Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set-A (P

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2st In-Sem. Examination

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

Course Name: Automotive Power Train Chassis & 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) The distance between TDC and BDC is called .....
   a) Stroke
   b) Radius
   c) Bore
   d) All of the above
2) When piston is at BDC, the volume contained in the cylinder above the top of the piston is called.....
   a) Swept volume
   b) Clearance volume
   c) Total cylinder volume
   d) None of these
3) Clutch in the Automobiles is used to.....
   a) Start the engine
   b) Cut off the power transmitted to Gear box from engine.
   c) Change the gear
   d) Volume ratio
4) The word "Automobile" means:
   a) Auto-drive
   b) Self-Moving
   c) Self-controlling
   d) All of the above
5) The transmission system transmits.....from engine to wheel
   a) Speed
   b) Power
   c) Current
   d) Gear ratio

Section – B

03X02 = 06 Marks

6) Define the term "Automobile".
7) Write a short note on otto cycle.
8) Write a short note on Automotive Gears.

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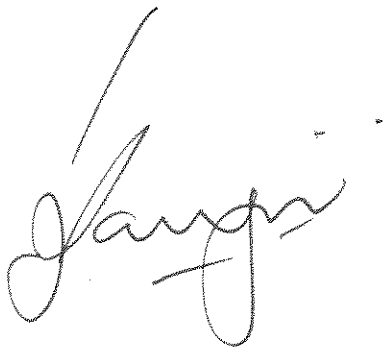
Section – C 03X03 = 09 Marks

9) What is 5S? Explain each of them with example.
10) What is clutch? Explain the working of single plate clutch.
11) Explain the working of 4-stroke diesel engine with the help of a diagram.



Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set-A
Answer Key

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2st In-Sem. Examination

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

Course Name: Automotive Power Train Chassis & 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) The distance between TDC and BDC is called .....
   a) Stroke
   b) Radius
   c) Bore
   d) All of the above

2) When piston is at BDC, the volume contained in the cylinder above the top of the piston is called.....
   a) Swept volume
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   c) Total cylinder volume
   d) None of these

3) Clutch in the Automobiles is used to.....
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   d) Volume ratio

4) The word "Automobile" means:
   a) Auto-drive
   b) Self-Moving
   c) Self-controlling
   d) All of the above

5) The transmission system transmits.....from engine to wheel
   a) Speed
   b) Power
   c) Current
   d) Gear ratio

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) Write a short note on otto cycle.

Ans.

- Process 1-2: Reversible adiabatic compression of air.
- Process 2-3: Heat addition at constant volume.
- Process 3-4: Reversible adiabatic expansion of air.
- Process 4-1: Heat rejection at constant volume.

8) Write a short note on Automotive Gears.

- Ans. Automotive gear and gear parts constitute an essential part of an automotive transmission system.
- These transmission parts are toothed wheels that comprises of interlinked set of rotating gears which are basically used for changing speed or direction of a moving vehicle.
- The size and dimension of the automotive gears differ according to the size of the vehicle.
- For covering smaller distances there are low gears and for larger distances there are high gears.
- High gears usually have more number of teeth and have an ability of covering larger distances in just one revolution of pedal.

Section – C 03X03 = 09 Marks

9) What is 5S? Explain each of them with example.

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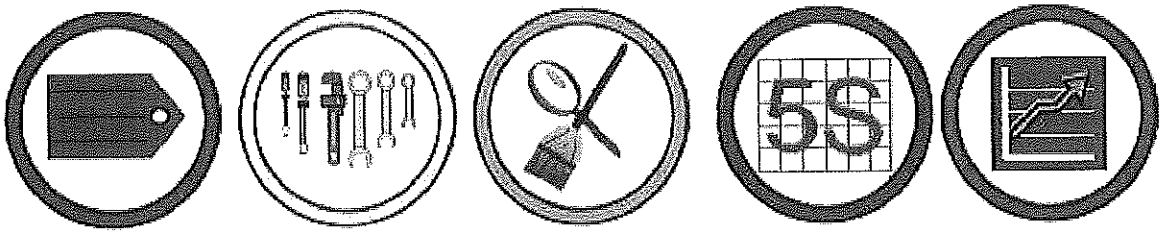
Ans.

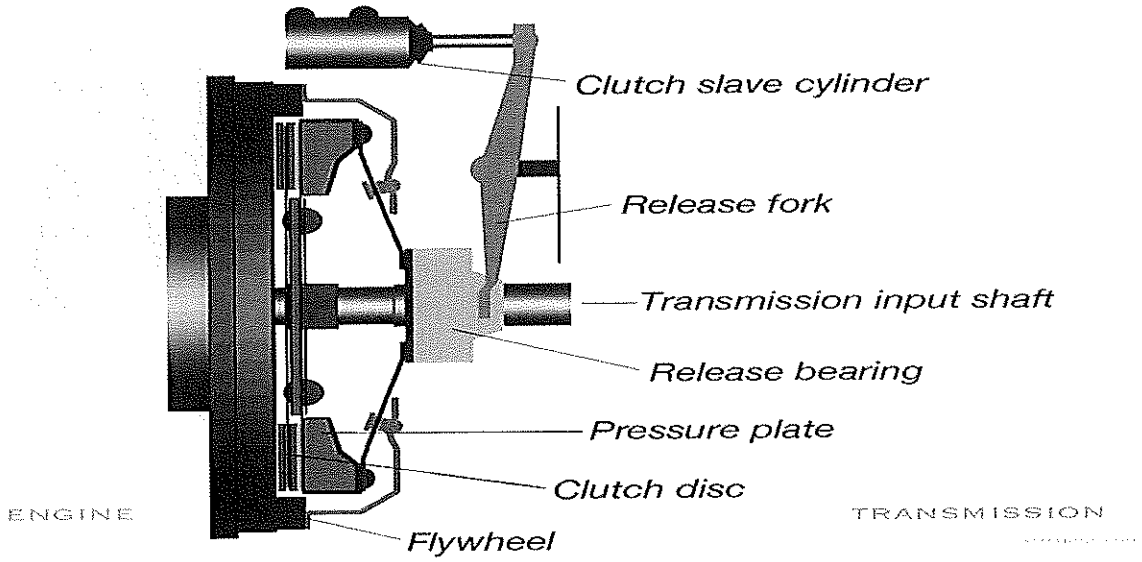
5S Explanation



Sort	Set in Order	Shine	Standardize	Sustain
When in doubt, move it out – Red Tag technique	A place for everything and everything in its place	Clean and inspect or Inspect through cleaning	Make up the rules, follow and enforce them	Part of daily work and it becomes a habit

10) What is clutch? Explain the working of single plate clutch.

Ans. In the single plate clutch a flywheel is fixed to the engine shaft and a pressure plate is attached to the gear box shaft. A friction plate is situated between the flywheel and pressure plate



11) Explain the working of 4-stroke diesel engine with the help of a diagram.

