



School of Automotive Skills
Session: 2021-22 (Winter Semester)
B. Voc. Program, 1st Semester,
2nd 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 which of the following cycles, constant volume heat addition and constant volume heat rejection takes place:

- a) Carnot Cycle
- b) Diesel Cycle
- c) Otto Cycle
- d) None of the above

Q2. Which device is used to reduce exhaust noise:

- a) Muffler
- b) Exhaust Pipe
- c) Exhaust Manifold
- d) Tail pipe

Q3. The purpose of a thermostat in an engine cooling system is to:

- a) Prevent the coolant from boiling.
- b) Allow the engine to warm up quick.
- c) Pressurize the system to increase boiling point.
- d) Indicate to the driver, the coolant temperature.

Q4. In Battery coil ignition system, the correct sequence of flow of current is:

- a) Battery – Ammeter – Ignition coil – Distributor – Spark plug
- b) Battery – Ignition coil – Ammeter – Distributor – Spark plug
- c) Battery – Ammeter – Distributor – Ignition coil – Spark plug
- d) Battery – Distributor – Ammeter – Ignition coil – Spark plug



Q5. What is the compression ratio in SI engine?

- a) 6 – 10
- b) 3 – 5
- c) 1 – 2
- d) 11 – 15

Section – B

03X02 = 06 Marks

Q6. Write down the functions of piston rings.

Q7. What is the formula for the efficiency of Otto cycle and diesel cycle?

Q8. Write down 2 advantages of rear wheel drive.

Section – C

03X03 = 09 Marks

Q9. Explain PV and TS diagram for Otto cycle.

Q10. Write a short note on exhaust system.

Q11. Classify IC engines on the basis of, method of ignition, arrangement of cylinder, cycle.



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Section – A

05X01 = 05 Marks

Q1. In which of the following cycles, constant volume heat addition and constant volume heat rejection takes place:

- c) Otto Cycle

Q2. Which device is used to reduce exhaust noise:

- a) Muffler

Q3. The purpose of a thermostat in an engine cooling system is to:

- b) Allow the engine to warm up quick.

Q4. In Battery coil ignition system, the correct sequence of flow of current is:

- a) Battery – Ammeter – Ignition coil – Distributor – Spark plug

Q5. What is the compression ratio in SI engine?

- a) 6 – 10

Section – B

03X02 = 06 Marks

Q6. Write down the functions of piston rings.

Ans: The main functions of piston rings in reciprocating engines are :

1. Sealing the combustion chamber so that there is no transfer of gases from the combustion chamber to the crank ("blow-by gases")
2. Supporting heat transfer from the piston to the cylinder wall.
3. Regulating engine oil consumption.

Q7. What is the formula for the efficiency of Otto cycle and diesel cycle?

Ans:

$$\eta_{\text{otto}} = 1 - \frac{1}{(r_c)^{\gamma-1}}$$

r_c = Compression ratio
 γ = adiabatic index

$$\eta_{\text{diesel}} = 1 - \frac{1}{(r_c)^{\gamma-1}} \left[\frac{r_c^\gamma - 1}{\gamma (r_c - 1)} \right]$$

r_c = compression ratio
 γ = adiabatic index
 r = Fuel cutoff ratio
 $\Rightarrow \frac{\text{Volume after cutoff}}{\text{Volume before cutoff}}$

Q8. Write down advantages of rear wheel drive.

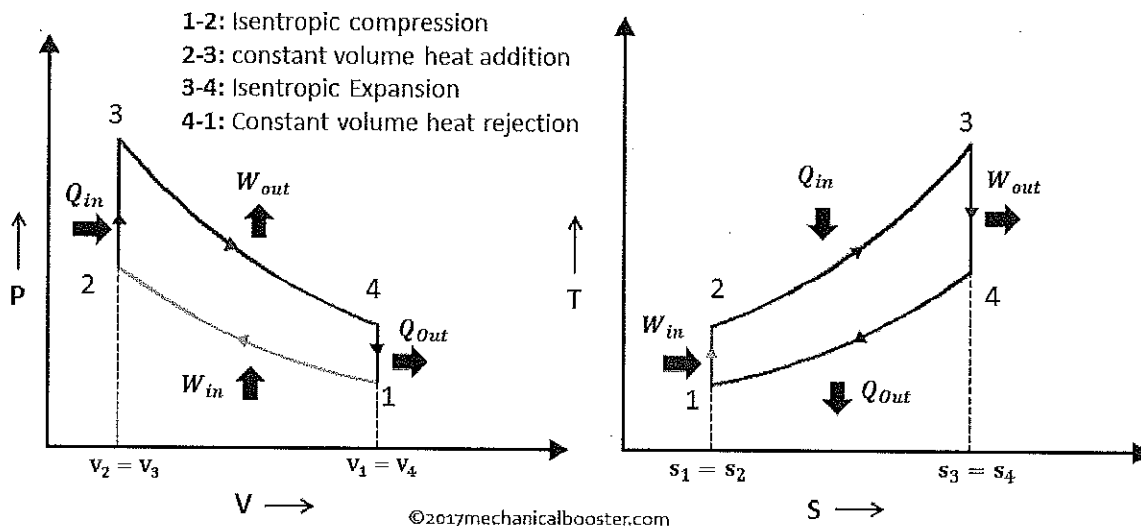
Ans:

1. RWD spreads the weight of its drivetrain more evenly than FWD from the front to the rear.
2. Sturdy and solid- RWD can typically take a lot of abuse without expensive repairs
3. RWD drive vehicles are fast! High horsepower.
4. Better stopping due to better weight distribution

Section – C

03X03 = 09 Marks

Q9. Explain PV and TS diagram for Otto cycle.



P-V and T-S Diagram of Otto Cycle



Q10. Write a short note on exhaust system.

