QP Set-A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester

2nd In-Sem. Examination

Course Code: AUT1301 **Time: 1 Hour**

Course Name: Automotive Power Train **Max. Marks: 20**

Instruction:

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

Section-A

5x1=5 Marks

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

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

Q-2. In water cooling system the heat dissipates from engine to coolant in which heat transfer mode?

a. Radiation
b. Convection
c. Conduction
d. None of the above

Q-3. Special tool used for removing the piston rings is...

a. Piston ring compressor
b. Piston ring expander
c. Dial indicator
d. All of the above

Q-4. The ECU uses which sensor to supply the fuel through indicator...

a. Oxygen sensor
b. Coolant temperature sensor
c. Air mass flow sensor
d. All of the above

Q-5. The full form of CRDI is:

a. Common rail diesel injection
b. Common rail dual injection
c. Common rail direct injection
d. None of the above

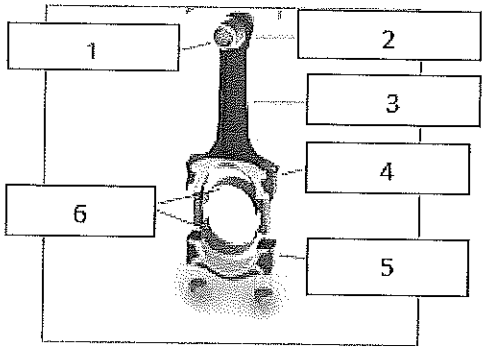
Section-B

3x2=6 Marks

Q-6. What are the special tool required for engine overhauling?

Q-7. write down the components of carburetor?

Q-8. Label the connecting rod diagram?



Section-C

3x3=9 Marks

Q-9. Explain air cooling and water cooling system?

Q-10. Draw the layout of S.I. engine fuel supply sytem and explain the procedure.

Q-11. Explain the types of carburetors on the basis of jet position .

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Sol. Set A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester

2nd In-Sem. Examination

Course Code: AUT1301 **Time: 1 Hour**

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Section-A

5x1=5 Marks

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a. Common rail diesel injection
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c. Common rail direct injection
d. None of the above

Section-B

3x2=6 Marks

Q-6. What are the special tool required for engine overhauling?

Ans. A. Piston ring compressor B. Piston ring Plier

C. Oil filter wrench D. Clutch alignment tools

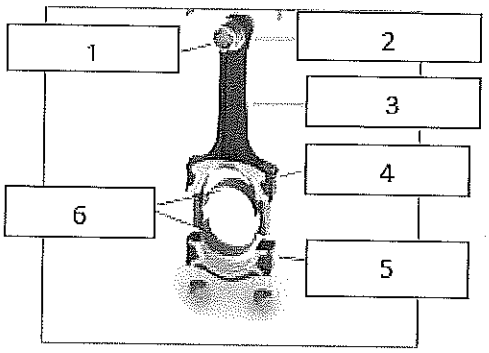
E. Valve spring compressor

Q-7. write down the components of carburetor?

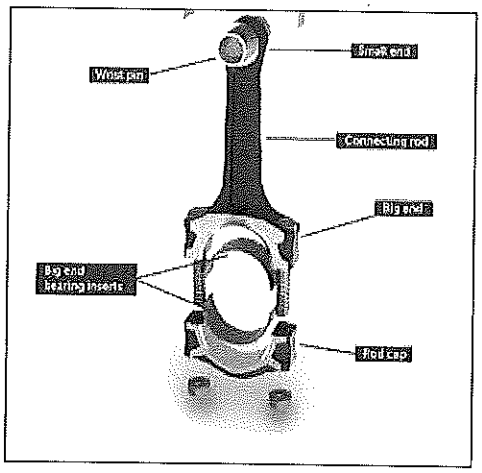
Ans. The main parts of carburettor are: -

- Float chamber
- Fuel jet
- Venturi
- Nozzle
- Throttle valve

Q-8. Label the connecting rod diagram?



Ans.



Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section-C

3x3=9 Marks

Q-9. Explain air cooling and water cooling system?