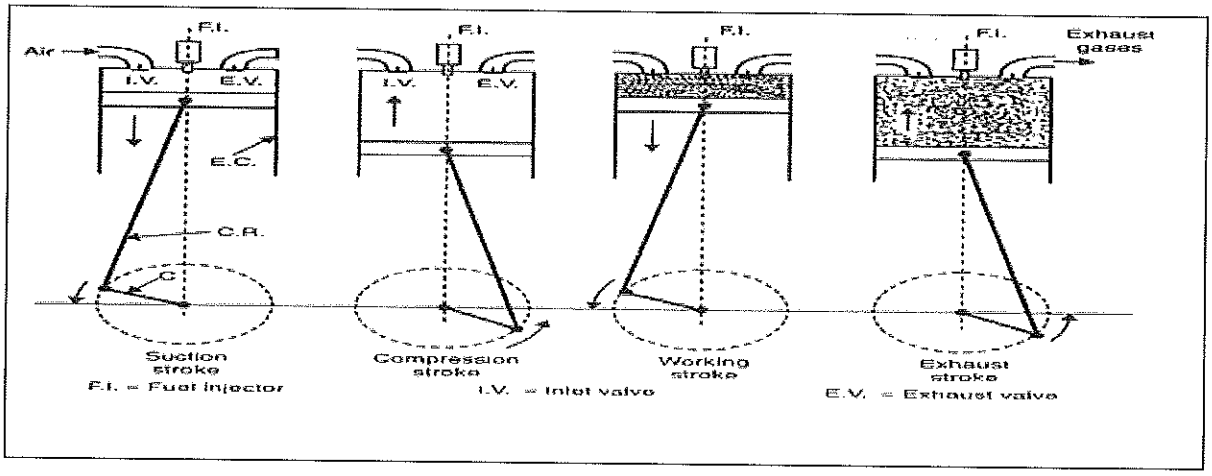
Ans.

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.



Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd 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 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

Q 1. After puncher of a tubeless tyre how long we can ride it further:

A. 30 miles.

B. 35 miles.

C. 50 miles.

D. 55 miles.

Q 2. What is Gerotor?

A. Negative displacement pump.

B. Positive displacement pump.

C. All of the above.

D. None of the above.

Q 3. Date of manufacturing on a tyre is given as:

A. 13-5-2018.

B. 13/05/2018.

C. 1318.

D. 13/18.

Q 4. Which material is used in manufacturing of wheel rims?

A. Plastic.

B. Fiber.

C. Copper.

D. Pressed steel disc.

Q 5. Which mechanism is used to turn the table in tyre changer equipment?

A. Electrical.

B. Manual.

C. Pneumatic.

D. None of these.

Section – B

03X02 = 06 Marks

Q 6. Define roles of a Wheel Care Technician in an Automotive Workshop.

Q 7. What is the difference between a tubeless tyre and a tube tyre?

Q 8. What is Tyre Pressure Monitoring Sensor (TPMS)?

Section – C

03X03 = 09 Marks

Q 9. Explain the following:

a) Tyre Width.

b) Aspect Ratio.

c) Radial Diameter.

Q 10. Explain Camber, Castor and Toe angles in detail.

Q 11. Explain the calibration process of wheel balancer.

Set A A.K.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd 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.
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Section – A

05x01 = 05 Marks

Q 1. After puncher of a tubeless tyre how long we can ride it further:

A. 30 miles.

B. 35 miles.

C. 50 miles.

D. 55 miles.

Answer: C. 50 miles.

Q 2. What is Gerotor?

A. Negative displacement pump.

B. Positive displacement pump.

C. All of the above.

D. None of the above.

Answer: B. Positive Displacement Pump.

Q 3. Date of manufacturing on a tyre is given as:

A. 13-5-2018.

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C. 1318.

D. 13/18.

Answer: C. 1318.

Q 4. Which material is used in manufacturing of wheel rims?

A. Plastic.
B. Fiber.
C. Copper.
D. Pressed steel disc.

Answer: D. Pressed Steel Disc.

Q 5. Which mechanism is used to turn the table in tyre changer equipment?

A. Electrical.
B. Manual.
C. Pneumatic.
D. None of these.

Answer: A. Electrical.

Section – B

03X02 = 06 Marks

Q 6. Define roles and 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.

Q 7. What is the difference between a tubeless tyre and a tube tyre?

Answer:

TUBE TYRE	TUBELESS TYRE
A tube inside a tire would simply collapse in case of puncture and the air in the tyre goes out in no time.	Tubeless tyre retains air pressure and helps avoid sudden air loss in the case of a puncture.

TUBE TYRE	TUBELESS TYRE
Fuel Efficiency	
Tube tyres are not so fuel efficient when compared to tubeless tyres.	Tubeless tyres are more fuel efficient.
Weight	
Tube tyres weigh more because of the tube placed inside them.	Tubeless tyres are light weight because of no tube inside the tyre.
In case of puncture	
The tube in the tube tyres will explode suddenly in case of puncture causing loss of control of the vehicle which may result in accidents.	Tubeless tyres make driving safe and easy and there is no loss of control of the vehicle in case of puncture.
Repair Process	
The puncture repairing process of tube tyre involves a complicated process of removing the tyre from the vehicle and removing tube from the tyre, etc.	The puncture repairing process of a tubeless tyre can be done without removing the tyre and is very simple compared to a tubed tyre.
Cost of Tyre	
The tube tyres are of less cost and are available in every size for every vehicle.	The tubeless tyres are costly and are not available for all types of vehicles.
Punctures	

TUBE TYRE	TUBELESS TYRE
The tube tyres are more prone to punctures because of the tubes placed in them.	The tubeless tyres are durable and last longer because of no tube is placed in them.
Repair Cost	
The tube tyre puncture repair cost is less when compared to that of the tubeless tyre.	The tubeless tyre puncture repair cost is very high and can be repaired instantly.

Q 8. What is Tyre Pressure Monitoring Sensor (TPMS)?

Answer:

A tire-pressure monitoring system (TPMS) is an electronic system designed to monitor the air pressure inside the pneumatic tires on various types of vehicles. TPMS report real-time tire-pressure information to the driver of the vehicle, either via a gauge, a pictogram displays, or a simple low-pressure warning light. TPMS can be divided into two different types – direct (dTPMS) and indirect (iTPMS). TPMS are provided both at an OEM (factory) level as well as an aftermarket solution. The target of a TPMS is avoiding traffic accidents, poor fuel economy, and increased tire wear due to under-inflated tires through early recognition of a hazardous state of the tires.

Section – C

03X03 = 09 Marks

Q 9. Explain the following:

a) Tyre Width.
b) Aspect Ratio.
c) Radial Diameter.

Answer:

a) Tyre width: The first three digits. This displays the width of the tyre in millimeters. A tyre marked 225 will measure 225mm across the tread from sidewall to sidewall.
b) Aspect ratio: The fourth and fifth digits of the tyre code that immediately follow the tyre width. So an aspect ratio of 55 for example means that the profile height of the tyre is 55% of its width.
c) Radial Diameter: It is the diameter from bead to bead of a tyre. It is denoted by "R". Example: R15 – Radial Diameter of 15 inches.

Q 10. Explain Camber, Castor and Toe angles in detail.