Ans:

1. Exhaust Manifold: It collects the exhaust gases from multiple cylinders into one pipe. Exhaust manifolds are generally simple cast iron or stainless steel units which collect engine exhaust gas from multiple cylinders and deliver it to the exhaust pipe.

2. Catalytic Converter: A catalytic converter is a device used to reduce the emissions from an internal combustion engine (used in most modern day automobiles and vehicles). Not enough oxygen is available to oxidize the carbon fuel in these engines completely into carbon dioxide and water; thus toxic by-products are produced. Catalytic converters are used in exhaust systems to provide a site for the oxidation and reduction of toxic by-products (like nitrogen oxides, carbon monoxide, and hydrocarbons of fuel into less hazardous substances such as carbon dioxide, water vapor, and nitrogen gas.

3. Resonator: A **resonator** is a device or system that exhibits resonance or resonant behavior, that is, it naturally oscillates at some frequencies, called its resonant frequencies, with greater amplitude than at others. Resonators are used to either generate waves of specific frequencies or to select specific frequencies from a signal. Musical instruments use acoustic resonators that produce sound waves of specific tones. Another example is quartz crystals used in electronic devices such as radio transmitters and quartz watches to produce oscillations of very precise frequency.

4. Muffler: A **muffler** (**silencer** in many non-US English speaking countries) is a device for decreasing the amount of noise emitted by the exhaust of an internal combustion engine.

5. Tail Pipe: Less harmful and low sound wave exhaust gases are transmitted to the environment through tail pipe.

Q11. Classify IC engines on the basis of, method of ignition, arrangement of cylinder, cycle.

Ans:

1. **According to method of ignition:**

Spark ignition engine and Combustion ignition engine

2. **According to Arrangement of cylinder:**

- a. Single cylinder
- b. In line or straight
- c. V-engine
- d. Opposed cylinder



3. According to cycle of combustion:

- a. Otto cycle
(Combustion at
constant volume)
- b. Diesel cycle
(Combustion at
constant pressure)
- c. Dual combustion

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

School of Automotive Skill

Session: 2021-22 (Winter Semester)

B. Voc., 1th Semester2nd In-Sem Examination

Course Code : AUT1102

Time : 1 Hour

Course Name: Automotive wheel care
and steering system

Max. Marks : 20

Instructions:

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

Section – A

05X01 = 05 Marks

1. What safety Equipment is used to protect lungs from poisonous gas: -
 - a. Dust mask
 - b. Respirator mask.
 - c. N 95 mask.
 - d. None of the above.
2. What is the use of universal joint in steering column?
 - a. For Aesthetics.
 - b. For higher efficiency.
 - c. For prevention from accident.
 - d. All of the above.
3. Why treads are made on the tire?
 - a. For grip
 - b. For aesthetic
 - c. Road terrain
 - d. Option A and B
4. What does “Seiton” means in 5s?
 - a. learing.
 - b. Set in order.
 - c. standardize.
 - d. None of the above
5. Is there any difference between C joint and universal joint?
 - a. Yes
 - b. No

Section – B

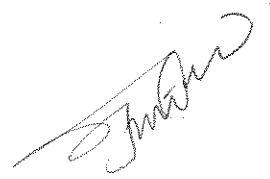
03X02 = 06 Marks

1. What are the components use in steering column? Draw a diagram of steering system.
2. What are the main function of steering system?
3. Name two types of steering system

Section – C

03X03 = 09 Marks

1. Explain the physics behind Pascal's law?
2. Explain the working principle of hydraulic steering system with diagram.
3. Explain castor, camber and toe angle?

A handwritten signature in black ink, appearing to be 'J. K. Singh', is written diagonally across the page.



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Session: 2021-22 (Winter Semester)

B. Voc., 1st Semester

2nd In-Sem Examination

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Course Name: Automotive wheel care
and steering system

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

05X01 = 05 Marks

1. What safety Equipment is used to protect lungs from poisonous gas: -
 - a. Dust mask
 - b. **Respirator mask.**
 - c. N 95 mask.
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2. What is the use of universal joint in steering column?
 - a. For Aesthetics.
 - b. For higher efficiency.
 - c. **For prevention from accident.**
 - d. All of the above.
3. Why treads are made on the tire?
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 - c. Road terrain
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4. What does “Seiton” means in 5s?
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 - a. **Yes**
 - b. No

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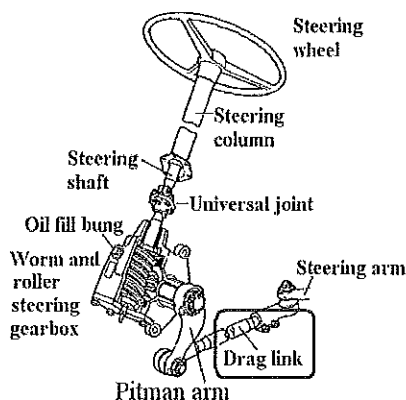
Section – B

03X02 = 06 Marks

1. What are the components use in steering column? Draw a diagram of steering system.

Ans. Steering Wheel.

- Steering Column & Shaft.
- Universal Joint.
- Steering Gear Box.
- Steering Pump.
- Linkage (Tie Rod).
- Rubber Bush.



2. What are the main function of steering system?

Ans. The primary function of the steering system is to achieve angular motion of the front wheels to negotiate a turn.

- To provide directional stability of the vehicle when going straight ahead.
- To minimize wear and tear of tyres.
- To facilitate straight ahead recovery after completing a turn.
- To providing perfect rolling motion of the road wheels at all times.
- To absorb a major part of the road shocks thereby preventing them to get transmitted to the hands of the driver.