Ans. **Air cooling:**

In this method, current of air flowing continuously over the heated metal from where the heat is to be removed. The heat dissipated depend upon following factors are: -

1. Surface area of metal contact with air.
2. Mass flow rate of air.
3. Temperature difference between the heated surface and air.
4. Conductivity of metal

Water cooling:

Colling medium used is water. In this, the engine cylinder is surrounded by water jackets through which the cooling water flows.

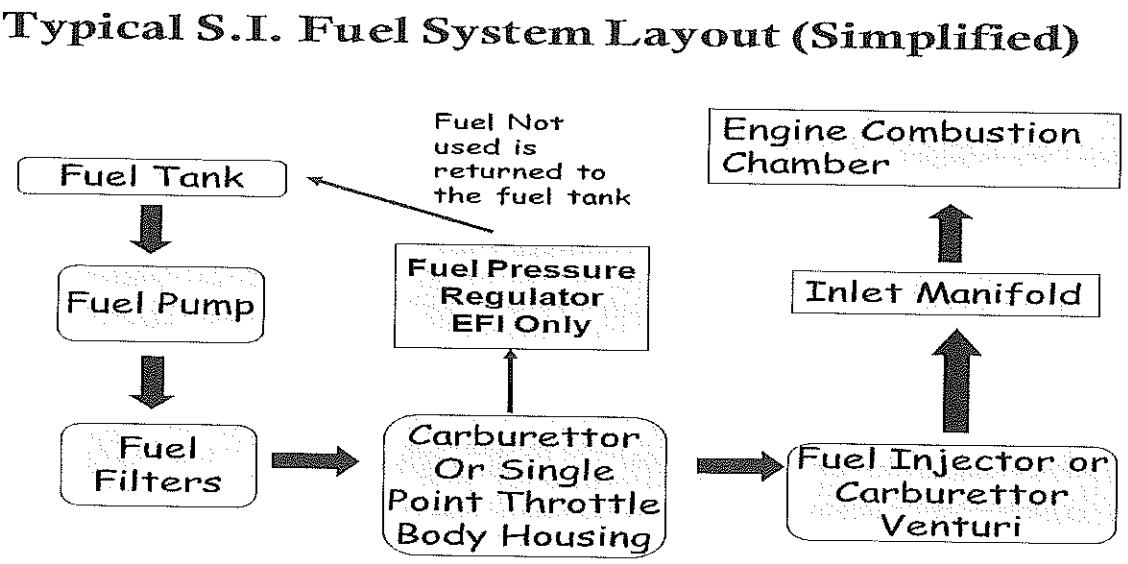
Heat flows from the cylinder walls into water which goes to radiator where it loses its heat to air. Some antifreeze is added to cooling water, due to which it is often referred to as coolant

Water cooling systems are of two types: -

1. Thermosiphon system
2. Pump circulation system

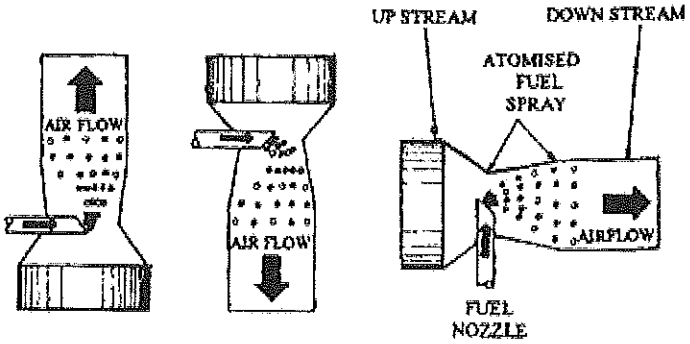
Q-10. Draw the layout of S.I. engine fuel supply sytem and explain the procedure.

Ans.



Q-11. Explain the types of carburetors on the basis of jet position .