Answer:

Caster:

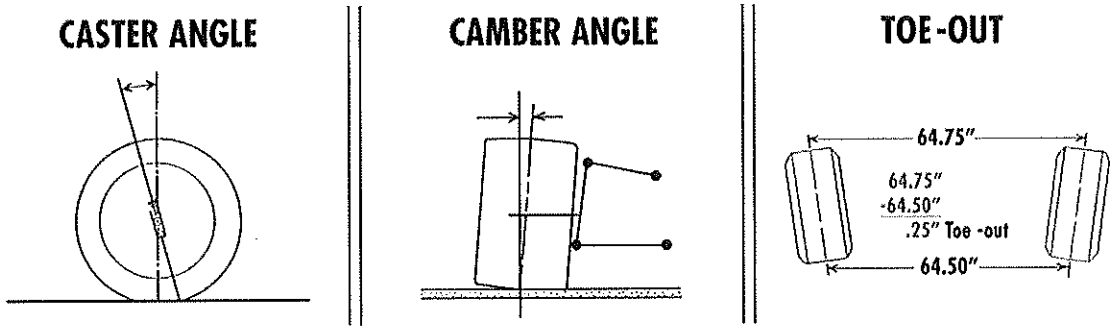
- This angle shows the forward or backward slope of a line drawn through the upper and lower steering pivot points, when viewed directly from the side of the vehicle.
- Also expressed in degrees, caster is measured by "comparing a line running through the steering system's upper and lower pivot points to a line drawn perpendicular to the ground,"

Camber:

- This suspension angle shows how the tire angles away from 0 degrees vertical when viewed from either the front or rear of the vehicle. Expressed in degrees, negative camber means the top of the tire tilts toward the centre of the vehicle, while positive camber means the top of the tire tilts away from centre.
- A visual cue for a camber problem is excessive tire wear on the inner or outermost ribs.

Toe:

- Identifies the direction tires are pointed relative to the centerline of the vehicle, when viewed from directly above. Toe can be expressed in either degrees or fractions of an inch.



Q 11. Explain the calibration process of wheel balancer.

Answer:

- Press F1 and SPIN
- The display will read "CAL Slu". Attach the round calibration weight in the threaded hole from the outer edge. See Figure 1
- Press SPIN again or lower the Wheel Guard to initiate the balancer spin cycle. The shaft will turn for about 15 seconds.
- The display will then change to "CAL 0". Remove calibration weight and Press SPIN or lower the wheel guard to perform second step of calibration. See Figure 2
- After another 15 second spin the display will read "CAL Good" to indicate a good calibration. Please secure the calibration weight in its proper place for safe keeping.

- Check again balancing.

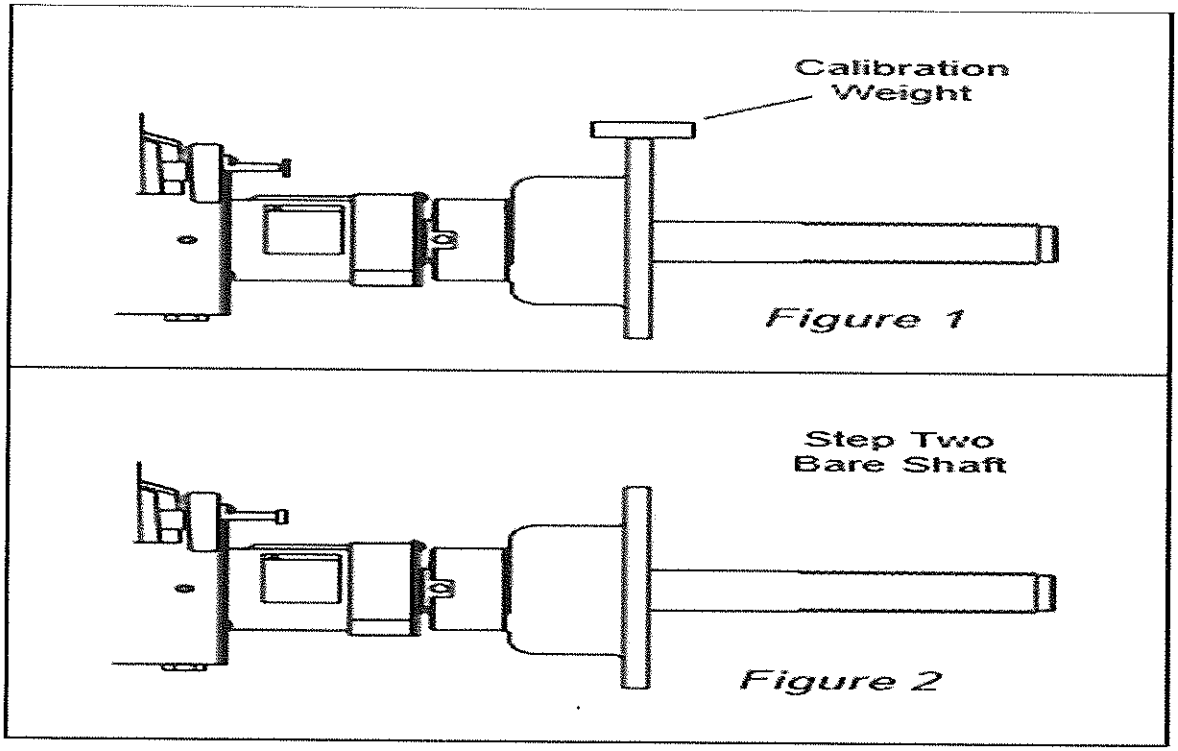


Figure 1

Figure 2

Set A 0P

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester

2nd In-Sem. Examination

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

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

Instruction:

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

Section-A

5x1=5 Marks

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

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

Q-2. Full form of MMAW is.....

a. Manual Mode Arc Welding
b. Manual Metal Arc Welding
c. Metal to Metal Arc Welding
d. None of the above

Q-3. Welding is type of..

a. Permanent joint
b. Solid Joint
c. Non-Permanent joint
d. All of the above

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. Monocoque is a.....

a. Body type
b. Vehicle type
c. Chassis type
d. Welding type

Section-B

3x2=6 Marks

Q-6. What are the purpose of Auto body repairer shop in the automotive workshop?

Q-7. Write a short note on Soldering?

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

Section-C

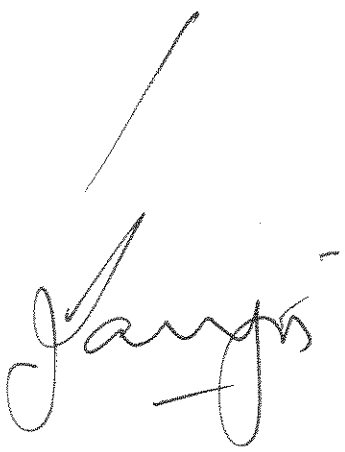
3x3=9 Marks

Q-9. Explain Different type of joints with the help of diagrams.

Q-10. What is MMA?Explain the working principle of MMA.

Q-11. Explain the following body types:

1. Sedan.
2. Hatchback.
3. Coupe.



A.Key Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester

2nd In-Sem. Examination

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Section-A

5x1=5 Marks

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

a. Blue
b. Green
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d. Red

Q-2. Full form of MMAW is.....

a. Manual Mode Arc Welding
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c. Metal to Metal Arc Welding
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a. Shoes
b. Gloves
c. Goggles
d. All of the above

Q-5. Monocoque is a.....

a. Body type
b. Vehicle type
c. Chassis type
d. Welding type

Section-B

3x2=6 Marks

Q-6. What are the purpose of Auto body repairer shop in the automotive workshop?

