BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1101 **Time: 1 Hour**

Course Name: Automotive Powertrain, Chassis and Suspension **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 a ventilated disk brake:

a) Caliper is covered with cooling fins
b) A duct directs air towards the caliper for cooling while the vehicle is moving
c) Disc contains many small holes for optimum cooling performance
d) Disc contains radial vanes between its rubbing surfaces for optimum cooling performance

Q2. The most common used power plant in automobiles is:

a) Gas turbine
b) I C engine
c) Battery
d) None of the above

Q3. In spark ignition engine:

a) Only air is introduced in the cylinder.
b) Mixture of air and fuel is introduced into the cylinder.
c) Both a and b.
d) None of the above.

Q4. Personal Protective Equipment is required when:

a) Employers suffer an injury
b) The employees suffer an injury
c) An employee asks for it
d) Engineering, work practice, and administrative controls do not provide sufficient protection against hazards

Q5. Petrol engine works on which cycle?

a) Otto cycle
b) Diesel cycle
c) Rankine cycle
d) None of the above

Section – B

03X02 = 06 Marks

Q6. Explain any 4 basic components of an automobile?

Q7. Write a short note on crank shaft?

Q8. Classify automobiles on the basis of Drive and Capacity?

Section – C

03X03 = 09 Marks

Q9. Explain role of an automobile technician.

Q10. Write a short note on Front wheel drive?

Q11. Explain working of a 4 stroke IC engine.

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School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1101 **Time: 1 Hour**

Course Name: Automotive Powertrain, Chassis and Suspension system **Max. Marks: 20**

Instruction:

Answer all questions from section – A, each question carries one mark.

Attempt all questions from section – B, each question carries two marks.

Answer all questions from section – C, each question carries three marks.

Section – A

05X01 = 05 Marks

Q1. In a ventilated disk brake?

d) Disc contains radial vanes between its rubbing surfaces for optimum cooling performance

Q2. The most common used power plant in automobiles is?

b) I C engine

Q3. In spark ignition engine?

b) Mixture of air and fuel is introduced into the cylinder.

Q4. Personal Protective Equipment is required when-

d) Engineering, work practice, and administrative controls do not provide sufficient protection against hazards.

Q5. Petrol engine works on which cycle?

a) Otto cycle

Section – B

03X02 = 06 Marks

Q6. Explain any 4 basic components of an automobile?

Answer: a) Transmission: A car transmission, also known as the transmission system, is the mechanism by which power created by the engine is transferred to the driving wheels. This

part of the vehicle is the most important in determining the power and functionality of your engine systems.

b) Radiator: It's function is to keep the engine cool by removing heat from the coolant, before it (coolant) is pumped back to the engine.
c) Catalytic converter - Catalytic converters are emission control devices fitted on the exhaust system. Catalytic converters convert harmful exhaust gases to un-harmful gases. Catalytic converters are coated with noble metals like Platinum, Palladium, Rhodium on the inside
d) **Distributor**: The distributor is a device that passes a high voltage electric current from the ignition coil to each spark plug in the correct order and for the right amount of time.

Q7. Write a short note on crank shaft?

Answer: - The crankshaft, sometimes casually abbreviated to crank, is the part of an engine which translates reciprocating linear piston motion into rotation. To convert the reciprocating motion into rotation, the crankshaft has crank throws or crank pin, additional bearing surfaces whose axis is offset from that of the crank, to which the big ends of the connecting rods from each cylinder attach. It typically connects to a flywheel, to reduce the pulsation characteristic of the four-stroke cycle, and sometimes a torsional or vibrational damper at the opposite end, to reduce the torsion vibrations often caused along the length of the crankshaft by the cylinders farthest from the output end acting on the torsional elasticity of the metal.

Q8. Classify automobiles on the basis of Drive and Capacity?

Answer: Capacity:

- Heavy Transport vehicle(H.T.V) like trucks and buses
- Light Transport Vehicle (L.T.V) Like cars, jeeps

Drive:

- Whether the vehicle can be driven sitting towards right or left side
  a) Left hand drive: In USA
  b) Right hand drive: In India
- Whether front axel, rear axle or both axels are driving axels.
  a) Front wheel drive
  b) Real wheel drive
  c) All wheel drive.

Section – C

03X03 = 09 Marks

Q9. Explain role of an automobile technician.

Answer: Automotive service technicians and mechanics typically do the following:

- Identify mechanical problems, often by using computerized diagnostic equipment.
- Test parts and systems to ensure that they are working properly.
- Follow checklists to ensure that all critical parts are examined.
- Perform basic care and maintenance, including changing oil, checking fluid levels, and rotating tires.
- Repair or replace worn parts, such as brake pads and wheel bearings.
- Disassemble and reassemble parts of Automotive Vehicles.
- Use testing equipment to ensure that repairs and maintenance are effective

Q10. Write a short note on front wheel drive?

Answer: Front-wheel drive (FWD) is a form of engine and transmission layout used in motor vehicles, where the engine drives the front wheels only. Most modern front-wheel-drive vehicles feature a transverse engine, rather than the conventional longitudinal engine arrangement generally found in rear-wheel-drive and four-wheel drive vehicles.

Advantages:

1. Lighter construction
2. Lesser mechanical inertia in the powertrain which means greater fuel economy
3. Engine pulls the car rather then pushing it, avoiding skidding provides safety especially on snow covered roads
4. Powertrain is packed entirely in the engine compartment avoiding requirement for transmission tunnel hence resulting in more interior space

Disadvantages:

1. Complicated arrangement: Front wheels (Driving wheels) which in this case has to be steered also.
2. Two constant velocity joints have to be used in this case because ordinary universal joints would give large speed fluctuations.
3. In front engine front wheel drive the front axel supports 2/3 weight of the vehicle weight, thus contributing in under steer.
4. Turing radius more as compared to Rear Wheel drive Vehicles

Q11. Explain working of a 4 stroke IC engine.

Answer: As the name suggest the Four Stroke Petrol Engine uses a cycle of four strokes and petrol as the fuel.

The steps involved are as follows:

1) Intake Stroke: I this stroke the intake of fuel takes place. When the engine starts, the piston descends to the cylinder's bottom (BDC) from the top (TDC). Thus the pressure inside the cylinder reduces. Now the intake valve opens and the fuel and air mixture enters the cylinder.
2) Compression Stroke: This stroke is known as compression stroke because the compression of the fuel mixture takes place at this stage. When the intake valve closes (exhaust valve is already closed), the piston forced back to the top of the cylinder (TDC) and the fuel mixture gets compressed. The compression is around 1/8th of the original volume. An engine is considered more efficient if its compression ratio is higher.
3) Combustion/Power Stroke: Now in case of petrol engine when the fuel mixture compresses to the maximum value the spark plug produces spark which ignites the fuel mixture. The combustion leads to the production of high pressure gases. Due to this tremendous force the piston is driven back to the bottom of the cylinder (BDC). As the piston moves downwards, the crankshaft rotates which rotates the wheels of the vehicle.
4) Exhaust Stroke: As the piston moves to the bottom the exhaust valve opens up and due to the momentum gained by the wheel the piston is pushed back to the top (TDC) of the cylinder. The gases due to combustion are hence expelled out of the cylinder into the atmosphere through the exhaust valve.