3. Name two types of steering system

Ans. Two types of steering system are as follows:

1. Hydraulic steering system
2. Electric steering system

Section – C

03X03 = 09 Marks

1. Explain the physics behind Pascal's law?

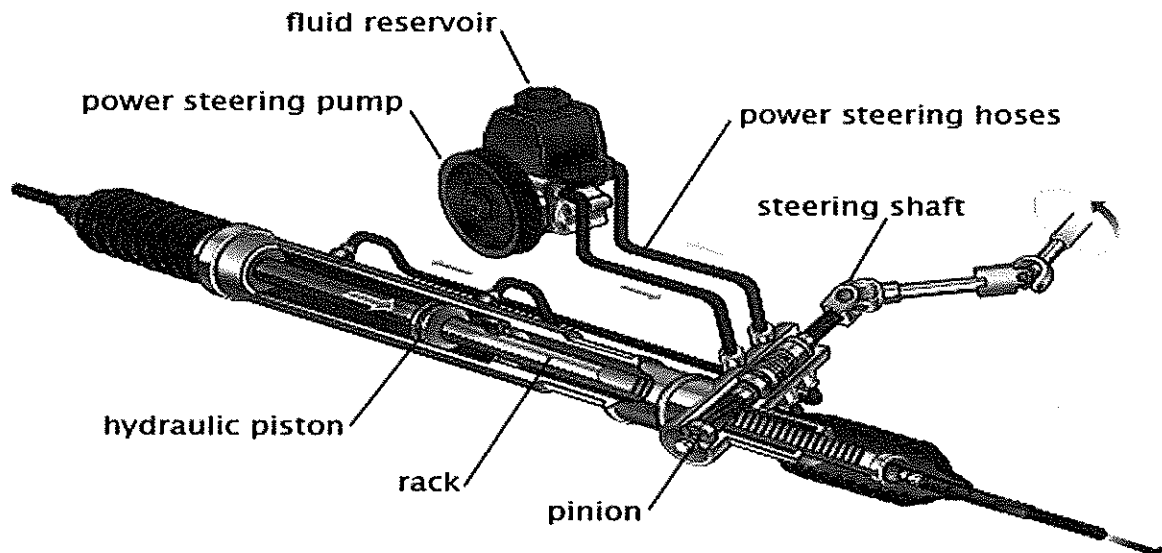
Ans. **Pascal's law** is the basis of **hydraulic** drive systems. As the pressure in the system is the same, the force that the fluid gives to the surroundings is therefore equal to pressure \times area. In such a way, a small piston feels a small force and a large piston feels a large force.

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2. Explain the working principle of hydraulic steering system with diagram.

Ans. Hydraulic power steering systems work by using a hydraulic system to multiply force applied to the steering wheel inputs to the vehicle's steered (usually front) road wheels. A double-acting hydraulic cylinder applies a force to the steering gear, which in turn steers the roadwheels.

- pressure
- return



3. Explain caster, camber and toe angle?

Ans. **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,”

Toe:

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

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.



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School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester

2nd 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 safe condition sign?

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

Q-2. The operating temperature of brazing is....

- | | |
|------------------------------|------------------------------|
| a. Above 450 degrees Celsius | c. Above 850 degrees Celsius |
| b. Below 450 degrees Celsius | d. None of the above |

Q-3. Soldering is a types of

- | | |
|--------------------|------------------------|
| a. Permanent joint | c. Non-Permanent Joint |
| b. Solid Joint | d. Flexible joint |

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

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

Q-5. Sedan is a

- | | |
|-----------------|---------------------|
| a. Body type | d. All of the above |
| b. Chassis type | |
| c. Welding type | |



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Section-B

03x02=06 Marks

Q-6. Write down the full form of the following:

1. MMAW
2. MIG
3. MAG
4. TIG

Q-7. Write a short note on a Brazing?

Q-8. Explain the working principle of MMAW with the help of a diagram.

Section-C

03x03=09 Marks

Q-9. Write down the characteristics of electrode coating along with its types.

Q-10. What is Gas shielded arc welding? Explain its types.

Q-11. What is the role of 5S in Auto Body shops



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Time: 1 Hour

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Section-A

5x1=5 Marks

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

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| b. Gloves | d. All of the above |

Q-5. Sedan is a

- | | |
|-----------------|---------------------|
| a. Body type | c. Welding type |
| b. Chassis type | d. All of the above |

Section-B

3x2=6 Marks

Q-6. Write down the full form of the following:

Ans:

1. MMAW = Manual Metal Arc welding
2. MIG = Metal inert Gas welding
3. MAG = Metal Active Gas welding
4. TIG= tungsten inert gas welding

Q-7. Write a short note on a Brazing?

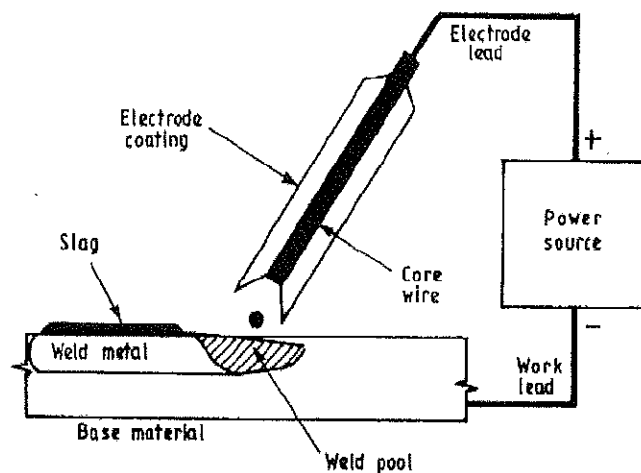
Ans.

- Brazing is when a filler metal or alloy is heated to its melting temperature above 450 °C.
- In this case only filler metal melts, there is no melting of work piece metal.
- But this process need preheating of base metal.