Ans.

- Automotive repair shops that specialize in bodywork repair are known as body shops.
- They offer paintwork repairs to scratches, scuffs and dents, as well as repairs to the bodies of vehicles damaged by traffic collisions.

Q-7. Write a short note on Soldering?

Ans.

- Soldering is normally done by melting the solder with a soldering iron and applying it to the two metals that are going to be joined together.
- The filler metal used in the process is called solder.
- Soldering is done temperature below 450°C

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

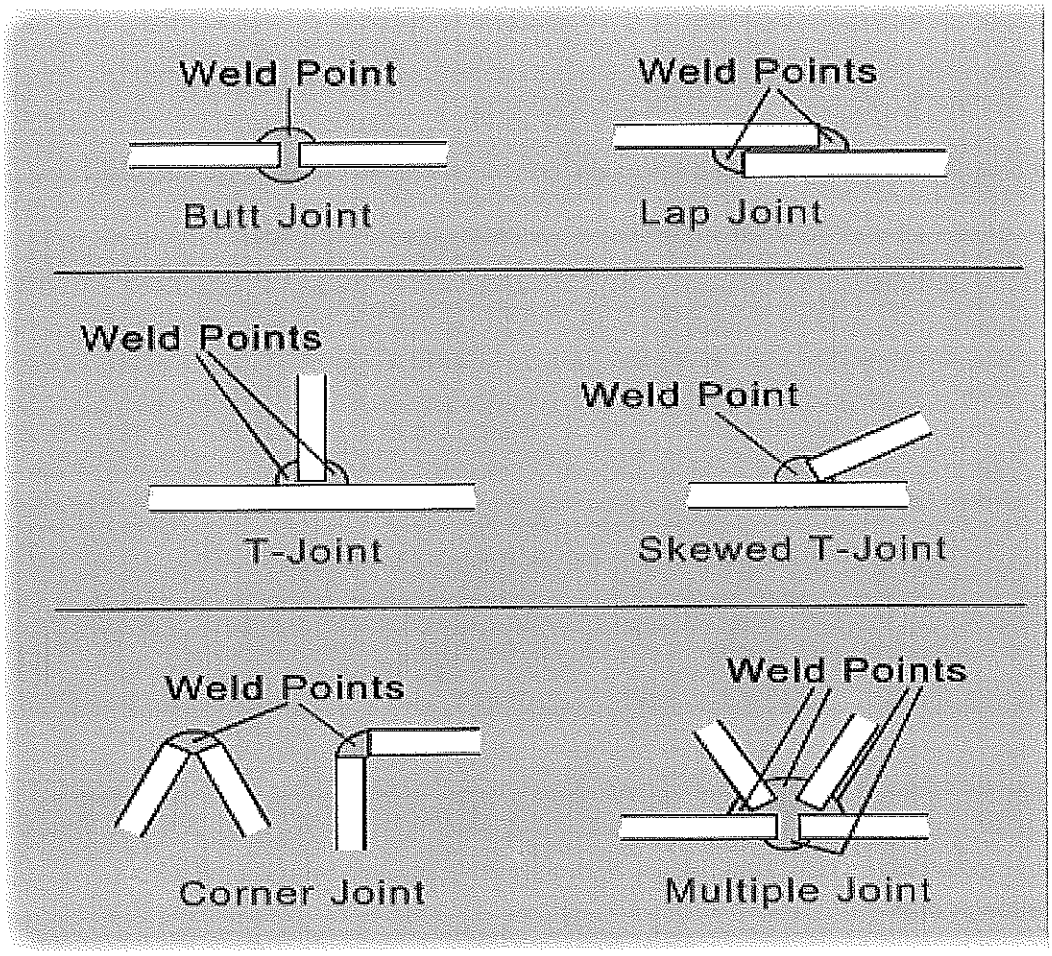
3x3=9 Marks

Q-9. Explain Different type of joints with the help of diagrams.

Ans.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY



Q-10. What is MMA?Explain the working principle of MMA.

- Ans. During this welding procedure, the work piece material is melted by the high temperature of an electric arc.
- The arc is struck between an electrode and the work piece.
- During welding, welding power source, the electrode, the arc and the work piece and electric circuit are required.
- This melts the electrode, which then serve as a filler metal for the weld seam.
- The temperature required of approx. 4000◦ C is achieved by the flow of an electric current of up to 1000 A.

- It is not possible to draw such powerful currents directly from the normal mains supply of 110 or 480 V.
- Such a procedure would also be extremely dangerous.
- Therefore, the line voltage is stepped down via special machines (welding power sources) to levels between 15 and 50 V, which makes possible higher current flows.
- Both direct current (DC) and alternating current (AC) can be used for welding.
-

Q-11. Explain the following body types:

1. Sedan.
2. Hatchback.
3. Coupe.

Ans.

1. Sedan

   This is one of the most popular body styles of cars today, with seating for at least four people.
   They're also called all-rounder that deliver both performance, space and business-friendly running costs.

Highlights:
Space, style and better mileage
Makes longer journeys comfortable
Decent passenger and cabin space
e.g. Honda City

Best for:
Executive drivers and family people

2. Hatchback

- Hatchbacks are more practical car.
- Best known for fun driving and suitable for small families.
- For everyday driving, hatchbacks can be a better option, thanks to its small size having less engine capacity, consume lesser fuel and provide better mileage.

Highlights:
Value for money
Better equipped
Comfortable & more practical
e.g. Maruti Suzuki Swift

Best for:
Everyday use
Small families

3. Coupe

A coupe is generally a two-door car that generally has either 2 seats or 4 seats placed in a 2+2 configuration.

It's normally called the sporty variants of sedan (saloon) body style.

Highlights:	**Best for:**
Beautiful design and unmatched style	Sports lovers
Majority of coupes are two-doors.	
Comfortable & gives you sporty feeling	
e.g. Audi A5	

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

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

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

Instruction: Attempt all questions.

Section – A

05X01 = 05 Marks

Q-1. Which substance acts as a bonding agent?

a. Putty
c. Hardener
b. Primer
d. None of these

Q-2. Which place is used to mix the paint?

a. Inside Paint booth
c. Outside paint booth
b. Paint mixing room
d. None of the above

Q-3. Which place is used for final painting?

a. Paint booth
c. Paint mixing room
b. Sanding room
d. None of the above

Q-4. Sanding process is required to...

a. Even the surface
c. Both (a) and (b)
b. Fill the holes
d. None of the above

Q-5. The substance used as an undercoat during painting is...

a. Primer
c. Thinner
b. Putty
d. None of these

Section – B

03X02 = 06 Marks

Q-6. Write short notes on paint mixing room.

Q-7. What is putty? also write its different types of putty.

Q-8. What are the job responsibilities of a paint shop technician?

Section – C

03X03 = 09 Marks

Q-9. What is primer? Explain different properties of primer.

Q-10. What is dry sander? Explain different components of pneumatic dry sander.

Q-11. What is sanding? Explain types of sanding.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

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

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

Instruction: Attempt all Questions.