Ans. 1. Up draught type. 2.down druaght 3. Horizontal type



Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

QP-Set -A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

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

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

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

05X01 = 05 Marks

1. Which one of them is the heart of braking system?

   a) Master cylinder b) brake lever
   c) Brake booster d) E.C.U

2. Service brakes can also be called as: -

   a) Foundation brake b) Base brake
   c) Hydraulic brake d) Both a & b

3. Which type of axle doesn't transfer any power to the wheels?

   a) Live Axle b) Dead Axle
   c) Full floating Axle d) None of above

4. Which of these sensor is used in ABS system?

a) Wheel speed sensor
b) TPMS
c) Vehicle speed sensor
d) Both a and b

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

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

Section – B

03X02 = 06 Marks

6. Explain two types of caliper.
7. What is the role of brake lever?
8. Write a short note on the followings: -
   a. ABS
   b. ESP

Section – C

03X03 = 09 Marks

9. Explain the working of hydraulic braking system with the help of diagram.

10. What do you mean by Slip in wheels? Explain

11. Write a short note on the following: -

    a. Semi-Floating axle
    b. Three quarter floating axle

21 Dec 2020

S01. S04.A

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

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

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

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

05X01 = 05 Marks

1. Which one of them is the heart of braking system?

   a) Master cylinder b) brake lever
   c) Brake booster d) E.C.U

2. Service brakes can also be called as: -

   a) Foundation brake b) Base brake
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3. Which type of axle doesn't transfer any power to the wheels?

   a) Live Axle b) Dead Axle
   c) Full floating Axle d) None of above

4. Which of these sensor is used in A.B.S system?

a) Wheel speed sensor
b) TPMS
c) Vehicle speed sensor
d) Both a and b

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

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

Section – B

03X02 = 06 Marks

6. Explain two types of caliper.

- Ans. **Fixed caliper:** The **fixed brake caliper** is the earliest design. The fixed caliper has a body manufactured in two halves, and uses two, four, or six pistons to apply the brake pads. The fixed caliper gets its name from the fact that the caliper is rigidly mounted to the suspension. When the brakes are applied, the pistons extend from the caliper bores and apply the brake pads with equal force from both sides of the rotor. No part of the caliper body moves when the brakes are applied.

  When the brakes are applied, the caliper piston moves out of its bore and applies the inner brake pad. At the same time, the caliper body moves in the opposite direction on the anchor plate and applies the outer brake pad. With a floating or sliding caliper, the caliper body moves every time the brakes are applied.

- **Floating & Sliding caliper:** The front brakes of most vehicles are fitted with either floating or sliding calipers, which are *not* rigidly mounted. The caliper is free to move within a limited range on an **anchor plate** that *is* solidly mounted to the vehicle suspension. The anchor plate may be cast into a suspension member (often the front spindle) or it can be a separate piece that bolts to the suspension.

7. What is the role of brake lever?

Ans. Braking system is the most important part of any vehicle which is used to stop the vehicle from running situation to stationary condition. For controlling the power of engine to the wheels. We must require large force to stop the vehicle. This force is generated or initiated by the lever in traditional braking system. It generates the momentum force due to lower support mechanism so that the applied force outcomes with the greater force due to Force * length.

As much as the length is the outcome force is higher.

8. Write a short note on the followings: -

a. A.B.S.

Ans. Antilock braking systems (ABS) help prevent the wheels from locking during sudden braking, especially on slippery surfaces. This helps the driver maintain control. Antilock brakes increase safety because they eliminate lockup and minimize the danger of skidding, allowing the vehicle to stop in a straight line. ABS also allows the driver to maintain steering control during heavy braking so the vehicle can be steered to avoid an obstacle or another vehicle.

On dry or wet pavement, maximum braking traction occurs when tire slip is held between approximately 15% and 30%.

b. E.S.P

Ans. The electronic stability program (ESP®) supports the driver in nearly all critical driving situations. It comprises the functions of the antilock braking system (ABS) and the traction control system, but can do considerably more. It detects vehicle skidding movements, and actively counteracts them.

Section – C

03X03 = 09 Marks

9. Explain the working of hydraulic braking system with the help of diagram.

Ans.

In addition to the mechanical advantage provided by leverage, all vehicles use hydraulic pressure to help increase brake application force. All braking systems require that a driver's force is transmitted to the drum or rotor attached to each wheel.