Q-8. Explain the working principle of MMAW with the help of a diagram.

Ans.

- **Working principle:**
- When the Current flows through the cables from the power source (AC/DC), the circuit is completed when the electrode tip comes in contact with the surface of the work piece.
- The heat is simply generated at the meeting point between the electrode and the work pieces (arc).
- This arc melts the base metal and the core wire of the electrode to form weld pool.





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Section-C

3x3=9 Marks

Q-9. Write down any four characteristics of electrode coating along with its types.

Ans:

1. Provide a protective atmosphere (a gas shield around the arc).
2. Stabilize the arc.
3. Act as a flux to remove impurities from the molten metal.
4. Provide a protective slag coating to accumulate impurities, prevent oxidation, and slow the cooling of the weld metal.
5. Reduce weld-metal spatter and increase the efficiency of deposition.
6. Add alloying elements.
7. Affect arc penetration (the depth of melting in the work piece).
8. Influence the shape of the weld bead.
9. Add additional filler metal.

Types:

A= Acid Coating

C= Cellulose Coating

B= Basic Coating

R= Rutile Coating

Q-10. What is Gas shielded arc welding? Explain its types.

Ans.

- Gas shielded arc welding is also performed with the help of a welding arc.
- During welding, the molten pool is protected by a gaseous shield.
- The shield is not produced by the electrode covering.
- Here, the shielding gas comes directly from a gas cylinder and is fed through a gas nozzle on the torch to the welding point.

1. MIG

Metal inert gas welding takes its name from the use of inert gases such as argon, helium and mixture of the two gases.

MIG welding is an arc welding process in which a continuous solid wire electrode is fed through a welding gun and into the weld pool, joining two base material together.

The process is semi- automatic because the electrode and gas are automatically fed through a welding the gun at a user defined speed when the operator pulls down the trigger.

2. MAG :

Metal active gas welding takes its name from the active welding gas used (CO₂ or gas mixture (argon containing active gas, two or three components)).

Long and short arc are used during MAG welding.

MAG welding is a steel welding process.

Q-11. What is the role of 5S in Auto Body shop?

Ans.

1. NEAT & CLEAN WORKPLACE
2. SMOOTH OPERATIONS
3. NO OBSTRUCTION
4. SAFETY INCREASES
5. PRODUCTIVITY IMPROVES
6. QUALITY IMPROVES
7. WASTAGE DECREASE
8. MACHINE MAINTENANCE
9. VISUAL CONTROL SYSTEM
10. EMPLOYEES MOTIVATED
11. WORKSTATIONS BECOME SPACIOUS



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Registration No.:

School of Automotive Skills
Session: 2021-22 (Winter Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Course Code: AUT1104

Time: 1 Hour

Course Name: Automotive Spray Paint

Max. Marks: 20

Instruction: Attempt all Questions.

Section – A

05X01 = 05 Marks

Q1. 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 |

Q2. Sanding process is required to...

- | | |
|---------------------|----------------------|
| a. Even the Surface | c. Both (a) & (b) |
| b. Fill The holes | d. None of the Above |

Q3. The substance used as an undercoat during painting is...

- | | |
|------------|----------------------|
| a. Thinner | c. Primer |
| b. Putty | d. None of the Above |

Q4. Which type of sanding processes is recommended by OEM for refinish painting.

- | | |
|----------------|----------------------|
| a. Dry Sanding | c. Both (a) & (b) |
| b. Wet Sanding | d. None of the Above |

Q5. The equipment used to spread the putty on the surface during surface preparation is...

- | | |
|----------------|-------------------------|
| a. Sand Block | c. Putty Spreader Sheet |
| b. Dent Puller | d. None of the Above |



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Section – B

03X02 = 06 Marks

Q-6. What are applications of Paintbooth and Paint mixing room.

Q-7. Write short notes on following..

- a. Random Orbital Sander
- b. Spray Gun

Q-8. Explain refinish painting hazards.

Section – C

03X03 = 09 Marks

Q-9. Describe primer application process in details.

Q-10. What are the responsibilities of a paint shop technician?

Q-11. Write the steps for putty application and putty sanding.



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Course Code: AUT1104

Time: 1 Hour

Course Name: Automotive Spray Paint

Max. Marks: 20

Instruction: Attempt all Questions.

Section – A

05X01 = 05 Marks

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Section – B

03X02 = 06 Marks

Q-6. What are applications of Paintbooth and 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. Write short notes on following..

- a. Random Orbital Sander
- b. Spray Gun

Q-8. Explain refinish painting hazards.

Ans: Interior Painting Safety Hazards:

- Inadequate ventilation is the first and foremost hazard when painting indoors.
- Take care when placing appropriate warning signs for people place them at a level and in a position where the majority of people can see them easily.

Fire and explosion hazards:

- One of the major safety concerns associated with spray application is the combustible, flammable vapours and mists.
- It is important to ensure that all potential sources of ignition have been removed prior to spraying flammable and combustible products.

Health effects:

- Overexposure to a substance like primer or paint when spraying them means that too much has been breathed in, swallowed or absorbed.
- The possible health effects of overexposure to these products can vary depending on the chemicals they contain.

The main health effects from exposure to these solvents can include:

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

Potential sources of ignition include:

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



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Section – C

03X03 = 09 Marks

Q-9. Describe primer application process in details.

Q-10. What are the responsibilities of a paint shop technician?