Section – A

05X01 = 05 Marks

Q-1. Which substance acts as a bonding agent?

a. Putty
c. Hardener
b. Primer
d. None of these

Ans: (b) primer

Q-2. Which place is used to mix the paint?

a. Inside Paint booth
c. Outside paint booth
b. Paint mixing room
d. None of the above

Ans: (B) Paint mixing room

Q-3. Which place is used for final painting?

a. Paint booth
c. Paint mixing room
b. Sanding room
d. None of the above

Ans: (A) Paint Booth

Q-4. Sanding process is required to...

a. Even the surface
c. Both (a) and (b)
b. Fill the holes
d. None of the above

Ans: (A) Even the Surface

Q-5. The substance used as an undercoat during painting is...

a. Primer
c. Thinner
b. Putty
d. None of these

Ans: (A) Primer

Section – B

03X02 = 06 Marks

Q-6. Write short notes on paint mixing room?

Ans: Paint mixing room is a place where we mix the the paints according to the requirements.

It should have colour-corrected artificial lighting and downdraft ventilation.

Paint mix rooms are generally located next to the spray booth to maximise painter productivity.

Q-7. What is putty and write its different types?

Ans: Putty is a material with high plasticity, similar in texture to clay.

• Painter's Putty is typically used for filling holes, minor cracks, scratches etc.

There are three types of putty/body fillers:-

1. Standard
2. Mid-range
3. Premium

Q-8. What are the responsibilities of a paint shop technician?

Ans: 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

- To identify and utilise the correct methods of working by using your experience, skills, training and industry knowledge,
- To keep your skills up-to-date by making appropriate efforts to acquire adequate knowledge of new vehicles.

To identify and report all apparent faults considered to be advisable in the interest of safety and reliability

Section – C

03X03 = 09 Marks

Q-9. What is primer? Explain different properties of primer.

Ans: Primers are the most common undercoats used when refinishing car bodies. • Primer is a bonding agent which enables a bond between the surface underneath it and the paint that will be sprayed on top.

Basically, primers are categorized in 2 parts: -

1. 1-k primers
2. 2-k primers

Adhesion – they provide a strong bond between the sheet metal or old paint and the new paint • Rust resistance – they resist the formation of rust where they adhere to the sheet metal

• Build– they're able to fill sanding and grinding marks in old paint, sheet metal and fillers

• Sanding ease – they can be sanded smooth and levelled quickly and easily

• Hold out – they prevent the paint from soaking in, which results in a dull finish

• Drying speed – a good high-build primer should be ready to sand in as little as 30 minutes

Q-10. What is dry sander? Explain different components of pneumatic dry sander.

Ans: A sander is a tool that's used to smooth a vehicle's surface before painting.

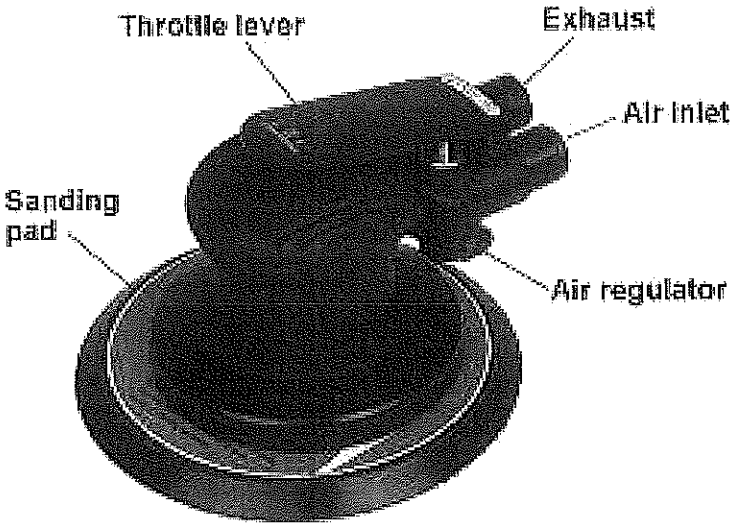
• Sanders are useful for a variety of tasks, including removing old paint and varnish, buffing, and polishing.

There are three primary types of sanders for cars:

• Air sanders

• Hand sanders

• Electric sanders



Q-11. What is sanding? Explain types of sanding.

Ans: Sanding removes the top layer of your car's paint using abrasive materials. It also helps to make the surface even after the putty application by removing extra putty from the surface.

Function of sanding in car repairing

Removal of material. • Preparation of surfaces (adhesion promoter). • Smoothing and surface embellishment. • Reparation of defects.

Types of sanding

1. Manual sanding. • Wet sanding • Dry sanding

2. Automatic sanding.

Manual sanding:• Manual or hand sanding is the oldest known method of sanding used. • It only uses when the machine cannot be used, such as sanding small and hard surfaces access, etc..

The hand sanding can be done using 2 techniques: • Water sanding or wet sanding • Dry sanding.

1. Water sanding: - • Water or wet sanding is done by immersing the sandpaper in a bucket of water. • It produces less dust, longer life of the sandpaper and allows obtain a smooth surface compared with dry sanding.

2. Dry sanding: - • Dry sanding is applied directly on the surface. • This type of sanding causes excessive dust resulting abrasive action of the grain on the surface.

Automatic sanding: • Automatic sanding is done by sanding machines called as sanders. • Greatly reduces the effort and time of work compared to hand sanding. • The main disadvantage is that sanders not arrive well in difficult areas or edges, where it is necessary sand by hand.

QP Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session 2020-21, Summer Semester

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

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

Course Name: Automotive Electrical Fundamentals & Comfort System

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

Q 1. OBD used in scanning the sensor faults in an Automotive vehicle stands for....

A. Over Board Diagnostic.
C. On Board Display.
B. On Board Data.
D. On Board Diagnostic.

Q 2. Mixed-Signal Circuits in an Automotive electronics is also known as.....

A. Combined Circuits.
C. Hybrid Circuits.
B. Joint Circuits.
D. Series-Parallel Circuit

Q 3. What are the modes of Heat transfer in a thermodynamic system?

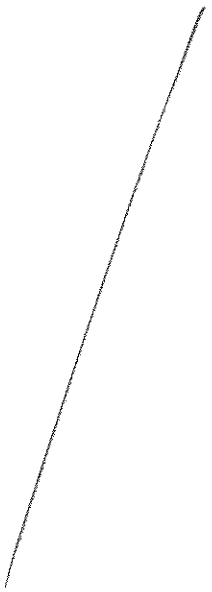
A. Transmission.
B. Induction.
C. Conduction, Convection and Radiation.
D. None of the above.

Q 4. The charging system:

A. Provides all electrical energy to operate the electrical system while the engine is running.
B. Restores the energy to the battery after starting the engine.
C. Uses the principle of magnetic induction to generate electrical power.
D. All of the above.

Q 5. A parking light takes 0.5A current, its resistance is 24 Ω. What is the voltage of the lamp?

A. 12 Volts.
C. 10 Volts.
B. 24 Volts.
D. 48 Volts.



Section – B

03X02 = 06 Marks

Q 6. Define the following:

a. Coefficient of performance.

b. Heat Engine.

c. Heat Pump.

d. Refrigerator.