- The force that can be exerted on the brake pedal varies due to the strength and size of the driver. Engineers design braking systems to require less than 150 lb of force (68 kg) from the driver, yet provide the force necessary to stop a heavy vehicle from high speed.

10. What do you mean by Slip in wheels? Explain

Ans. Quite simply, wheel slip occurs when the force applied to a tire exceeds the traction available to that tire. Force is applied to the tire in two ways: Longitudinally -- Longitudinal force comes from the torque applied to the tire by the engine or by the brakes. It tends to either accelerate or decelerate the car.

11. Write a short note on the followings: -

a. Semi-Floating axle

- Ans. The semi-floating rear axle is shown in the diagram The short rear axle shaft inner end is supported only be the differential side gear. The differential case carries the inner bearing between it and the axle shaft housing that supports it. The inner end of the axle shaft is thus relieved of the task of supporting the weight of the vehicle. The weight of the vehicle is supported by the axle housing. Now the outer end of the axle supports the weight of the vehicle and takes up end thrust. Hence, this construction is called Semi floating rear axle.
- The inner end of the axle shaft is splined to the differential side gear. The outer end is flanged and the wheel is bolted directly to it.

b. Three quarter floating

- Ans. The three quarter floating axle is shown in picture In this axle, the wheel hub is supported by the single bearing located in the centre of the wheel hub. The wheel hub runs on the axle housing. The axle shaft is keyed rigidly to the wheel hub. This arrangement provides the driving connection and maintains the alignment of the wheel.
- The construction at the inner end of the axle shaft is the same as with the semi floating type. This axle is not supported by bearings at either end. The three quarter floating axle has only one bearing at the outer end. It is not as quite as the full floating type.

CP-Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

Course Code: AUT 1303 **Time: 1 Hour**

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

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words will be found.

Section – A

05X01 = 05 Marks

1. How many panels are there in a vehicle?
   a. 8
   b. 12
   c. 13
   d. None of the above
2. .....is a stamped steel or moulded plastic sheet that forms a body part.
   a. Auto body Panel
   b. Chassis
   c. Frame
   d. Body shell
3. What is the full form of CRS?
   a. Color refinish system
   b. Crash Reform System
   c. Color Re-Polish System
   d. Crash Repair System
4. Which of the following would you use while preparing bare metal surface for corrosion protection?
   a. Sanding with Coarse Sand paper
   b. Sanding with coarse powder
   c. Lacquer Thinner
   d. Wash with hot water and soap
5. Which of the following material is denser in physical property?
   a. Polyester putty
   b. Epoxy primer
   c. Body filler
   d. None of the above

Section – B

03X02 = 06 Marks

6. Write the steps to remove the door of the vehicle.
7. How Rear quarter panel can be removed from the vehicle?
8. Write any four difference between traditional dent repair and paint less dent repair.

Section – C

03X03 = 09 Marks

9. Explain the working of Seat Belt.
10. Explain the process of Door Skin Removal in an Automotive vehicle.
11. Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Sol.Set-A

Registration No.: .....

School of Automotive Skills

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B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

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Section – B

03X02 = 06 Marks

6. Write the steps to remove the door of the vehicle.

Ans.

a. Removing the Control Panel and Door Latch

b. Lift the door latch and remove the screw attaching it to the panel.

c. Use a pair of pliers to pull the door latch off of the panel.
d. Wedge a screwdriver into the lower edge of the control panel and pry it up.
e. Disconnect the wires from the control panel to remove it.
f. Remove the clip wire and pull off the window crank if there is one.
g. Insert a screwdriver into the edge of the armrest cover and pry it off.
h. Pry off the cover at the edge of the window with a screwdriver.
i. Remove the speaker cover and screws and pull it off if there is one.
j. Pry off any screw covers from the door panel with a screwdriver.
k. Remove the fastening screws from the panel.
l. Grab the door panel at the top and bottom and wiggle it
m. Pull the door panel straight out with your hands to remove it.

7. How Rear quarter panel can be removed from the vehicle?

Ans.

Step 1

Unscrew the lug nuts on the left and right front wheel using a tire iron. Use a car jack to raise the front end of the vehicle and rest the front end onto jack stands. Pull the wheels off the frame.