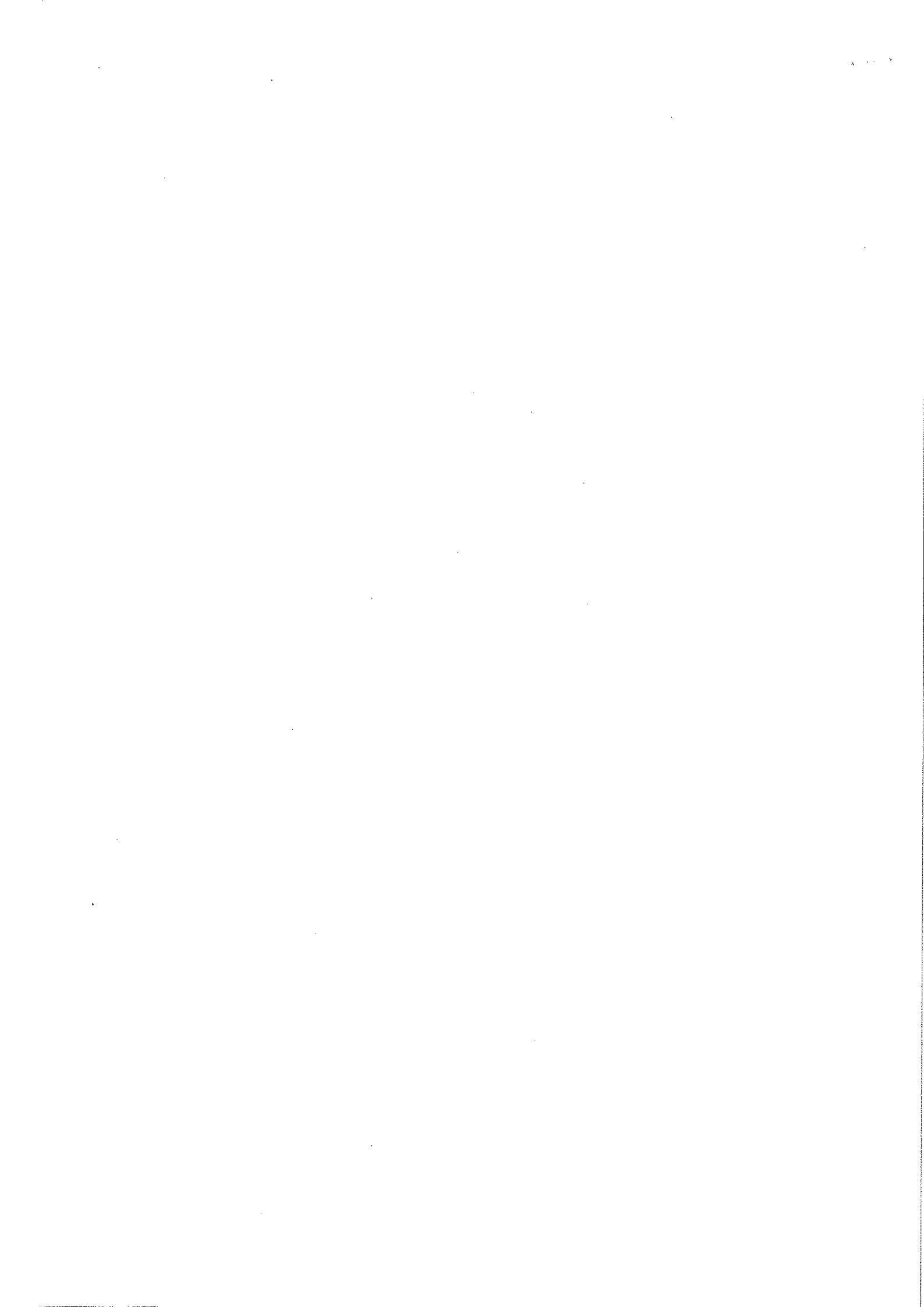
Ans: To carry all types of vehicle body refinishing work like:-

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

Q-11. Write the steps for putty application and putty sanding.

Ans:



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School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

Course Code: AUT1105

Time: 1 Hour

Course Name: Automotive Electrical Fundamental

Max. Marks: 20

& A.C

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) Electric pressure is also called as?

- a. Voltage
- b. Resistance
- c. Power
- d. Energy

Q2) Which of the following materials has the least resistivity?

- a. Zinc
- b. Lead
- c. Mercury
- d. Copper

Q3) When the temperature of the surrounding is higher than the temperature of the body, then the heat loss by convection from the body to the surrounding will be?

- a. Positive
- b. Negative
- c. Zero
- d. None of these

Q4) Freon group of refrigerants are?

- a. Inflammable
- b. Toxic
- c. Non-inflammable and toxic
- d. Nontoxic and non-inflammable

Q5) A sound sensor converts sound levels to _____ output.

- a. Sound
- b. Voltage
- c. Current
- d. Power

Section-B

03X02 = 06 Marks

Q06) Explains reasons for unpleasant odour in AC system of a car.

Q07) what are the types of refrigerant's?

Q08) Define Pressure.

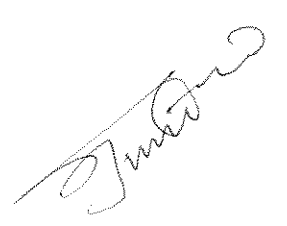
Section-C

03X03 = 09 Marks

Q09) Explain types of thermodynamic system.

Q10) What is the function of OBD tool?

Q11) What do you mean by "Actual Values" in diagnostics?

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, 1st Semester,

2nd In-Sem. Examination

Course Code: AUT1105

Time: 1 Hour

Course Name: Automotive Electrical Fundamental

Max. Marks: 20

& A.C

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) Electric pressure is also called as?

- a. Voltage
- b. Resistance
- c. Power
- d. Energy

Ans- a

Q2) Which of the following materials has the least resistivity?

- a. Zinc
- b. Lead
- c. Mercury
- d. Copper

Ans- D

Q3) When the temperature of the surrounding is higher than the temperature of the body, then the heat loss by convection from the body to the surrounding will be?

