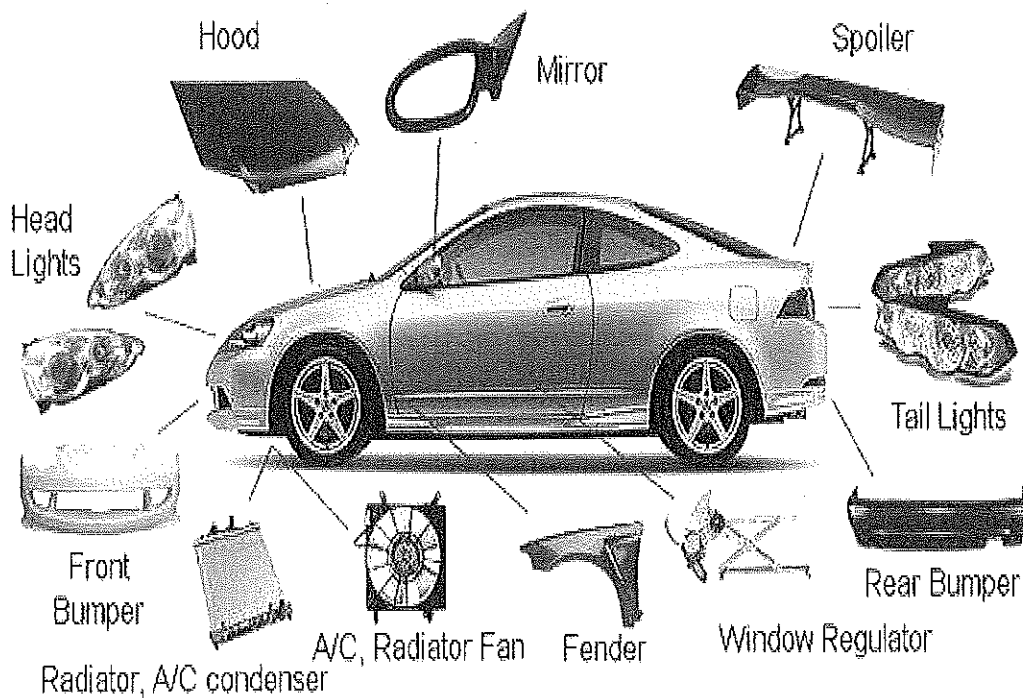
## Pickup

A pickup is a light motor vehicle with an open rear cargo area known as a 'bed'. These are extremely popular in the US, and feature factory-built integrated beds. The term also applies to coupe utility vehicles, where they are based on a car chassis or a dedicated platform. Pickups are called 'utes' in Australia and New Zealand. They are often available with two or four doors for the passenger compartment, and are called single-cab pickups and double-cab pickups respectively. An example of a pickup is the Tata Xenon, which features a double-cab design.

Q11. Name the parts of car body given in diagram -



Ans.







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

**Course Code: AUT1104**

**Time: 1 Hour**

**Course Name: Automotive Spray Painting**

**Max. Marks: 20**

**Instruction:**

1. Answer all questions from section – A, each question carries one mark.
2. Attempt 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. In paint shop we ..... the damaged body color to original color.

- a) Damage.
- b) Restore.
- c) All of the above.
- d) None of the above.

Q2. Color matching process is executed in which section of an automotive workshop?

- a) Body Shop Section.
- b) Wheel Care Section.
- c) Paint Shop Section.
- d) Mechanical Section.

Q3. What is the first and foremost hazard takes place in the indoor painting of a vehicle?

- a) Fire & Explosion.
- b) Drowsiness.
- c) Vomiting.
- d) Inadequate ventilation.

Q4. To carry out refinish painting on a vehicle what type of work comes under a paint shop technician?

- a) Rectification of defects.
- b) Priming and Painting.
- c) Paint Inspection.
- d) All of the above.



Q5. Hazard substitutes in paint shop should be:

- a) More.
- b) Less.
- c) Neither more nor less.
- d) None of the above.

**Section – B**

03X02 = 06 Marks

Q6. What are the major health effects can be caused due to exposure of solvents in a paint shop section to the paint technician?

Q7. Name the preventive measures carried out to reduce hazards in paint shop section.