Step 2

Unscrew the screws that are holding the cover in place inside the wheel well and remove the wheel well cover from the frame.

Step 3

Locate the bolts inside the wheel well that are holding the quarter panel in place on the vehicle's frame. Find the right-size socket in the socket set that matches the securing bolts. Remove the bolts using the ratchet and socket.

Step 4

Open the hood of the vehicle and locate the bolts on the side of the engine compartment that are securing the quarter panel to the frame. Remove the bolts using the ratchet and socket.

Pull the quarter panel off the frame.

8. Write any four difference between traditional dent repair and paint less dent repair.

Ans.

it restores the original look of your vehicle without the need of bodywork or repainting (both decrease the value of your vehicle). Traditional auto body repair relies on chemicals throughout the process. PDR restores the metal to its original shape without the need for any of the additional materials.

paint less Dent Repair can remove a variety of dents, dings, and body creases. PDR is a specialized technique utilized to restore vehicles to their factory condition quickly and cost

effectively. Additionally, if there is no damage to the paint, the dent, ding, or crease is likely repairable using PDR.

Section – C

03X03 = 09 Marks

9. Explain the working of Seat Belt.

Ans.

1. Pull on the seatbelt to try and release it from its auto-lock function.
2. Pry off the plastic covers that hold the seatbelt mechanism with a screwdriver or needle nose pliers.
3. Pull the seatbelt out completely.
4. Untangle the seatbelt if there are any jams in it.
5. Allow the seatbelt to roll back into place.

10. Explain the process of Door Skin Removal in an Automotive vehicle.

Ans.

1. Door frame preparation
2. Clean the frame
3. Replacement skin prep.
4. Dry fit panel
5. NVH replacement
6. Apply bonding adhesive.
7. Install door skin
8. Clamp and cure
9. Seam sealing

11. Write any six difference between chemical paint removal and Dry sanding with coarser abrasives.

Ans. **Chemical paint remover**

Caustic paint removers, typically sodium hydroxide (also known as lye or caustic soda), work by breaking down the chemical bonds of the paint, usually by hydrolysis of the chain bonds of the polymers forming the paint. Caustic removers must be neutralized or the new finish will fail prematurely.
many are absorbed readily through the skin or are inhaled easily, some paint stripping chemicals can irritate the skin and eyes or cause headaches, drowsiness, nausea, dizziness, or loss of coordination.

Dry Sanding

Dry sanding abrasive paper usable over a wide range, from base adjustment of metal and woodworking polishing to coating film polishing. Dry sanding requires small circles. This way, each successive pass works to remove the scratches from the previous one.

Dry sanding is a lot less labor intensive, is less time consuming, and more times than not, creates more of a professional look. The smoother finish is better achieved through the mechanical process of the sander than the physical process of the sponge.

OP-301A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

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

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

Instruction:

1. All the questions are compulsory to attend.
2. Students are not allowed to bring any smart device or cell phone in the exam hall.
3. Marks will be deducted if any overwriting in words is found.

Section – A

05X01 = 05 Marks

1. What are the primary colors?
   a. Red, yellow Blue
   b. Blue, violet and Green
   c. Green, Orange and Red
   d. None of the above
2. Which light is best for inspection of Automotive Paint?
   a. Sunlight
   b. 3000 lux White light
   c. Artificial Sunlight
   d. All of the above
3. When light reflects on the color, it seems to be different color under different light sources. What is this phenomenon called?
   a. Color Spectrum
   b. Light simulation
   c. Gloss of color
   d. Metamerism
4. What is the full form of VOC?
   a. Violin organic compound
   b. Volatile organic compound
   c. Volatile organic component
   d. All of the above
5. Which of the following paint layer is not the part of refinish painting?
   a. Polyester putty
   b. Electrostatic dip coat primer
   c. Body filler
   d. Epoxy primer

Section – B

03X02 = 06 Marks

6. Write the steps for Primer Application
7. Define Metamerism.
8. What are the causes of Runs on the panels?

Section – C

03X03 = 09 Marks

9. Explain the process for refinish Painting?
10. What are the causes for mottling? How it can be repaired?
11. What are the causes of orange peel on the panel? Explain its prevention and remedies?