   The exhaust valve closes after the exhaust stroke and again the intake valve opens and the four strokes are repeated.

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School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1102 **Time: 1 Hour**

Course Name: Automotive Wheel Care & Steering System **Max. Marks: 20**

Instruction:

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

Section – A

05X01 = 05 Marks

Q1. Where is the bead located in the tyre?

a. At surface.
b. On edges.
c. On side walls.
d. Inner side.

Q2. What is the full form of TWI?

a. Tread wear indicator.
b. Tyre wear indicator.
c. Tread worn indicator.
d. Tyre worn indicator.

Q3. What is the main principle of wheel balancing?

a. To balance the wheel anyway.
b. To optimize and minimize the weight on wheel.
c. To rotate the wheel unbalanced.
d. All of the above.

Q4. The purpose of tyre pressure inflator in an Automotive Workshop is:

a. To clean the workshop.
b. To fill any standard of air to the wheels.
c. To inflate the required/standard pressure in PSI to the wheels.
d. None of the above.

Q5. The hand tool required to pinch, cut or pull an object is known as:

a. Nose Plier.
b. Wire Cutter.
c. Weight Plier.
d. Pincers.

Section – B

03X02 = 06 Marks

Q6. What types of safety equipment are required during wheel balancing and tyre changing in the wheel care section?

Q7. What are the differences between tools and equipment used in the wheel care department?

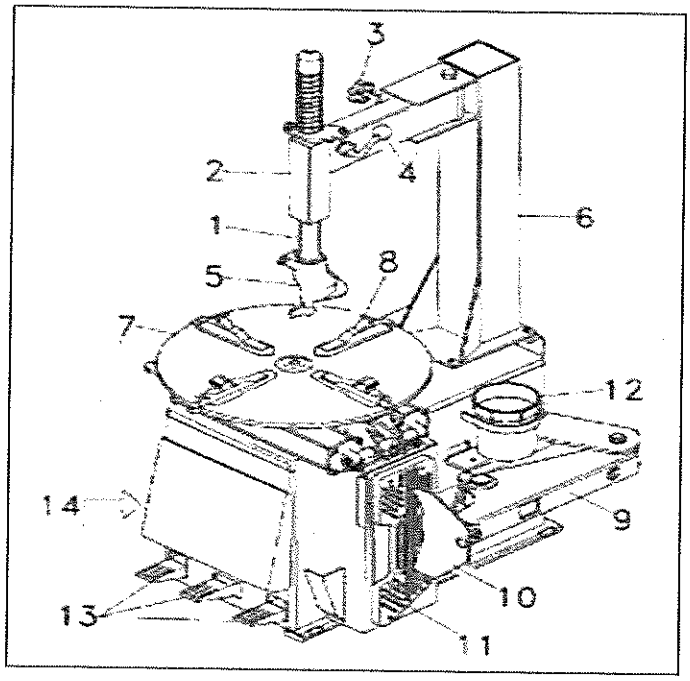
Q8. Explain any two tools used in wheel care section with their applications.

Section – C

03X03 = 09 Marks

Q9. Explain the role & responsibilities of a wheel care technician in an automotive workshop.

Q10. Identify the components of tyre changer in the figure given below:



Q11. Write different types of screwdrivers and explain them with diagrams.

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Answer Key

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1102 **Time: 1 Hour**

Course Name: Automotive Wheel Care & Steering System **Max. Marks: 20**

Section – A

05X01 = 05 Marks

Q1. Where is the bead located in the tyre?

Answer: b. On edges.

Q2. What is the full form of TWI?

Answer: a. Tread wear indicator.

Q3. What is the main principle of wheel balancing?

Answer: b. To optimize and minimize the weight on wheel.

Q4. The purpose of tyre pressure inflator in an Automotive Workshop is:

Answer: c. To inflate the required/standard pressure in PSI to the wheels.

Q5. The hand tool required to pinch, cut or pull an object is known as:

Answer: d. Pincers.

Section – B

03X02 = 06 Marks

Q6. What types of safety equipment are required during wheel balancing and tyre changing in the wheel care section?
Answer:

- Safety goggles:

If you are working in workshop, then you should always wear safety glasses. Because some time stones, dust particles available on wheel and when wheel is rotating then it gone into your eyes so you must wear safety glasses with side protection.

- Safety gloves:

This type of glove can provide protection against some moderate concentrated chemicals. The risk of cuts and abrasions also can be minimized by wearing gloves.

- Helmet:

Helmet will protect the user's head against: impact from objects falling from above, by resisting and deflecting blows to the head.

- Safety shoes:

A steel-toe boot is protective reinforcement in the toe which protects the foot from falling objects or compression, usually combined with a mid-sole plate to protect against punctures from below.

Q7. What are the differences between tools and equipment used in the wheel care department?

Answer:

Sr. No.	Tools	Equipment
1	A tool can be any item that is used to achieve a goal	Equipment usually denotes a set of tools that are used to achieve a specific objective
2	A tool can be non-mechanical device	A equipment is a mechanical device
3	The usage of tools among human beings runs back to millions of years	The use of equipment is more of a recent development.
4	Tools are often seen to be used by animals	Equipment is only used by human beings.

Q8. Explain any two tools used in wheel care section with their applications.

Answer:

1. **Open-end spanner:** This one-piece wrench is made double-ended with differing size openings for opposite faces of bolts or nuts. The U-shaped opening on each end provides grip for objects by flipping the wrench over to use the opposite side.
2. **Combination spanner:** The combination wrench is a multi-purpose tool with the open-end for tightening and loosening in small spaces and the box-end for leverage and a firm grip around nuts and bolts.

Section – C

03X03 = 09 Marks

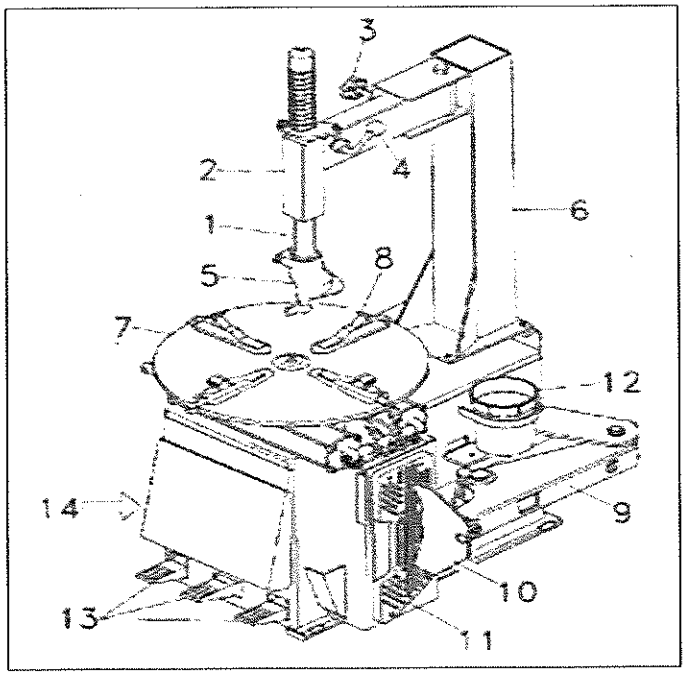
Q9. Explain the role & responsibilities of a wheel care technician in an automotive workshop.