Q8. What are the potential source of ignition (fire) can occur in a paint shop?

**Section – C**

03X03 = 09 Marks

Q9. What are the major safety equipment used in a paint shop?

Q10. What are the major responsibilities of a paint technician in an automotive workshop?

Q11. Explain about the uses of a paint booth and a paint mixing room in the paint shop section in an automotive workshop.

*Vijay*



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**Course Code: AUT1104**

**Time: 1 Hour**

**Course Name: Automotive Spray Painting**

**Max. Marks: 20**

**Section – A**

05X01 = 05 Marks

Q1. In paint shop we ..... the damaged body color to original color.

Answer: b) Restore.

Q2. Color matching process is executed in which section of an automotive workshop?

Answer: c) Paint Shop Section.

Q3. What is the first and foremost hazard takes place in the indoor painting of a vehicle?

Answer: d) Inadequate ventilation.

Q4. To carry out refinish painting on a vehicle what type of work comes under a paint shop technician?

Answer: d) All of the above.

Q5. Hazard substitutes in paint shop should be:

Answer: b) Less.

**Section – B**

03X02 = 06 Marks

Q6. What are the major health effects can be caused due to exposure of solvents in a paint shop section to the paint technician?

Answer:

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

Q7. Name the preventive measures carried out to reduce hazards in paint shop section.

Answer:

1. Engineering Controls:
  - a. Use of less hazardous substitutes
  - b. Proper ventilation



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- c. Proper isolation during spray painting
2. Administrative controls:
  - a. Education and training
  - b. Safe work procedures
3. Personal protective equipment:
  - a. Respiratory protective equipment
  - b. Eye protection
  - c. Protective clothing

Q8. What are the potential source of ignition (fire) can occur in a paint shop?

Answer:

Potential sources of ignition include:

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

### Section – C

03X03 = 09 Marks

Q9. What are the major safety equipment used in a paint shop?

Answer:

1. Dust Mask and Respirators.
2. Safety Goggles.
3. Safety Shoes.
4. Safety Gloves (Nitrile).
5. Antistatic Overall Suit.
6. Ear Plugs.
7. Safety Helmet (if required).

Q10. What are the major responsibilities of a paint technician in an automotive workshop?

Answer:

1. To carry all types of vehicle body refinishing work like:
  1. Pre -paint preparation
  2. Priming and painting
  3. Paint inspection
  4. Rectification of defects
2. To identify and utilize the correct methods of working by using your experience, skills, training and industry knowledge,



3. To keep your skills up-to-date by making appropriate efforts to acquire adequate knowledge of new vehicles.
4. To identify and report all apparent faults considered to be advisable in the interest of safety and reliability.

Q11. Explain about the uses of a paint booth and a paint mixing room in the paint shop section in an automotive workshop.

Answer:

### **Paint Booth:**

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

In general, there are two types of paint booths:

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

### **Reason to use Paint Booth:**

- Confine the application of a hazardous material to a restricted controlled environment.
- Prevent hazardous overspray and volatiles from escaping confinement and causing fire or explosion to nearby operations.
- Control air fuel/mixture so that a combustible combination cannot occur.
- Provide a clean environment in which to paint.

### **Paint mixing room:**

- Paint mixing room is a place where we mix the paints according to the requirements.
- It should have color-corrected artificial lighting and downdraft ventilation.
- Paint mix rooms are generally located next to the spray booth to maximize painter productivity

### **Benefits of mixing room:**

- Waste reduction: You mix only the amount of paint you need.
- Time savings: Your paint is ready when you need it.
- Versatility: You can match thousands of factory colors.





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

**Course Code: AUT1105**

**Time: 1 Hour**

**Course Name: Automotive Electrical Fundamentals & A. C.**

**Max. Marks: 20**

**Instruction:**

1. Answer all questions from section – A, each question carries one mark.
2. Attempt 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. In an open system of thermodynamics:

- a) Mass / matter transfers.
- b) Energy / heat transfers.
- c) Both Mass and Energy transfers.
- d) Nothing transfers.

Q2. What is the most efficient measuring instrument is used in the automotive workshop to measure temperature?