S01. Set-A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

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   c. Body filler
   d. Epoxy primer

Section – B

03X02 = 06 Marks

6. Write the steps for Primer Application.

   Ans. These are the following steps taken under consideration for primer application.

   1. Inspect the panel of the vehicle.
   2. Identify the uneven surface.
   3. Dry sand the panel for body filler/putty application.

Note :- Body filler and putty is applied depends on the condition of the panel.

4. Dry sand the putty/Body filler by applying dry sander.
5. Use dry guide coat for even surface during sanding.
6. Apply 2K Primer on the panel with the help of 1.8 mm nozzle Spray gun.
7. Sand the primer with P320 disc and 400 soft disc on the corners and edges.
8. Degrease the panel.

7. Define Metamerism.

Ans. Metamerism is the effect where a colour that appears the same shade to a second colour under certain conditions, for example, in daylight, may look totally different in other conditions – for example, when viewed in artificial light such as garage or street lighting.

8. What are the causes of Runs on the panels?

Ans. Paint drips are usually caused by applying too much paint to your project in a single coat, typically from an overloaded paintbrush. Gravity causes the excess paint to run, and as it begins to dry, the paint congeals in visible drips.

Section – C

03X03 = 09 Marks

9. Explain the process for refinish Painting?

Ans.

a. Cleaning the surface: - Begin by completely removing the older coatings and bringing the substrate back in the form of a bare metal. ...
b. Repairing the surface: - Deep dents should be completely removed before starting to get repaired.
c. Get it primed: -
d. Apply base coat: -
e. Apply the top coat: -

10. What are the causes for mottling? How it can be repaired?

Ans. This is when the metallic particles in a refinishing material "float" together and can form a streaking pattern or "tiger stripes." One of the common causes of mottling is a spray gun being held too close to the surface causing the refinishing material to be applied to wet.it can be prepared by increasing the distance and overlapping of the paint on the substrate.

11. What are the causes of orange peel on the panel? Explain its prevention and remedies?

Ans.

- Spray gun held too far from object.
- Spray pressure too low (poor atomisation)
- Paint film too thin.
- Viscosity too high (paint too thick)

- Hardener and/or thinner too fast for the conditions or size of object.
- Spray nozzle too small.
- Flash-off time too long between coats.

Op-Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

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

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

Instruction:

1. Attempt all the questions.

2. Draw neat and clean diagram.

Section – A

05X01 = 05 Marks

1. The instrument whose output varies continuously is known as the_____instrument: -
   (A) analogue (B) Digital
   (C) Both A and B (D) None of these
2. The_____ is utilized in permanent magnet moving coil instruments: -
   (A) Force between two current carrying coil
   (B) Force between two permanent magnet carrying coil
   (C) Force between current carrying coil and permanent magnet
   (D) None of these
3. The accuracy of the_____electronic instrument is very much high: -
   (A) analogue (B) digital
   (C) Both A and B (D) None of these
4. The_____in digital instrument is used to convert non-electrical or physical quantities into an electrical quantity: -
   (A) Transducer (B) Signal modifier
   (C) Display device (D) None of these
5. The _____ is the heart of the CRO: -
   (A) Focusing Anode (B) Heater
   (C) cathode-ray tube (D) None of these

Section – B

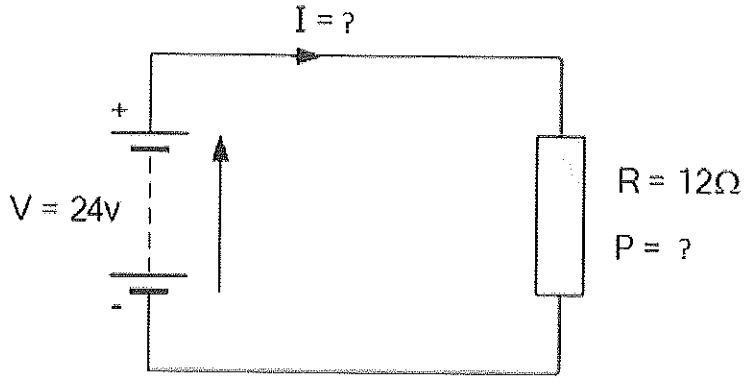
03X02 = 06 Marks

1. What is Ohms law triangle?
2. Explain the procedure of measuring the AC voltage by digital multimeter.
3. What are the advantages and disadvantages of analogue multimeter?