- a. Positive
- b. Negative
- c. Zero
- d. None of these

Ans- b

Q4) Freon group of refrigerants are?

- a. Inflammable
- b. Toxic
- c. Non-inflammable and toxic
- d. Nontoxic and non-inflammable

Ans- d

Q5) A sound sensor converts sound levels to _____ output.

- a. Sound
- b. Voltage
- c. Current
- d. Power

Ans- b

Section-B

03X02 = 06 Marks

Q06) Explains reasons for unpleasant odour in AC system of a car.

Ans- These droplets of water should drain out via the AC duct, but at times the moisture and leftover water causes fungus and bacteria to grow inside the AC ducts. This causes a foul mouldy stink in your AC which is similar to the smell of dirty, old socks. A stinking AC calls for air conditioner cleaning and maintenance

Q07) what are the types of refrigerant's?

1. Ans- CFC.
2. HCFC.
3. HFC.
4. HC.
5. FC.
6. NH3.
7. CO2.

Q08) Define Pressure.

Ans- the force applied perpendicular to the surface of an object per unit area over which that force is distributed.

Q09) Explain types of thermodynamic system.

- Ans- 1. Open System
2. Closed System
3. Isolated system

Q10) What is the function of OBD tool?

Ans- It is used to read all diagnostics data from the car.

It has Mobile device-based tools and analysis, PC-based scan tools and analysis platforms, Data Loggers, Emission Testing, Drivers supplementary vehicle instrumentation, vehicle telematics.

Used to monitor real-time data like:

Engine temperature.

Fuel rate.

O2 sensor voltage.

Battery voltage level.

Time your engine has been running, etc.

Q11) What do you mean by "Actual Values" in diagnostics?

Ans- actual values are the real data provided by the control modules of sensors and components.

These are provided by obd tool which communicates with the cars ECU.





Q.P.

Registration No.:

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

1st Semester, 2nd In-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

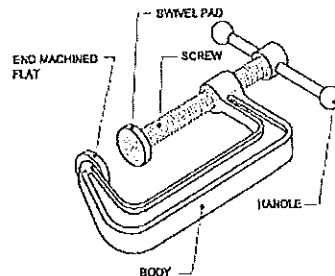
Q1. _____ are used in places where fixing and removal of components are frequent

- a. Set screw
- b. Thumb screw
- c. Grub screw
- d. Countersink screw

Q2. _____ is angle between the top face of cutting point and normal to work surface at cutting edge

- a. Clearance angle
- b. Point angle
- c. Rake angle
- d. None of the above

Q.3 Name the equipment





Registration No.:

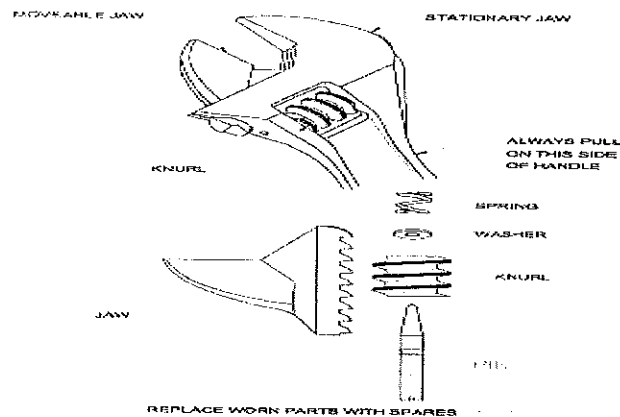
BHARTIYA SKILL DEVELOPMENT UNIVERSITY

- a. Pin vice
- b. Measuring Gauge
- c. C-clamp
- d. None of the above

Q4. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

- a. Anti-Fatigue Bolts
- b. Body fit Bolts
- c. Studs
- d. None of the above

Q.5 Name the type of spanner



- a. Open end spanner
- b. Close end spanner
- c. Adjustable spanner
- d. Hook spanner

Section – B

03X02 = 06 Marks

Q6. What necessary points should remember while safe and correct using of spanners.

Q.7 Explain Purpose of chisel, its parts and types of chisel.

Q8. Write Different types of nuts and bolts.

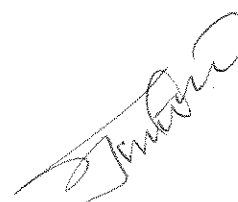
Section – C

03X03 = 09 Marks

Q9. Explain the types of machine screws

Q10. Write different angles of chisel and their effects.

Q11. Write and explain different pliers and snips.

A handwritten signature in black ink, slanted diagonally across the page. The signature is cursive and appears to read 'S. J. ...'.



A.S.

Registration No.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Automotive Skills

1st Semester, 2nd In-Sem. Examination

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

Answersheet

Course Code: AUT1106

Time: 1 Hour

Course Name: Automotive tools and measurement

Max. Marks: 20

Instructions:

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

Section – A

05X01 = 05 Marks

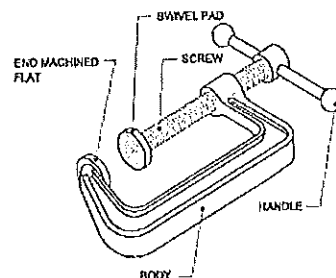
Q1. _____ are used in places where fixing and removal of components are frequent

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- d. Countersink screw

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- a. Clearance angle
- b. Point angle
- c. Rake angle
- d. None of the above

Q.3 Name the equipment





Registration No.:

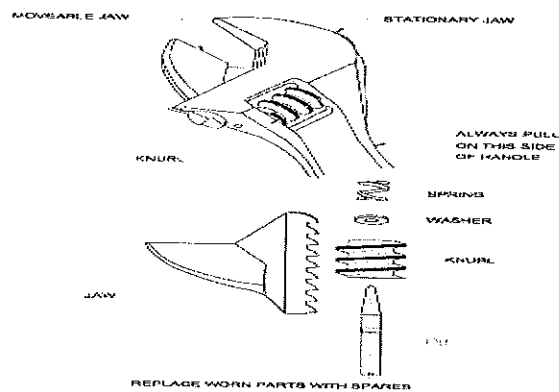
BHARTIYA SKILL DEVELOPMENT UNIVERSITY

- a. Pin vice
- b. Measuring Gauge
- c. C-clamp
- d. None of the above

Q4. This type of bolts is used when the assembly is subjected to alternating load condition continuously.