Answer:

Roles and responsibilities of technician in wheel care

1. An automotive service technician (or auto mechanic) is someone who inspects, maintains, repair and replace like tyre, brake etc.
2. Test parts and systems to ensure they are working properly.
3. Identify mechanical problems, often by using computerized diagnostic equipment.
4. Follow checklists to ensure that all critical parts are examined.
5. Perform basic care of tyre rotations.
6. Repair or replace worn parts, such as brake pads and wheel bearings.
7. Disassemble and reassemble parts.
8. Use testing equipment to ensure that repairs and maintenance are effective.
9. Explain to clients their automotive problems and the repairs done on their vehicles.

Q10. Identify the components of tyre changer in the figure given below:



Answer:

1. Vertical slide.
2. Swing arm.
3. Adjustable knob.
4. Lock lever.
5. Mount / demount head.
6. Tower or column.
7. Turntable.
8. Jaw or clamp.
9. Bead breaker arm.
10. Bead breaker blade.
11. Bead breaker pads.
12. Lube pail.
13. Foot pedal controls.
14. Bead seater/ inflator pedal.

Q11. Explain different types of screwdrivers used in Automotive Wheel Care Section.

Answer:

1. Slot Head – This is one of the most common types because it is the easiest screw to make. For this reason, just about anything you find that was created during the error where screws were handmade will have a slot head screw. Most people call this a flat head screw or flat head screwdriver.
2. Philips – Most people don't realize that a Phillips head screwdriver is designs for a specific task. It is designed to push the screwdriver out of the head when the screw is tight. That's why you have trouble getting one into some materials that are extremely tough.
3. Pozidrive – A Pozidrive screw looks a lot list a Phillips head screw, but does not push your screwdriver out when tight. You can apply as much torque as you need without running into any problems.
4. Hexagon – Hex screwdrivers are some of the simplest and cheap to produce. This is why you will see them used in a lot of furniture you purchase from discount stores. They are easy to use, but do not provide you any insurance that you won't tighten them too much.
5. Torx – Just like the name implies, this head is designed to give you the most torque possible. It is designed a lot like the hex screws but it is designed to have more contact between the screwdriver and the screw, so the torque is distributed more evenly.

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

1st In-Sem. Examination

Course Code: AUT1103 **Time: 1 Hour**

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

Instruction:

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

Section-A

05x01=05 Marks

Q-1. What is the color code of a warning sign?

a. Blue
b. Green
c. Yellow
d. Red

Q-2. Out of the following options which is not a body panel?

a. Door
b. Fender
c. Wheel
d. Bumper

Q-3. The number of Body Panel in a vehicle are:

a. 10
b. 20
c. 12
d. 13

Q-4. Out of the following options which one is a safety equipment?

a. Shoes
b. Gloves
c. Goggles
d. All of the above

Q-5. What is the color code of a prohibition sign?

a. Red
b. Yellow
c. Black
d. Blue

Section-B

03x02 = 06 Marks

Q-6. Write down the operations of body repair workshop?

Q-7. What are the role and responsibilities of an Auto body repairer?

Q-8. Write down the full form of SUV, MUV and ATV.

Section-C

03x03= 09 Marks

Q-9. Explain the 5S theory.

Q-10. Explain the tools and equipments required in body shop?

Q-11. Explain any three automotive body types?

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Winter Semester)

B. Voc. Program, 1st Semester

1st In-Sem. Examination

Course Code: AUT1103 **Time: 1 Hour**

Course Name: Automotive Body Repairs **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

Ans-1. C) Yellow

Ans-2. C) wheel

Ans-3. D) 13

Ans-4. D) All of the above

Ans-5. A) Red

Section-B

3x2=6 Marks

Q-6. Describe body repair workshop?

- Ans. 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

Q-7. what are roles and responsibilities of an Auto body repairer?

Ans.

- An auto body repairer is someone who works in the automotive industry.
- They repair, restore, refinish, and replace vehicle bodies and frames, windshields, and window glass.

Q-8. Write down the full form of SUV, MUV and ATV.

Ans.

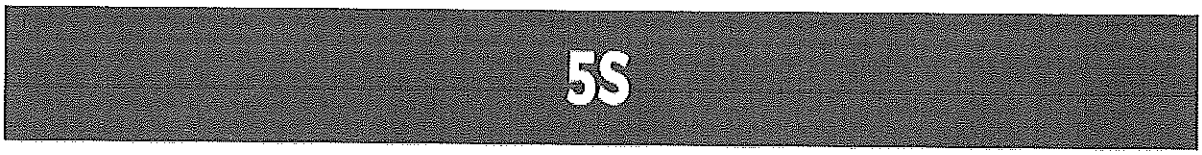
1. SUV= Sport Utility Vehicle
2. MUV= Multi Utility Vehicle
3. ATV= All-terrain Vehicle

Section-C

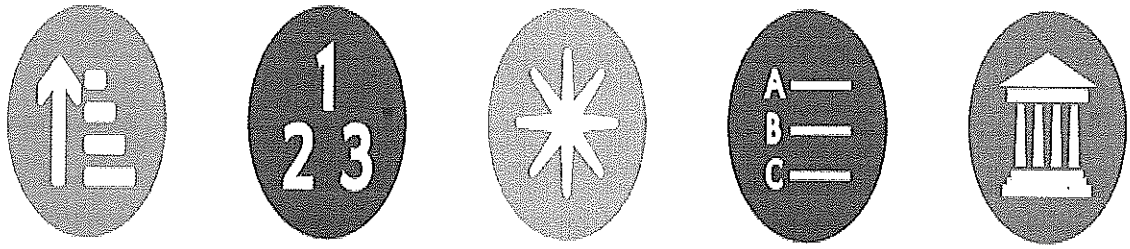
3x3=9 Marks

Q-9. Explain 5S theory.

Ans.



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



Sort	Set In Order	Shine	Standardize	Sustain
Keep only necessary items in the workplace.	Arrange items to promote efficient workflow.	Clean the work area so it is neat and tidy.	Set standards for a consistently organized workplace.	Maintain and review standards.

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Q-10. Explain the tools and equipments required in body shop?