Section – C

03X03 = 09 Marks

1. Explain the construction of digital instruments with the help of diagram.
2. Explain the digital multimeter in detail.
3. Find the value of Current (I) and Power (P) for the circuit shown below:



21 Dec 2020

Sol. Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Automotive Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

Course Code: AUT1305

Course Name: Automotive Electrical Fundamental & AC

Section – A

05X01 = 05 Marks

1. The instrument whose output varies continuously is known as the_____instrument: -
   (A)analogue
2. The_____ is utilized in permanent magnet moving coil instruments: -
   (C)Force between current carrying coil and permanent magnet
3. The accuracy of the_____electronic instrument is very much high: -
   (B)digital
4. The_____in digital instrument is used to convert non-electrical or physical quantities into an electrical quantity: -
   (A)Transducer
5. The _____ is the heart of the CRO: -
   (C) cathode-ray tube

Section – B

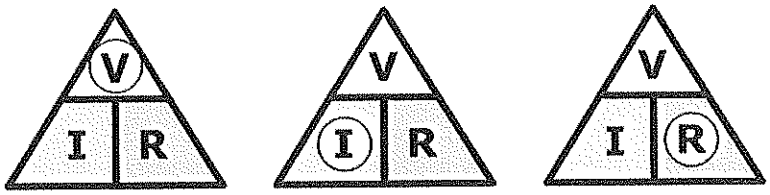
03X02 = 06 Marks

1. What is Ohms law triangle?

Ans.

Ohms Law Triangle

- Transposing the standard Ohms Law equation above will give us the following combinations of the same equation:



$V = I \times R$ $\quad I = \frac{V}{R}$ $\quad R = \frac{V}{I}$

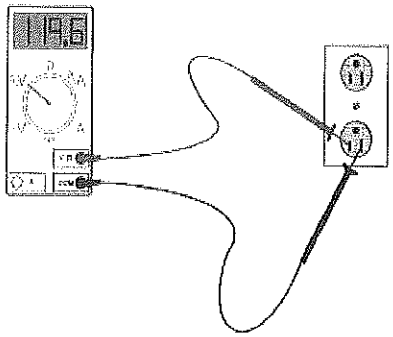
- Then by using Ohms Law we can see that a voltage of 1V applied to a resistor of 1Ω will cause a current of 1A to flow and the greater the resistance value, the less current that will flow for a given applied voltage. Any Electrical device or component that obeys "Ohms Law" that is, the current flowing through it is proportional to the voltage across it ($I \alpha V$), such as resistors or cables, are said to be **"Ohmic"** in nature, and devices that do not, such as transistors or diodes, are said to be **"Non-ohmic"** devices.

2. Explain the procedure of measuring the AC voltage by digital multimeter.

Ans.

AC VOLTAGE MEASUREMENT

1. Connect the red test lead to "V.Ω. mA" jack and the black test lead to the "COM" jack.
2. Set the rotary switch at desired ACV position.
3. Connect test leads across the source or load being measured.
4. Read voltage value on the LCD display.



3. What are the advantages and disadvantages of analogue multimeter?

Ans.

Advantages of Analog Multimeter

- A sudden change in signal can detect by analog multimeter more swiftly than a digital multimeter.
- All measurements are possible by using one meter only.
- Increase or decrease in signal levels can be observed.

Disadvantage of Analog Multimeter

- Analog meters are bulky in size.
- They are bulky and costly.
- The pointer movement is slow, can't be used to measure voltages with frequencies higher than 50 HZ.
- Inaccurate due to the effect of earth magnetic field.
- They are vulnerable to shock and vibration.