Q 7. Explain Thermodynamic System.

Q 8. What do you understand by insulators? Name any four applications of insulators in an automotive electrical.

Section – C

03X03 = 09 Marks

Q 9. Write down the advantages and disadvantages of VCRS over Air Refrigeration System..

Q 10. Write a short note on:

a) Electrostatic Effects.

b) Ohm's Law.

c) Multimeter.

Q 11. Solve the following problems:

a) One cable is damaged on the insulation. A residual current of 5.5A flows at a voltage of 48V. What is the resistance at the damaged area?

b) If 500μA flow at 250mV, then what will be the resistance in the circuit?

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session 2020-21, Summer Semester

B. Voc. Program, 1st Semester,

1st In-Sem. Examination

Course Code: AUT1105

Course Name: Automotive Electrical Fundamentals & Comfort System

Section – A

05x01 = 05 Marks

Q 1. OBD in scanning the sensor faults in an Automotive vehicle stands for....

Answer: D. On Board Diagnostic.

Q 2. Mixed-Signal Circuits in an Automotive electronics is also known as.....

Answer: C. Hybrid Circuits.

Q 3. What are the modes of Heat transfer in a thermodynamic system?

Answer: C. Conduction, Convection and Radiation

Q 4. The charging system:

Answer: D. All of the above.

Q 5. A parking light takes 0.5A current, its resistance is 24 Ω. What is the voltage of the lamp?

Answer: A. 12 Volts.

Section – B

03X02 = 06 Marks

Q 6. Define the following:

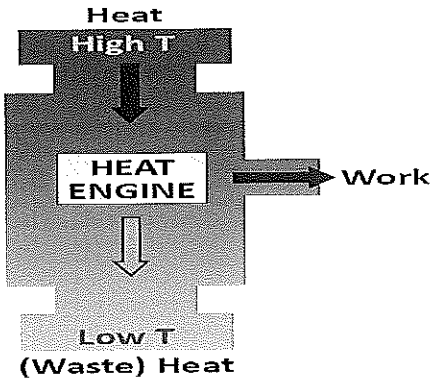
a. Coefficient of performance.
b. Heat Engine.
c. Heat Pump.
d. Refrigerator.

Answer:

a. 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. While CoP is a very simple measure of performance,

it is typically not used for industrial refrigeration in North America. Owners and manufacturers of these systems typically use performance factor (PF).

b. In thermodynamics and engineering, a heat engine is a system that converts heat or thermal energy—and chemical energy—to mechanical energy, which can then be used to do mechanical work. It does this by bringing a working substance from a higher state temperature to a lower state temperature.

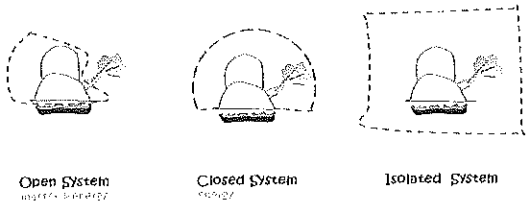


c. A heat pump is a device that transfers heat energy from a source of heat to what is called a thermal reservoir. Heat pumps move thermal energy in the opposite direction of spontaneous heat transfer, by absorbing heat from a cold space and releasing it to a warmer one.

d. A refrigerator (colloquially fridge) consists of a thermally insulated compartment and a heat pump (mechanical, electronic or chemical) that transfers heat from the inside of the fridge to its external environment so that the inside of the fridge is cooled to a temperature below the room temperature. Refrigeration is an essential food storage technique in developed countries.

Q 7. Explain Thermodynamic System.

1. **Answer:**
2. • 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.
3. • The simplest state of a thermodynamic system is a state of thermodynamic equilibrium, as opposed to a non-equilibrium state. A system is defined as quantity of matter or a region in space chosen for study. Everything external to the system is surrounding. Thermodynamic system and surrounding is always separated by the boundary.



4. • The system can be separated from its surrounding by a wall or without a wall.
5. • When the state of its content varies in space, the system can be considered as many systems located next to each other, each being a different thermodynamical system.
6. • A thermodynamic system is subject to external interventions called thermodynamic operations; these alter the system's walls or its surroundings; as a result, the system undergoes thermodynamic processes according to the principles of thermodynamics. (This account mainly refers to the simplest kind of thermodynamic system; compositions of simple systems may also be considered.)

Q 8. What do you understand by insulators? Name any four applications of insulators in an automotive electrical.

Answer:

Insulators are the materials or substances which resist or don't allow the current to flow through them. They are mostly solid in nature and are finding use in a variety of systems. They do not allow the flow of heat as well. The property which makes insulators different from conductors is its resistivity.

Application of insulators:

1. Thermal Insulators, disallow heat to move from one place to another. We use them in making thermoplastic bottles, in fireproofing ceilings and walls.
2. Sound Insulators help in controlling noise level, as they are good in absorbance of sound. Therefore, we use them in buildings, conference halls, and buildings to make them noise-free
3. Electrical Insulators hinder the flow of electron or passage of current through them. We use them extensively in circuit boards, high-voltage systems and also in coating electric wire and cables.

Section – C

03X03 = 09 Marks

Q 9. Write down the advantages and disadvantages of VCRS over Air Refrigeration System.

1. **Answer:**
2. **Advantages:**
3. • Size is small when compared to an air refrigeration system for a given capacity of refrigeration.
4. • Volume of refrigerant circulated is low. Hence the running cost is low.
5. • High coefficient of performance.
6. • The operating temperature range is huge.
7. • The temperature at the evaporator can be easily controlled by regulating expansion valve.

8. • It requires smaller evaporator.

9. Disadvantages:

10. • High initial cost, costly refrigerant.

11. • Environmental hazardous refrigerant involved.

12. • Must ensure the prevention of leakage of refrigerant.

Q 10. Write a short note on:

a) Electrostatic Effects.

b) Ohm's Law.

c) Multimeter.

Answer:

a) Electrostatic effects: Electrostatics is a branch of physics that studies electric charges at rest. Since classical physics, it has been known that some materials such as amber attract lightweight particles after rubbing. The Greek word for amber, or electron, was the source of the word 'electricity'. Electrostatic phenomena arise from the forces that electric charges exert on each other. Such forces are described by Coulomb's law. Even though electrostatically induced forces seem to be rather weak, some electrostatic forces such as the one between an electron and a proton, that together make up a hydrogen atom, is about 36 orders of magnitude stronger than the gravitational force acting between them.

b) Ohm's Law: Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points. Introducing the constant of proportionality, the resistance, one arrives at the usual mathematical equation that describes this relationship:

$$I=V / R$$

c) Multimeter: A multimeter or a multitester, also known as a VOM (volt-ohm-milli-ammeter), is an electronic measuring instrument that combines several measurement functions in one unit. A typical multimeter can measure voltage, current, and resistance. Analog multimeters uses a micro-ammeter with a moving pointer to display readings. Digital multimeters (DMM, DVOM) have a numeric display, and may also show a graphical bar representing the measured value. Digital multimeters are now far more common due to their lower cost and greater precision, but analog multimeters are still preferable in some cases, for example when monitoring a rapidly varying value.