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 equipment are ;

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

Q-11. Explain any three automotive body types?

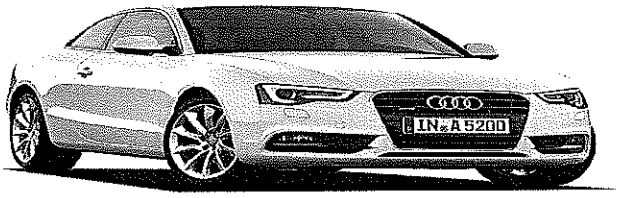
Ans:

- **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.

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Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. , I-Semester,

1st In-Sem. Examination

Course Code: AUT1104 **Time: 1 Hour**

Course Name: Automotive Spray Painting **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.

Q1. Which of the following methods can be used to strip paint from the metal surfaces of a vehicle?

a) Sanding
b) Blasting
c) Chemical stripping
d) All of the above

Q2. Which product should be used to mask next to a part that is being painted around?

a) Narrow masking tape
b) Wide masking tape
c) Fine line masking tape
d) Duct tape

Q3. PPE's in Paint booth include?
a) Nityrle gloves
b) Antistatic overall
c) Respirator
d) All of the above

Q4. P80 is an _____ type of sander?
a) FEPA
b) American standard
c) Asia standards
d) None of the above

Q5. The thickness of Body Filler in one coat is recommended _____?
a) 1/4"
b)1/2"
c)1/16
d)3/8"

Section – B

03X02 = 06 Marks

short answer type questions, each question carries 02 marks.

Q6. What is surface preparation and why we do that?

Q7. What are the PPEs we should use in Paint?

Q8. What are the raw materials and Equipment needed for Sanding?

Section – C

03X03 = 09 Marks

essay type questions, each question carries 03 marks.

Q9. What are the types of Sanders used in spray painting ?

Q10. What are the difference between a body filler and a putty??

Q11.From base metal to top layer ?

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Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc., I-Semester,

1st In-Sem. Examination

Course Code: AUT1104 **Time: 1 Hour**

Course Name: Automotive Spray Painting **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) All of the above

A2. b) Wide masking tape

A3. d) All of the above

A4. a) FEPA

A5. a) 1/4"

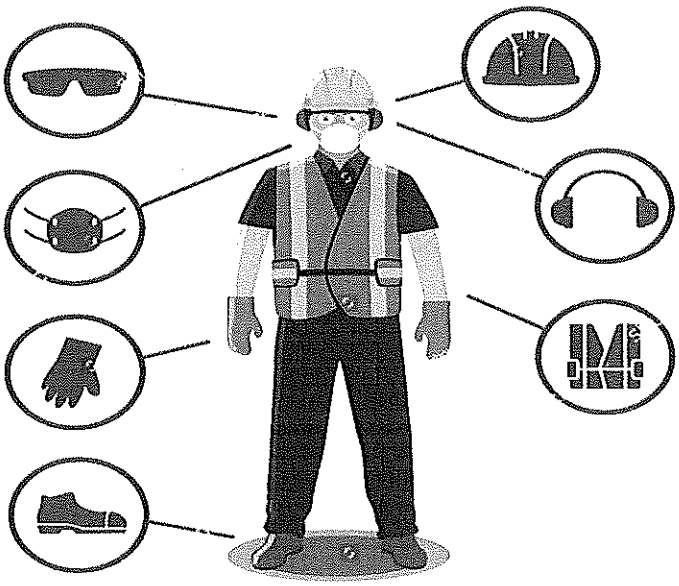
Section – B

03X02 = 06 Marks

short answer type Questions, each Question carries 02 marks.

A6. Surface preparation is basically a method of restoring all the body lines curve and panel finish before painting in a body shop.

It is majority done to prevent the base metal from, cracking, Infiltration of paint surface and corrosion.



A7. Safety googles

Respirator

Hard shoes

Antistatic overall

Nityrle gloves

A8. Sanding –

Equipment sander (dual action sander), interface pad, soft disk, abrasive paper, Velcro disc

Suction pneumatic connections, hand block

Raw material – putty filler, dry guide coat,

Section – C

03X03 = 09 Marks

03 essay type Questions, each Question carries 03 marks.

A9.

TABLE 25–3 USE OF SANDERS

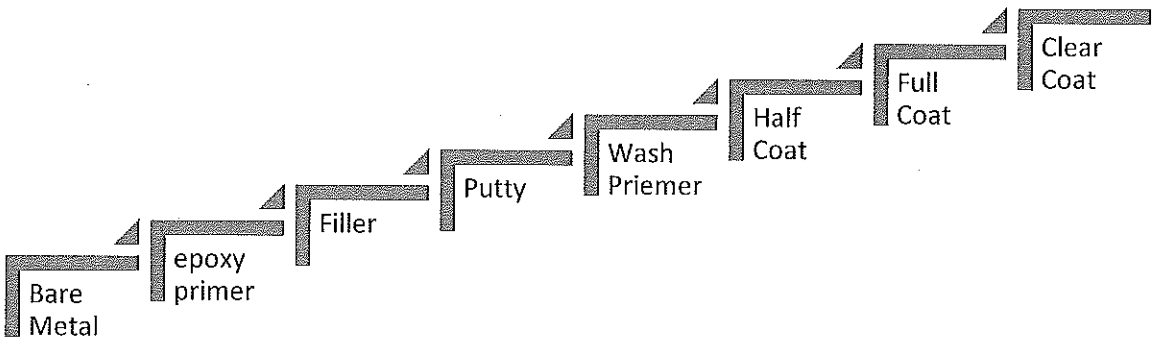
Sander Type	Normal Area of Operation	Normal Use						
		Paint Stripping	Featheredging	Rough Sanding of Solder	Rough Sanding of Metal Putty	Rough Sanding of Poly Putty	Sanding of Metal Putty	Sanding of Poly Putty
Disc Sander	Suitable for narrow areas	A	C	B	C	C	C	C
Dual Action Sander		B	A	C	A	A	A	A
Orbital Sander		B	B	C	A	A	A	A
Straight Line Sander	Suitable for wide open spaces	B	C	C	A	B	A	B
Long Orbital Sander		B	C	C	A	B	A	B

Note: It is important that the correct type of sander and abrasive paper be used for each type of job. Also, always wear a mask or use some sort of dust arrester when using a sander.
A Preferred
B Acceptable
C Least preferred

A10. What are the difference between a body filler and a putty?

Putty	Body filler
Dense and based on Polyester chemical	Light in weight and low density
Use to restore Body linings and curves	Use to restore metal surface
Used hardener	No hardener used
Putty can be sanded with a fine-grade of sandpaper.	Filler is non sandable in most cases however a fine abrasive paper is used.

A11



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School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1105 **Time: 1 Hour**

Course Name: Automotive Electrical Fundamentals & Air Conditioning **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=05Marks**

Q1) Output of a digital multi-meter is ?

a. Mechanical.
b. Optical.
c. Electrical.
d. Analog.