- a. Anti-Fatigue Bolts
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- c. Studs
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Q.5 Name the type of spanner

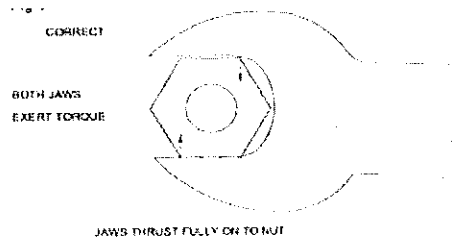


- a. Open end spanner
- b. Close end spanner
- c. Adjustable spanner
- d. Hook spanner

Q6. What necessary points should remember while safe and correct using of spanners.

Ans. **Correct use of spanners**

- To fit Exactly a spanner must be:
- Of correct size
- Placed correctly on nut
- In good condition
- Spanners have their jaws slightly wider than the width of the nut so that they can be placed in position easily.
- Any excess more than few hundredth of millimeter clearance could cause the spanner to slip under pressure.



Things to remember

- Place the Spanner so that its jaws are bear fully on flats of nut
- Incorrect use damages the spanners and nuts too
- Discard any defective spanners
- Choose spanners that allow room for use

Q.7 Explain Purpose of chisel, its parts and types of 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

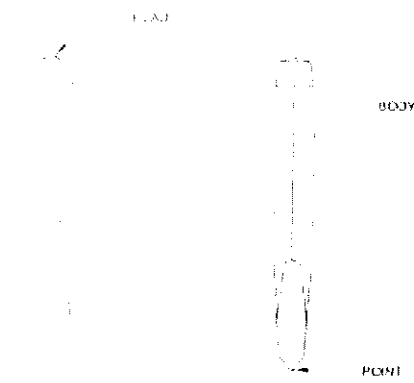
• **A Chisel has following parts:**

Head

Body

Point or cutting edge

- Chisels are made from High carbon steel, Chrome vanadium steel
- The cross section of chisels is usually hexagonal or octagonal



TYPES OF CHISELS •Common types of Chisels are:

- Flat Chisel
- Cross Cut or Cape Chisel
- Half Round Nose Chisel
- Diamond Point Chisel
- Web or Punching Chisel

Q8. Write Different types of nuts and bolts.

Ans.

There are different types of nut:

- Hexagonal nuts
- Square nuts
- Self-locking nuts
- T- nuts
- Slotted & Castle nuts
- Round nuts
- Slotted Round nuts

Depending upon type of application, different types of bolts are used:

- Bolts with clearance hole
- Body fit bolt
- Anti-fatigue bolt
- Studs

Section – C

03X03 = 09 Marks

Q9. Explain the types of machine screws

Ans.

SCREWS

The diagram shows several types of machine screws: a hex head screw, a flat head screw, a Torx head screw, and a screw with a split lock washer. To the right is a close-up of a screw thread.

- Machine screws are used when a nut cannot be used in the assembly and the component in the assembly has a threaded hole to receive the screw.
- Types of machine screws
 - Hex head screws
 - Flat head screws
 - Torx head screws
 - Split lock washer and lock head screws
 - Self-tapping
 - Self-drilling



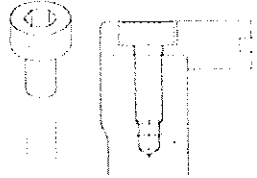
HEXAGON HEAD SCREWS

- Hexagon head screws are used when the projection of the screw head will not be an obstruction in the assembly
- They are made of steel and for electrical work they are made of brass



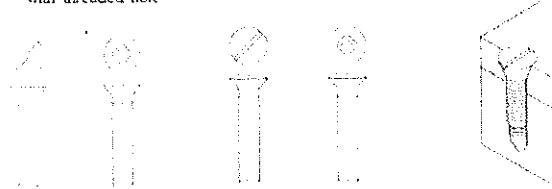
HEXAGON SOCKET HEAD CAP SCREWS

- These are used when the projection of the screw head above the surface is to be avoided
- The Indian standard specification head socket cap screws cover the range from 1.6 mm to 36 mm
- They are made of steel.



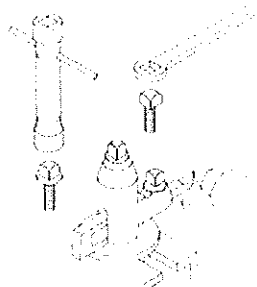
COUNTER SINK SCREWS

- There are four types of counter-sink head screws in common use
 - Slotted countersink head screws (M1-M20)
 - Cross recessed countersink head screws (M1.6-M10)
 - Slotted raised countersink head screws (M1-M20)
 - Cross recessed, raised countersink head screws (M1.6-M10)
- Countersink screws are capable of aligning the matching component correctly with threaded hole



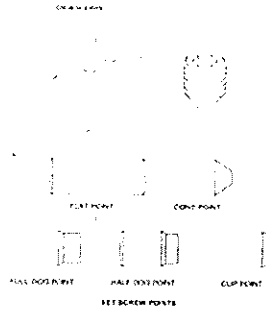
SQUARE HEAD SCREWS

- Square head screws are used in places where there is frequent removal and refitting of the assembly
- These screws are tightened to a higher torque using a wrench
- Square head screws are also available with a collar
- There is a washer at the base which is integral part of the head
- The purpose of collar is to protect the work surface from damages due to constant use of wrenches



SET SCREWS AND GRUB SCREWS

- Hexagonal socket set screws - these are available in other sizes available with different points for various functional applications.
- Flat point - they allow to bite into the metal - tighten without damage to the workpiece.
- Conical point - used to fasten pulleys, collars etc. to shafts.
- Cup point - used for higher strength applications where space is limited.