Q 11. Solve the following problems:

a) One cable is damaged on the insulation. A residual current of 5.5A flows at a voltage of 48V. What is the resistance at the damaged area?

Solution:

Given: Voltage (V) = 48 V.

Current (I) = 5.5 A.

w.k.t. by Ohm's Law,

V = IR

48 = 5.5 x R

⇨ R = 48/5.5

⇨ **R = 8.73 Ohms** (Resistance at the damaged area of the cable).

b) If 500μA flow at 250mV, then what will be the resistance in the circuit?

Solution:

Given: Voltage (V) = 250 mV = 250 x 10^{-3} V.

Current (I) = 500 μA = 500 x 10^{-6} A.

w.k.t. by Ohm's Law,

V = IR

⇨ R = 250 x 10^{-3} / 500 x 10^{-6}

⇨ **R = 500 Ohms** (Resistance in the circuit).

CO P SO1 A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

Course Code: AUT1106 **Time: 1 Hour**

Course Name: Automotive Tools & Measurement **Max. Marks: 20**

Instruction: Attempt all Questions.

Section – A

05X01 = 05 Marks

Q-1. In first angle projection object is kept between observer & plane of projection:

a. True.

b. False.

c. None of the above.

Q-2. Tolerance can be defined as:

a. Permissible variation of specified dimension.

b. Unilateral dimension.

c. Bi-Lateral dimension.

d. Both (a) &(b).

Q-3. A ..... view is obtained making an imaginary cut through the part.

a. Front View.

b. Side View.

c. Sectional View.

d. Top View.

Q-4. When the tolerance distribution is only on one side of the basic size, it is known as:

a. Unilateral tolerance.

b. Bilateral tolerance.

c. None of the above.

Q-5. Which value can be the reading of an instrument having least count = 50μm ?

a. 19.05

b. 18.062

c. 19.06

d. 18.006

Section – B

03X02 = 06 Marks

Q-6. Calculate the least count of a Vernier Caliper, the 49 division of main scale is coinciding with 50 divisions of Vernier scale (MSD = 1 mm).

Q-7. Name the instruments & accessories used for technical drawing.

Q-8. Write short notes on chisels.

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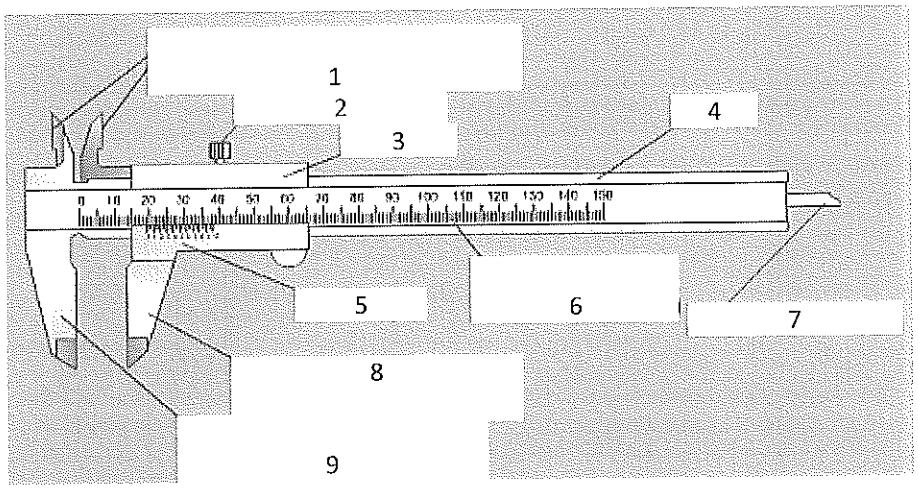
Section – C

03X03 = 09 Marks

Q-9. What do you understand by measuring? And how can you differentiate between direct measuring & indirect measuring?

Q-10. Differentiate between first angle projection & third angle projection.

Q-11. Name the different parts of the following measuring instrument:



A.Roy Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

Course Code: AUT1106 **Time: 1 Hour**

Course Name: Automotive Tools & Measurement **Max. Marks: 20**

Instruction: Attempt all Questions.

Section – A

05X01 = 05 Marks

Q-1. In first angle projection object is kept between observer & plane of projection:

a. True.

b. False.

c. None of the above.

Q-2.Tolerance can be defined as:

a. Permissible variation of specified dimension.

b. Unilateral dimension.

c. Bi-Lateral dimension.

d. Both (a) &(b).

Q-3. A ..... view is obtained making an imaginary cut through the part.

a. Front View.

b. Side View.

c. Sectional View.

d. Top View.

Q-4. When the tolerance distribution is only on one side of the basic size, it is known as:

a. Unilateral tolerance.

b. Bilateral tolerance.

c. None of the above.

Q-5. Which value can be the reading of an instrument having least count = 50μm ?

a. **20.05**

b. 20.062

c. 20.06

d. 20.006

Section – B

03X02 = 06 Marks

Q-6. Calculate the least count of a Vernier Caliper, the 49 division of main scale is coinciding with 50 divisions of Vernier scale (MSD = 1 mm).

Ans:

Q-7. Name the instruments & accessories used for technical drawing.

Ans:

a. Drawing Board.
b. Drawing sheet.
c. Mini-drafter.
d. Set Squares.
e. Compasses.
f. Divider.
g. Pencils/ lead sticks/ pencil sharpener/ eraser, etc.

Q-8. Write short notes on chisel.

Ans:

The cold chisel is a hand cutting tool used by fitters for chipping and cutting off operations

Chipping is an operation of removing excess metal with the help of a chisel and hammer

Chip surface being rough should be finished by filing

Section – C

03X03 = 09 Marks

Q-9. What do you understand by measuring? And how can you differentiate between direct measuring & indirect measuring?

Ans:

Measuring is a process by means of which a measured value is determined by comparing a given size with a statutory unit of measure.

Direct measuring: In this, the object to be measure is compared directly with the known dimension.

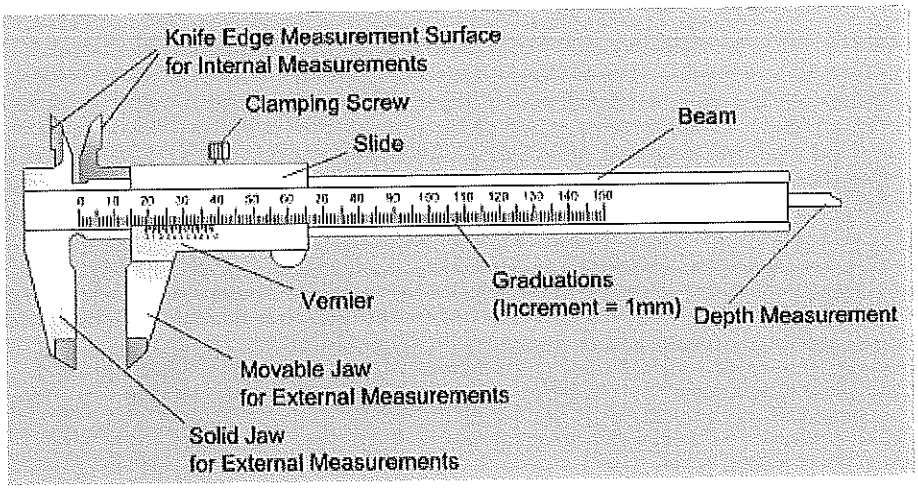
In-direct measuring: In this, the dimension is transferred from the measuring tool to the workpiece with the assistance of intermediate equipment.