Section – C

03X03 = 09 Marks

1. Explain the construction of digital instruments with the help of diagram.

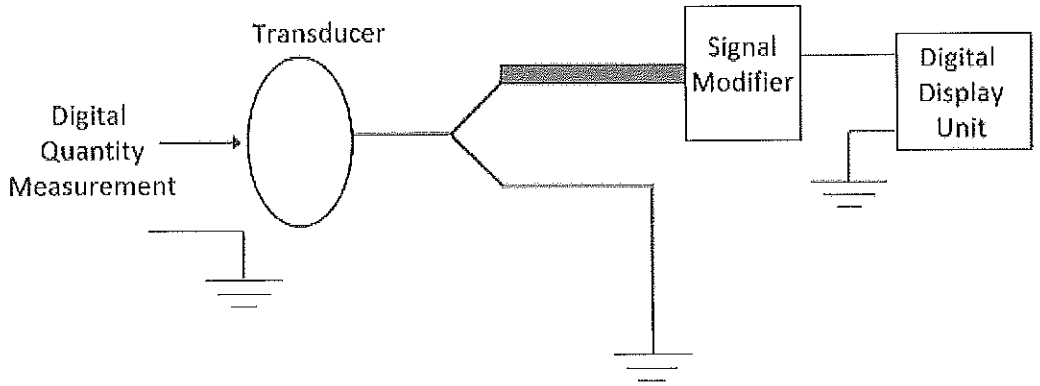
Ans.

Digital Instrument

- The digital instrument gives the output in the numeric form. The instrument is more accurate as compared to the analogue instrument because no human error occurs in the reading.
- The instrument which represents the measurand value in the form of the digital number is known as the digital instruments. It works on the principle of quantization. The quantization is the process of converting the continuous input signal into a countable output signal.
- The construction of the digital instrument is very complex, and their cost is also very high. The digital instruments consume very less power as compared to analogue instruments. The digital multimeter, digital voltmeter, digital frequency meter, etc. are the examples of the digital instruments.

Construction of Digital Instrument

- The construction of the digital instrument is shown in the figure below.
- The transducer, signal modifier and the display devices are the important part of the digital instrument.



Digital Instrument

- **Transducer** – The transducer is used for converting the non-electrical or physical quantities (temperature, displacement etc.) into an electrical quantity like voltage, current etc. which is easily measured by the meter. The transducer is not required for the electrical input.
- **Signal Modifier** – It is used for modifying the input signal of very weak strength.
- **Display Device** – The display device is used for showing the measurand quantities in the numeric form. Mostly, LED or LCD is used as a digital display.

2. Explain the digital multimeter in detail.

Ans.

Digital multimeter

- **Digital multimeter** is a test equipment which offers several electronic measurement task in one tool. It is also known as the voltmeter or Ohm meter or Volt Ohm meter. The standard and basic measurements performed by multimeter are the measurements of amps, volts, and ohms. Apart from that, these digital multimeters perform many additional measurements by using digital and logic technology. These may include temperature, frequency, continuity, capacitance etc. The new improved integrated circuits of **digital multimeter** are more efficient, faster and work with a large accuracy as compared to an analogue multimeter.
- But in the case of additional features, it is not accurate but close to the reading. A good multimeter is that has continuity and packed with smart features, including the ability to log and graph data and great for troubleshooting.

Parts of Digital Multimeter

- A multimeter is a simple but useful device which has only three parts; Display screen, selection knob, ports.

- **Display screen-It** has illuminated display screen for better visualization. It has five digits display screen; one represent sign value and the other four are for number representation.
- **Selection knob-** As we know a single multimeter performs so many tasks like reading voltage, resistance, and current. The selection knob allows the user to select the different job.
- **Port-** There are two ports on the front of the unit. One is the mAVΩ port which allows the measurement of all the three units: current up to 200 mA, voltage, and resistance. The red probe is plugged into this port. The other is COM port which means common and it normally connected to –ev of a circuit and black probe is plugged into it. There is one particular port is 10A, which is use to measures large current in the circuit.

3. Find the value of Current (I) and Power (P) for the circuit shown below:

Ans. I=2A, P=48W