Q2) If in series, One bulb blows out, others will?

a. Glow.
b. Turn off.
c. Blow up.
d. Heat up.

Q3) In a refrigeration system, the expansion device is connected between the?

a. Compressor and condenser.
b. Condenser and receiver.
c. Receiver and evaporator.
d. Evaporator and compressor.

Q4) During a refrigeration cycle, heat is rejected by the refrigerant in a.....?

a. Condenser.
b. Compressor.
c. Evaporator.
d. Expansion valve.

Q5) Actuators are used to?

a. Sense an object.
b. Activate a chemical.
c. Make a mechanical movement.
d. All the above.

Section-B **03X02 = 06 Marks**

Q06) Explain oxygen sensor.
Q07) Define Actuators and its types.
Q08) What is function of a condenser?

Section-C **03X03 = 09 Marks**

Q09) Explain series and Parallel Circuit with examples.
Q10) Explain various Leak tests done in AC system of a car.
Q11) Explain properties of a refrigerant.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1105 **Time: 1 Hour**

Course Name: Automotive Electrical Fundamentals & Air Conditioning **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=05Marks**

Q1) Output of a digital multi-meter is ?

a. Mechanical
b. Optical
c. Electrical
d. Analog

Ans- c

Q2) If in series, One bulb blows out, others will?

a. Glow
b. Turn off
c. Blow up
d. Heat up

Ans- b

Q3) In a refrigeration system, the expansion device is connected between the?

a. Compressor and condenser
b. Condenser and receiver
c. Receiver and evaporator
d. Evaporator and compressor

Ans- c

Q4) During a refrigeration cycle, heat is rejected by the refrigerant in a.....?

a. Condenser
b. Compressor
c. Evaporator
d. Expansion valve

Ans- a

Q5) Actuators are used to?

a. Sense an object
b. Activate a chemical
c. Make a mechanical movement
d. All the above

Ans- c

Section-B **03X02 = 06 Marks**

Q06) explain oxygen sensor.
Ans- The working principle of the o2 sensor is to check the oxygen amount within the exhaust. Firstly, this oxygen was added to the fuel for good ignition. The communication of this sensor can be done with the help of a voltage signal. So the oxygen status in the exhaust will be decided by the computer of the car.

The computer regulates the mixture of fuel or oxygen delivered to the car engine. The arrangement of the sensor before & after the catalytic converter permits to maintain the hygiene of the exhaust & check the converter's efficiency.

Q07) Define Actuators and its types.
Ans- An actuator is a component of a machine that is responsible for moving and controlling a mechanism or system, for example by opening a valve. In simple terms, it is a "mover".
Types:

Hydraulic.

Pneumatic.

Electric.

Q08) what is function of a condenser?

Ans- A condenser is designed to transfer heat from a working fluid (e.g. water in a steam power plant) to a secondary fluid or the surrounding air.

Heat transfer by latent heat is much more efficient than heat transfer by sensible heat only

The temperature of the working fluid stays relatively constant during condensation, which maximizes the temperature difference between the working and secondary fluid.

Section-C **03X03 = 09 Marks**

Q09) Explain series and Parallel Circuit with examples.

Ans- A "series" connection is that components are connected end-to-end in a line to form a single path through which current can flow.

The basic idea of a "parallel" connection, on the other hand, is that all components are connected across each other's leads. In a purely parallel circuit, there are never more than two sets of electrically common points, no matter how many components are connected. There are many paths for current flow, but only one voltage across all components:

Q10) Explain various Leak tests done in AC system of a car.

Ans. UV dye test

Vaccum test

Q11) explain properties of a refrigerant.

- Ans- It is non-toxic, non-flammable & non-corrosive.
- It has a boiling point of -15.34 Degree Fahrenheit or -26.3 degree Celsius.
- It has a high heat of vaporization.
- Its auto ignition temperature is 770 degree Celsius.
- Universally accepted cylinder code for R134a is light blue.
- It has a moderate density in liquid form, etc.

BSDU

School of Automotive Skills

1st Semester, 1stIn-Sem. Examination

B. Voc. Program, Winter 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

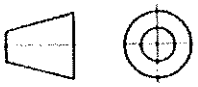
Q1. Least count of an outside micrometer is 0.01mm. Range of the micrometer is 75-100 mm. The barrel reading is 15.5 mm and the tenth thimble graduation coincides with the barrel datum line. The reading is _____

a. 15.60 mm
b. 15.06 mm
c. 15.50 mm
d. 15.40 mm

Q2. The least count defines the.....

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

Q3. Name the projection symbol :



a. First angle
b. Second angle
c. Third angle
d. None of the above

Q4. Which type of measurement does not provide numerical values?

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

Q5. 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

Section – B

03X02 = 06 Marks

Q.6 Write short note on measuring errors.

Q7. Write short note on surface finish indication

Q.8 Explain parallel and perspective projection

Section – C

03X03 = 09 Marks

Q9. Explain the parts of Vernier caliper with diagram.

Q10. Differentiate between first angle and third angle projection?

Q11. What is fit? Name types of fits.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

1st Semester, 1stIn-Sem. Examination

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

Anwersheet

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

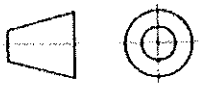
Q1. Least count of an outside micrometer is 0.01mm. Range of the micrometer is 75-100 mm. The barrel reading is 15.5 mm and the tenth thimble graduation coincides with the barrel datum line. The reading is _____

a. **15.60 mm**
b. 15.06 mm
c. 15.50 mm
d. 15.40 mm

Q2. The least count defines the.....

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

Q3. Name the projection symbol



a. **First angle**
b. Second angle
c. Third angle
d. None of the above

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Q4. Which type of measurement does not provide numerical values?

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

Q5. Why do not we use second angle and fourth angle projection?