Q-10. Differentiate between first angle projection & third angle projection.

Ans:

First angle projection	Third angle projection
Object is kept in the first quadrant	Object is assumed to be kept in 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 is 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 (plane) view is drawn below the XY line	Top (plane) view is drawn above the XY line
Left view is projected on the right plane & vice versa	Left view is projected on the left plane itself.
Followed in India, European countries.	Followed in USA.

Q-11. Name the different parts of the following measuring instrument:



Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Question Paper

School of Automotive Skills

1st Semester 2nd In-Sem. Examination

B. Voc. Program, Summer Semester (2020-21)

Course Code: AUT1110 **Time: 1 Hour**

Course Name: Basics of Automobiles **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

Q 1. Which type of clutch is used in motorcycles cars?

A. Single Plate clutch.
B. Multi Plate clutch.
C. Cone clutch.
D. Centrifugal clutch.

Q 2. The major function of a gearbox in an automobile is to:

A. Generate the mechanical power.
B. Transmit the mechanical power.
C. Generate the electrical power.
D. Transmit the electrical power.

Q 3. The speed of vehicle is moderate at:

A. Neutral.
B. Second gear.
C. Top gear.
D. Engine Idling speed.

Q 4. Sanders are used to:

A. Smooth vehicle's surface before painting.
B. Removing dent.
C. Body painting.
D. None of the above.

Q 5. While performing grinding in the body repair shop, which personal protective equipment is used?

A. Safety goggles.
B. Ear plugs.
C. Safety shoes.
D. All of the above.

Section – B

03X02 = 06 Marks

Q 6. Write classification of the clutch used in an automobile

Q 7. Explain engine intake air supply system.

Q 8. Describe diaphragm clutch in detail.

Section – C

03X03 = 09 Marks

Q 9. Explain engine lubrication system.

Q 10. Explain IC engine working.

Q 11. Explain the gearbox in detail.

Set A Answer key

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Question Paper

School of Automotive Skills

1st Semester 2nd In-Sem. Examination

B. Voc. Program, Summer Semester (2020-21)

Course Code: AUT1110 **Time: 1 Hour**

Course Name: Basics of Automobiles **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

Q 1. Which type of clutch is used in motorcycles?

A. Single Plate clutch.
B. Multi Plate clutch.
C. Cone clutch.
D. Centrifugal clutch.

Answer: B

Q 2. The function of clutch in an automobile is to:

A. Generate the mechanical power.
B. Transmit maximum mechanical power.
C. Generate the electrical power.
D. Transmit the electrical power.

Answer: B

Q 3. The speed of vehicle is moderate at:

A. Neutral.
B. Third gear.
C. Top gear.
D. Engine idling speed.

Answer: B

Q 4. Dolly and Hammers are part of:

A. Body repair
B. Painting
C. Sanding

D. None of the above.

Answer: A

Q 5. While performing painting, which personal protective equipment/s is/are necessary?

A. Safety goggles.

B. Respiratory mask.

C. Safety shoes.

D. All of the above.

Answer: D

Section – B

03X02 = 06 Marks

Q 6. Write the classification of gearbox used in an automobile

There are three basic types of gearboxes:

• Sliding-mesh • Constant-mesh • Synchro-mesh

Q 7. Explain engine intake air supply system.

AIR INTAKE SYSTEM

This system allows fresh air to enter the engine. Its main parts are: (i) air cleaner, (ii) supercharger (auxiliary unit), (iii) intake manifold, (iv) intake port and (v) intake valve.

Q 8. Describe function of clutch in detail

Function of transmitting the torque from the engine to the drivetrain.

Smoothly deliver the power from the engine to enable smooth vehicle movement.

Perform quietly and to reduce drive-related vibration.

Protect the drivetrain when given the inappropriate use. Given the situation, the Exedy clutch will fail when giventhe inappropriate use inturn to protect the rest of the drivetrain, similar to the function of an electric fuse.

Section – C

03X03 = 09 Marks

Q 9. Explain engine lubrication system and its importance.

LUBRICATION SYSTEM

IC engine is made of moving parts. Duo to continuous movement of two metallic surfaces over each other, there is wearing of moving parts, generation of heat and loss of power in engine. Lubrication of moving parts is essential to prevent all these harmful effects.

Purpose of lubrication-

1. Reducing frictional effect
2. Cooling effect
3. Sealing effect
4. Cleaning effect Types of lubricants

Lubricants are obtained from animal fat, vegetables and minerals. Vegetable lubricants are obtained from seeds, fruits and plants. Cotton seed oil, olive oil, linseed oil, caster oil are

used as lubricants. Mineral lubricants are most popular for engines and machines. It is obtained from crude petroleum found in nature.. Petroleum lubricants are less expensive and suitable for internal combustion engines

Engine lubrication system

The lubricating system of an engine is an arrangement of mechanisms which maintains the supply of lubricating oil to the rubbing surfaces of an engine at correct pressure and temperature.

The parts which require lubrication are

1. Cylinder walls and piston]
2. Piston pin
3. crankshaft and connecting rod bearings
4. Camshaft bearings
5. Valve operating mechanism
6. Cooling fan
7. Water pump and
8. Ignition mechanism

Types of lubricating systems

1. Splash system
2. Forced feed system

Q 10. Explain IC engine ignition system.

IGNITION SYSTEM

Fuel mixture of IC engine must be ignited in the engine cylinder at proper time for useful work. Arrangement of different components for providing ignition at proper time in the engine cylinder is called Ignition system

Types of ignition systems

1. Ignition by electric spark or spark ignition
2. Ignition by heat of compression or compression ignition
3. Ignition by hot tube or hot bulb
4. Ignition by open fire

Only the first two are important methods for modern engines

SPARK IGNITION

The purpose of spark ignition is to deliver a perfectly timed surge of electricity across an open gap in each cylinder at the exact moment so that the charge may start burning with maximum efficiency

Two types of spark ignition are a) Battery ignition b) magneto ignition

Q 11. Explain the gearbox in detail.

Gear Box Working Principle:

A Gear Box is an assembly consisting of various gears, synchronizing sleeves and gear-shifting mechanism fitted inside a metal housing. The metal housing usually made of

aluminium/iron casting accommodates all the gears in it. Gearbox is a part of the 'transmission' system as the gears play an important role in transmitting the engine power to the wheels.

A gear box contains gears of different sizes. This is mainly because of the varying demands of the vehicle in terms of the torque required at the wheels depending upon the road, terrain & load. For e.g., if a vehicle is climbing a slope, it needs higher torque as compared to while cruising on a straight road.

In a gear box, the first gear is biggest in size and provides maximum torque output while producing minimum speed. Hence, it is used when climbing slopes. All the gears between 1st and last gear vary in size; in a decreasing ratio. Thus, it provides a varying combination in terms of pulling ability and speed. So, the vehicle could be driven smoothly without any drop in its acceleration. The gear box basically improves the vehicle's driveability in all conditions.