- a) Thermometer.
- b) Laser temperature infrared thermometer.
- c) None of the above.

Q3. What is the S.I. unit of pressure?

- a) Newton (N).
- b) Meter (m).
- c) Kelvin (K).
- d) Pascal (Pa).

Q4. What are the modes of heat transfer in thermodynamics?

- a) Conduction.
- b) Convection.
- c) Radiation.
- d) All of the above.



Q5. Power is directly proportional to:

- a) Work.
- b) Time.
- c) Force x Time.
- d) None of the above.

**Section – B**

03X02 = 06 Marks

Q6. What do you understand by unit of refrigeration?

Q7. What is the full form of VCRS?

Q8. Write down any two demerits of an air refrigeration system.

**Section – C**

03X03 = 09 Marks

Q9. Define the following:

- 1. Refrigeration.
- 2. Refrigerants.
- 3. Thermodynamic Systems.

Q10. What do you understand by Coefficient of Performance (CoP)?

Q11. Name the components used in a simple VCRS.

*Vijay*



**School of Automotive Skills**  
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**Time: 1 Hour**

**Course Name: Automotive Electrical Fundamentals & A. C.**

**Max. Marks: 20**

**Section – A**

05X01 = 05 Marks

Q1. In an open system of thermodynamics:

Answer: c) Both Mass and Energy transfers.

Q2. What is the most efficient measuring instrument is used in the automotive workshop to measure temperature?

Answer: b) Laser temperature infrared thermometer.

Q3. What is the S.I. unit of pressure?

Answer: d) Pascal (Pa).

Q4. What are the modes of heat transfer in thermodynamics?

Answer: d) All of the above.

Q5. Power is directly proportional to:

Answer: a) Work.

**Section – B**

03X02 = 06 Marks

Q6. What do you understand by unit of refrigeration?

Answer:

The measured capacity of refrigeration is always dimensioned in units of power. Domestic and commercial refrigerators may be rated in kJ/s, or Btu/h of cooling. For commercial and industrial refrigeration systems, the kilowatt (kW) is the basic unit of refrigeration.

Q7. What is the full form of VCRS?

Answer: Vapour Compression Refrigeration System.

Q8. Write down any two demerits of an air refrigeration system.

Answer:

1. Low COP.
2. Freezing of moisture at low temperature.



Q9. Define the following:

1. Refrigeration.
2. Refrigerants.
3. Thermodynamic Systems.

Answer:

**Refrigeration:** Refrigeration is the process of cooling a space, substance, or system to lower and/or maintain its temperature below the ambient one (while the removed heat is rejected at a higher temperature).

**Refrigerants:** A refrigerant is a substance or mixture, usually a fluid, used in a heat pump and refrigeration cycle. In most cycles it undergoes phase transitions from a liquid to a gas and back again.

**Thermodynamic Systems:** A thermodynamic system is a group of material and/or radiative contents. Its properties may be described by thermodynamic state variables such as temperature, entropy, internal energy, and pressure.

Q10. What do you understand by Coefficient of Performance (CoP)?

Answer:

**CoP:** A refrigeration system's coefficient of performance (CoP) is very important in determining a system's overall efficiency. It is defined as refrigeration capacity in kW divided by the energy input in kW.

The Coefficient of Performance - COP - is the basic parameter used to report efficiency of refrigerant based systems. COP is the ratio between useful cooling or heating output and power input and can be expressed as:

$$\text{COP} = P_c / P$$

where, COP = Coefficient of Performance,  $P_c$  = useful cooling or heating power output (Btu/h, W),  $P$  = power input (Btu/h, W).

Q11. Name the components used in a simple VCRS.

Answer:

Components of VCRS:

1. Compressor.
2. Condenser.
3. Receiver-dryer.
4. Accumulator.
5. Expansion Valve.
6. Evaporator.
7. Clutches.

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

School of Automotive Skills

1<sup>st</sup> Semester, 1<sup>st</sup>In-Sem. Examination

B. Voc. Program, Summer Semester (2021-22)

Course Code: AUT1106

Time: 1 Hour

Course Name: Automotive tools and measurement

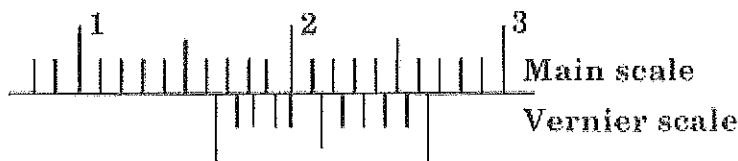
Max. Marks: 20

**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. What is the least count of the instrument?



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

Q.2 The least count defines the.....