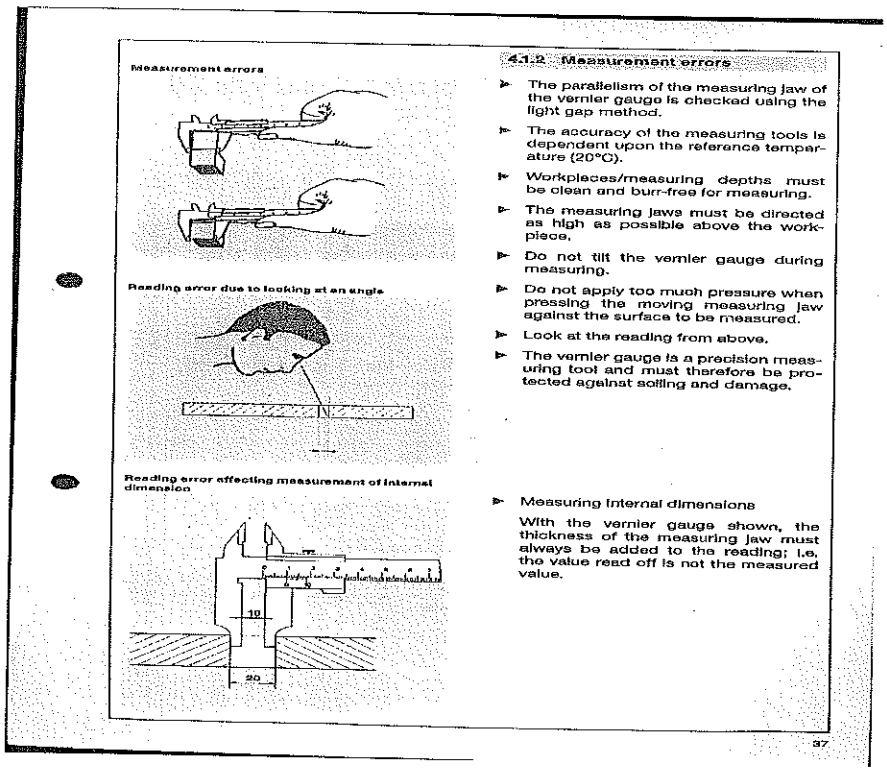
a. **Due to overlapping**
c. Due to lacking
b. Due to complications
d. None of the above

Section – B

03X02 = 06 Marks

Q.6 Write short note on measuring errors.

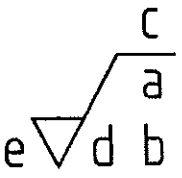
Ans.



Q7. Write short note on surface finish indication

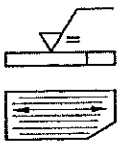
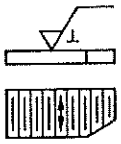
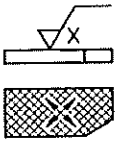
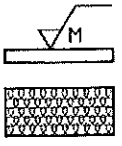
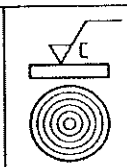
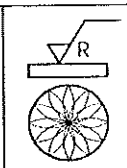
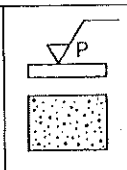
Ans.

Indication of surface finish cf. DIN EN ISO 1302 (2002-06)

Symbol	Meaning	Additional marks
	All manufacturing processes are allowed.	
	Material removal specified, e.g. turning, milling.	a surface parameter[1] with numerical value in µm, transfer characteristic[2]/individual evaluation length in mm
	Material removal not allowed or the surface remains in delivered condition.	b secondary surface finish requirement (as described for a)
	All surfaces around the contour must have the same surface-finish.	c manufacturing process
		d symbol for the required groove direction (table page 100)
		e machining deviation in mm

Indication of surface finish cf. DIN EN ISO 1302 (2002-06)

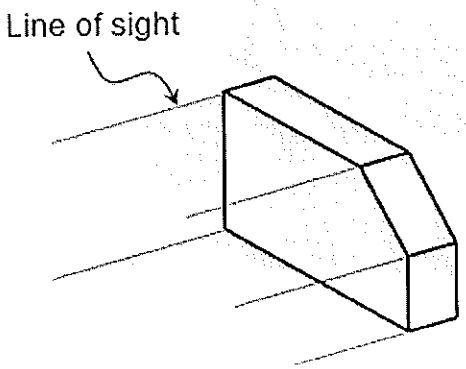
Symbols for groove direction

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

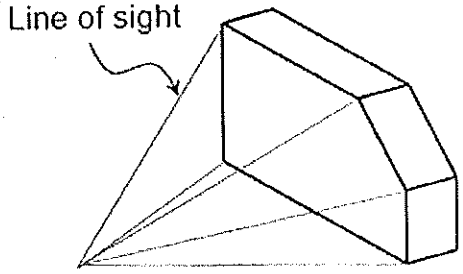
Q.8 Explain parallel and perspective projection

Ans.

Parallel projection



Perspective projection



Parallel vs. perspective projection

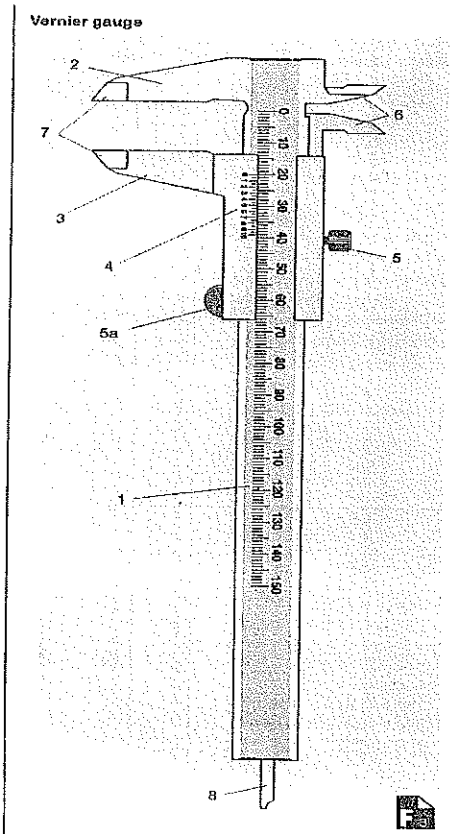
Parallel Projection	Perspective Projection
Distance from the observer to the object is infinite projection lines are parallel – object is positioned at infinity.	Distance from the observer to the object is finite and the object is viewed from a single point – projectors are not parallel
Less realistic but easier to draw.	Perspective projections mimic what the human eyes see, however, they are difficult to draw.

Section – C

03X03 = 09 Marks

Q9. Explain the parts of Vernier caliper with diagram.

Ans.



Components of a vernier gauge

A vernier gauge consists of the following parts:

1. The bar with the line graduation in millimetres
2. The fixed measuring jaw.
3. The adjustable measuring jaw.
4. The slide with vernier graduation
5. The retaining screw (type 1A)

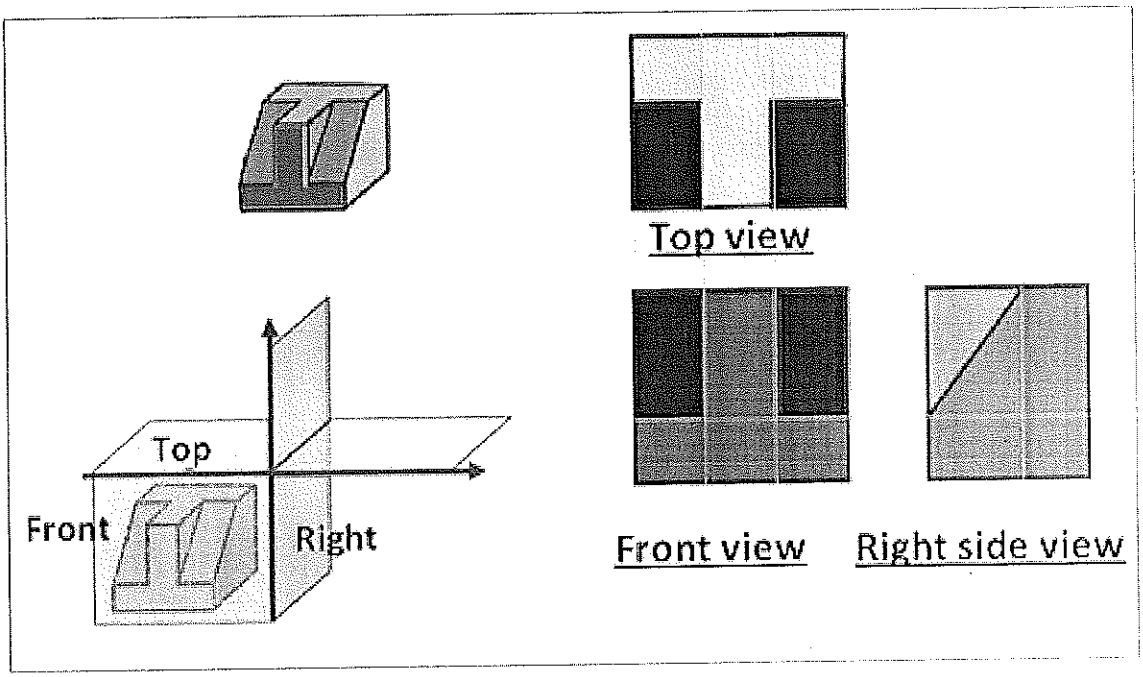
5a. The clamp (type 2A)

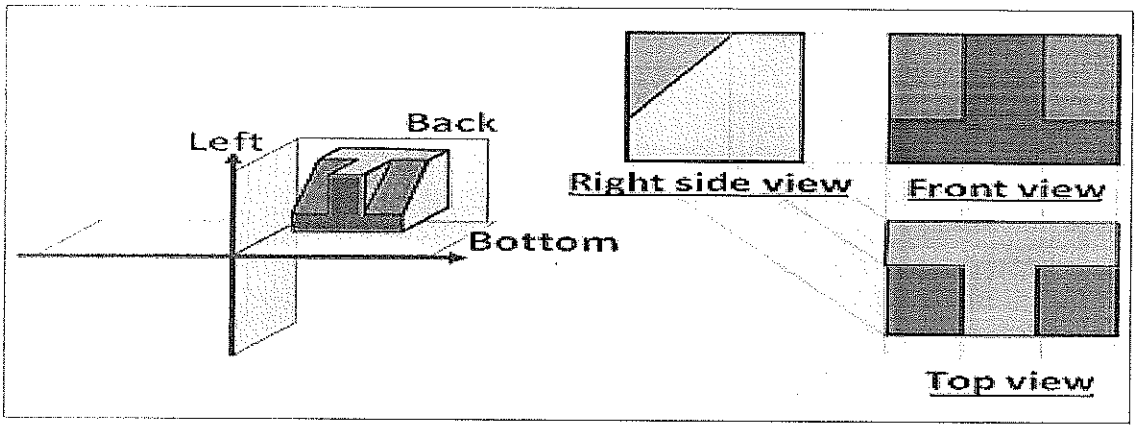
6. The cutting areas for measuring internal dimensions
7. The measuring areas for measuring threads
8. The depth measuring rod for measuring drill depths, groove depths and ridge heights

Q10. 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




Left
Back
Bottom
Right side view
Front view
Top view

Q11. 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:

a. Clearance fit
b. Interference fit
c. 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 and interference fit and sometimes clearance fit when assembled.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st /3rd / 5th Semester,

1st In-Sem. Examination

Course Code: AUT1115 **Time: 1 Hours**

Course Name: Basics of Automobile **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 four mark.
3. Answer all questions from section C, each question carries six mark.

Section – A

05X01 = 5 Marks

Q.1 The correct flow of power through the drive train is

a) Engine, gearbox, clutch, differential, wheels
b) Engine, differential, clutch, gearbox, wheels
c) Engine, clutch, differential, gearbox, wheels
d) Engine, clutch, gearbox, differential, wheels

Q. 2 The hydraulic braking system is work on the principle of

a) Joule's laws
b) Gas laws
c) Pascal's laws
d) Newton's laws

Q. 3 In a four stroke engine each cylinder has at least .....

a) One valve
b) Two valves
c) Three valves
d) Five valves

Q. 4 A machine member used to connect engine shaft and gear box is called...

a) Flywheel
b) Gear Box
c) Clutch
d) Differential

Q. 5 Four-wheel drive vehicles have differential on

a) Front wheels
b) Rear wheels
c) Both front and rear wheels
d) All of the above

Section – B

02X03 = 6 Marks

Q. 6 Define the term "Automobile".

Q. 7 List out the major components of IC engine.

Q. 8 Draw a labeled diagram of 4WD.

Section – C

03X03 = 9 Marks

Q. 9 Explain the process of 4-stroke diesel engine with the help of diagram.

Q. 10 Draw a labelled diagram of front-wheel drive vehicle.

Q. 11 What are the safety equipment used in mechanical shop? Write its name & advantages.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st /3rd / 5th Semester,

1st In-Sem. Examination

Course Code: AUT1115 **Time: 1 Hours**

Course Name: Basics of Automobile **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 four mark.
3. Answer all questions from section C, each question carries six mark.

Section – A

05X01 = 5 Marks

Q.1 The correct flow of power through the drive train is

a) Engine, gearbox, clutch, differential, wheels
b) Engine, differential, clutch, gearbox, wheels
c) Engine, clutch, differential, gearbox, wheels
d) Engine, clutch, gearbox, differential, wheels

Q. 2 The hydraulic braking system is work on the principle of

a) Joule's laws
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Q. 3 In a four stroke engine each cylinder has at least .....

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b) Two valves
c) Three valves
d) Five valves

Q. 4 A machine member used to connect engine shaft and gear box is called...

a) Flywheel
b) Gear Box
c) **Clutch**
d) Differential

Q. 5 Four-wheel drive vehicles have differential on

a) Front wheels
b) Rear wheels
c) Both front and rear wheels
d) All of the above

Section – B

02X03 = 6 Marks

Q. 6 Define the term "Automobile".

Ans: - An "Automobile" is a self-propelled vehicle driven by an internal combustion engine and is used for transportation of passengers and goods on ground. E.g.: Bus, car, Jeep etc...