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

Q.3 Which type of measurement does not provide numerical values?

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

Q.4 Why do not we use second angle and fourth angle projection?

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

Q.5 Which value can be the reading of instrument having least count =  $20\mu\text{m}$ ?

- a. 20.05
- b. 20.062
- c. 20.06
- d. 20.006

**Section – B**

**03X02 = 06 Marks**

Q.6 Explain different types of lines with their uses.

Q.7. Write short note on surface finish indication.

Q.8 What is fit? Name types of fit.

**Section – C**

**03X03 = 09 Marks**

Q.9 Explain tolerance and classify them.

Q.10 Explain projection methods.

Q.11 Differentiate between first angle and third angle projection?

*V. K. Singh*



# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

## School of Automotive Skills

### 1<sup>st</sup> Semester, 1<sup>st</sup>In-Sem. Examination

#### B. Voc. Program, Summer Semester (2021-22)

#### Answersheet

Course Code: AUT1106

Time: 1 Hour

Course Name: Automotive tools and measurement

Max. Marks: 20

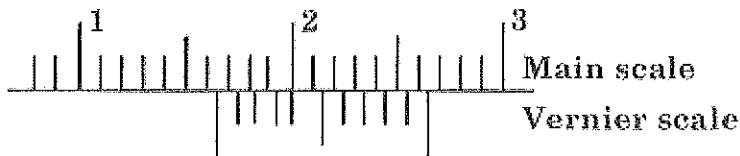
#### Instructions:

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. What is the least count of the instrument?



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

Q.2 The least count defines the.....

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

Q.3 Which type of measurement does not provide numerical values?

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

Q.4 Why do not we use second angle and fourth angle projection?

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



Ans.

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

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

Q.8 What is fit? Name types of fit

Ans.

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

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

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

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

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

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

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

### Section – C

03X03 = 09 Marks

Q.9 Explain tolerance and classify them.

Ans. Tolerance can be defined as the magnitude of permissible variation of a dimension or other measured value from the specified value.

- It can also be defined as the total variation permitted in the size of a dimension, and is the algebraic difference between the upper and lower acceptable dimensions. It is an absolute value.
- The basic purpose of providing tolerances is to permit dimensional variations in the manufacture of components, adhering to the performance criterion as established by the specification and design.

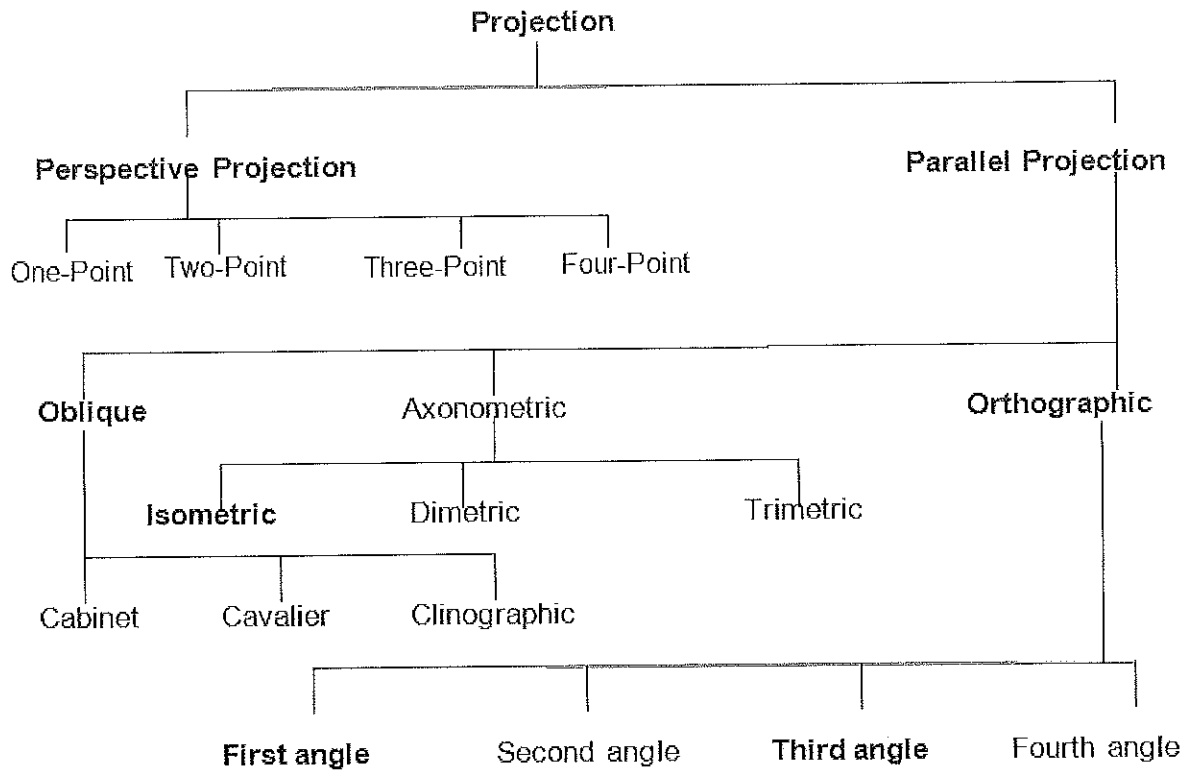
#### Dimensioning tolerance

- **Unilateral Tolerance:** When the tolerance distribution is only on one side of the basic size, it is known as unilateral tolerance. In other words, tolerance limits lie wholly on one side of the basic size, either above or below it.
- **Bilateral Tolerance:** When the tolerance distribution lies on either side of the basic size, it is known as bilateral tolerance. In other words, the dimension of the part is allowed to vary on both sides of the basic size but may not be necessarily equally disposed about it.

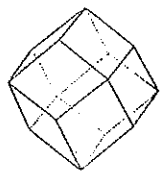
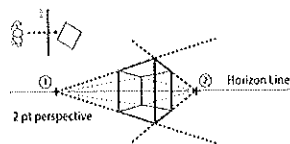
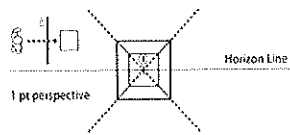
**Geometric Tolerance:** Geometric Dimensioning and Tolerance (GD & T) is a system for defining and communicating engineering tolerances. It uses a symbolic language on engineering drawings and computer generated three dimensional solid models that explicitly describes nominal geometry and its allowable variation.

Q.10 Explain projection methods.

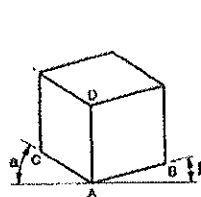
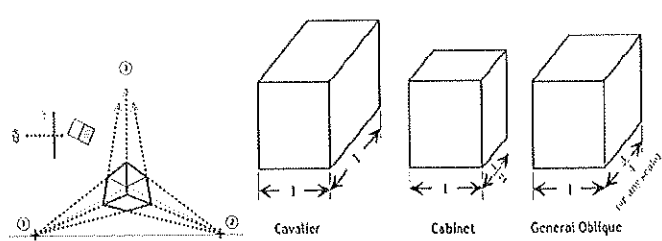
Ans.



## EXAMPLES

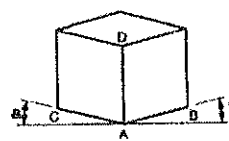


Clinographic



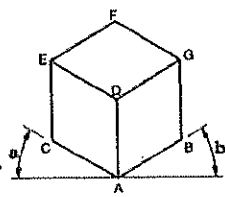
Note:  $a \neq b$  and  $AB \neq AC \neq AD$

Trimetric Projection



Note:  $a = b$  and  $AB = AC \neq AD$

Dimetric Projection



Note:  $a = b = c = 30^\circ$  and  $AB = AC = AD$

Isometric Projection

Q.11 Differentiate between first angle and third angle projection?

Ans.

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