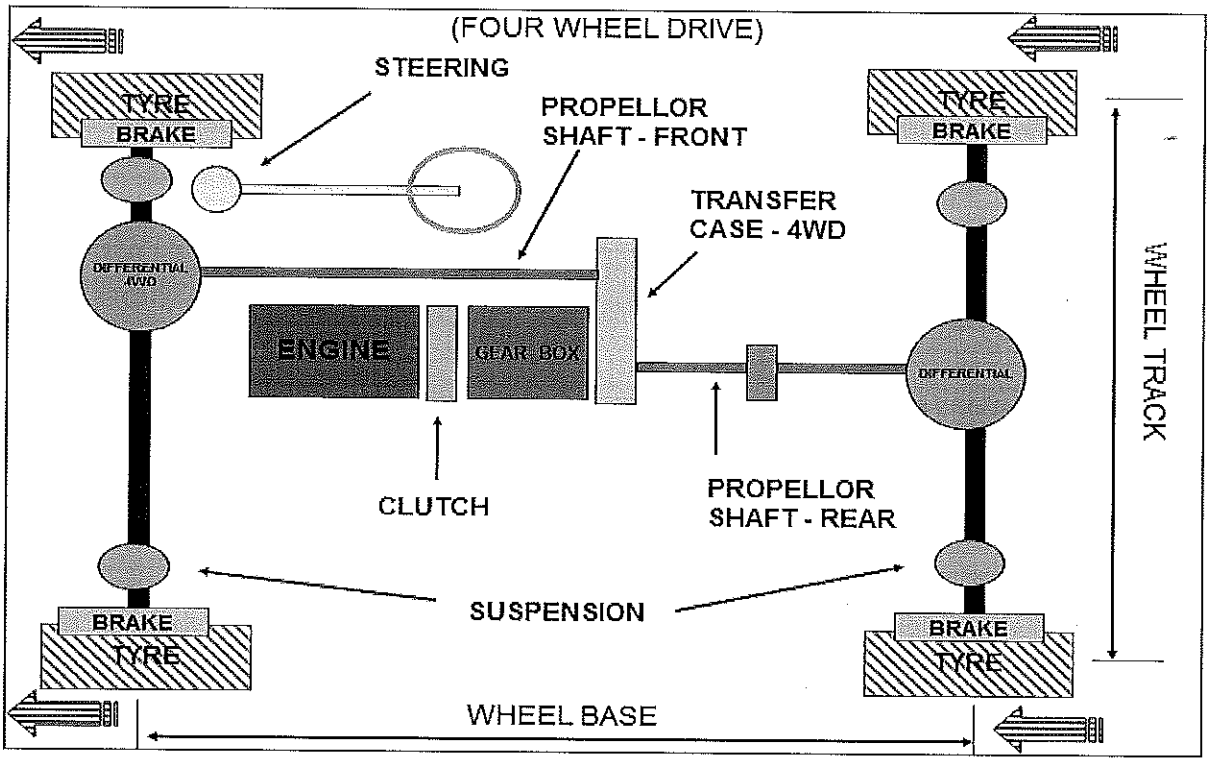
Q. 7 List out the major components of IC engine.

Ans: - The major components of an IC engine are as follows:

- Cylinder
- Cylinder head
- Piston
- Piston rings
- Gudgeon pin
- Connecting Rod
- Crankshaft
- Crankcase

Q. 8 Draw a labeled diagram of 4WD.

Ans: -



Section – C

03X03 = 9 Marks

Q. 9 Explain the process of 4-stroke diesel engine with the help of diagram.

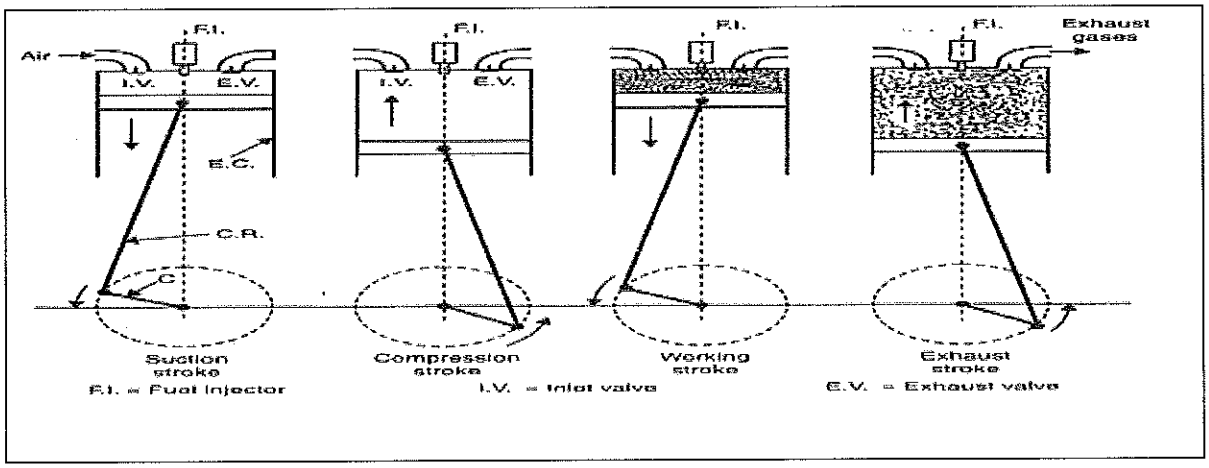
Ans: -

SUCTION STROKE: With the movement of the piston from T.D.C. to B.D.C. during this stroke, the inlet valve opens and the air at atmospheric pressure is drawn inside the engine cylinder; the exhaust valve however remains closed. This operation is represented by the line 5-1

COMPRESSION STROKE: The air drawn at atmospheric pressure during the suction stroke is compressed to high pressure and temperature as the piston moves from B.D.C. to T.D.C. Both the inlet and exhaust valves do not open during any part of this stroke. This operation is represented by 1-2

POWER STROKE OR EXPANSION STROKE: As the piston starts moving from T.D.C to B.D.C, the quantity of fuel is injected into the hot compressed air in fine sprays by the fuel injector and it (fuel) starts burning at constant pressure shown by the line 2-3. At the point 3 fuel supply is cut off. The fuel is injected at the end of compression stroke but in actual practice the ignition of the fuel starts before the end of the compression stroke. The hot gases of the cylinder expand adiabatically to point 4. Thus doing work on the piston.

EXHAUST STROKE: The piston moves from the B.D.C. to T.D.C. and the exhaust gases escape to the atmosphere through the exhaust valve. When the piston reaches the T.D.C. the exhaust valve closes and the cycle is completed. This stroke is represented by the line 1-5.



Q. 10 Draw a labelled diagram of front-wheel drive vehicle.

Ans:

Q. 11 What are the safety equipment used in mechanical shop? Write its name & advantages.

Ans: -

The safety equipment used in mechanical shop are as follows:

- Masks and Respirators.
- Eye Protection.
- **Gloves** and Hand Protection.
- Protective **Clothing**.
- Air plug
- Safety shoes
- Face shield

Advantages

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The purpose of Personal Protective Equipment (PPE) is to protect employees from exposure to work place hazards and the risk of injury. Before using or assigning PPE, steps should always be taken to eliminate or control hazards and work procedures should be in place to limit exposure to these hazards.