SET SCREWS AND GRUB SCREWS

- Grub Screws - have similar application as hexagonal socket set screws but are used for light duty.
- Grub screws are also available with different types of points.



Q10. Write different angles of chisel and their effects.

Ans.

Point Angle:

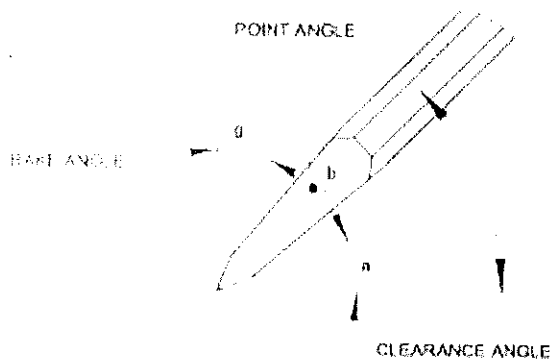
• Correct point/cutting angles of chisel depends on the material to be chipped, sharp angles for soft materials and wide angles for hard materials

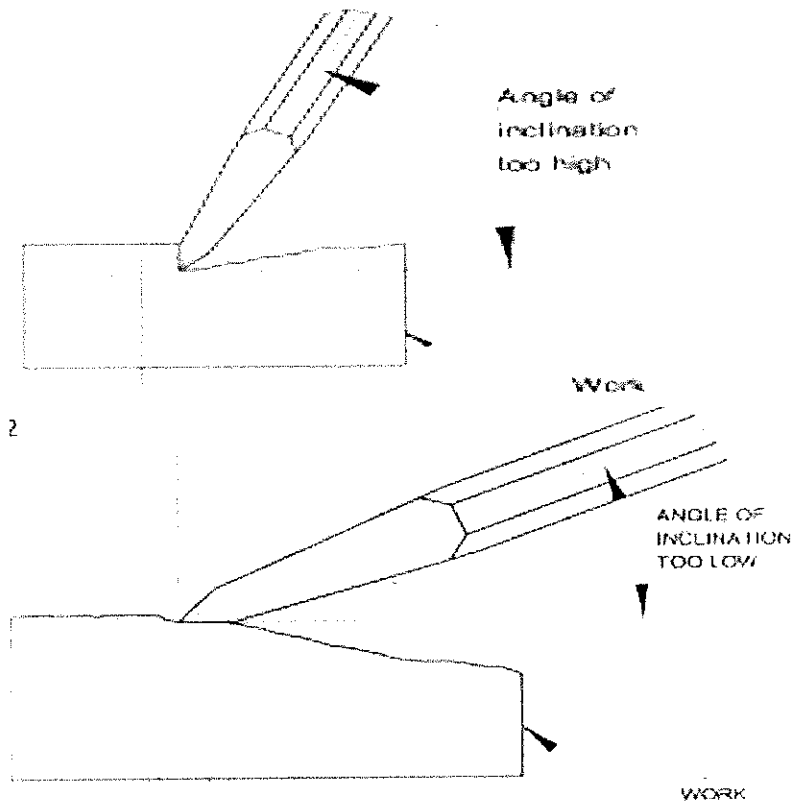
Rake Angle:

• Rake angle is angle between the top face of cutting point and normal to work surface at cutting edge

Clearance Angle:

• Clearance angle is angle between the bottom face of point and tangent to the work surface originating at the cutting edge





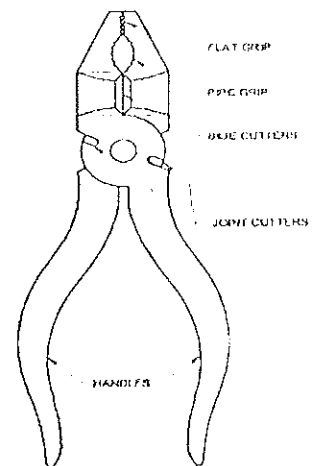
Effects -

- Angle of Inclination too low, Rake angle increases cutting edge cannot penetrate into work-piece
- Angle of Inclination too high, Rake angle decreases, cutting edge digs in, and the cut progressively increase

Q11. Write and explain different pliers and snips.

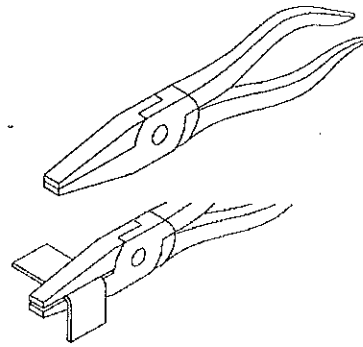
Ans. **PLIERS**

- Pliers have a pair of legs joined by a pivot, hinge or fulcrum pin (combination pliers)
- Each leg consists of long handle and a short jaw
- Elements of pliers:
 - Flat Jaw: Serrated for general gripping
 - Pipe Grip: serrated for gripping cylindrical objects
 - Side Cutters: for cutting off soft wires
 - Joint Cutters: two joint cutters for cutting or shearing off steel wires
 - Handles: for applying pressure by hand
- Available in sizes from 150 mm to 230 mm (Size = Overall length)



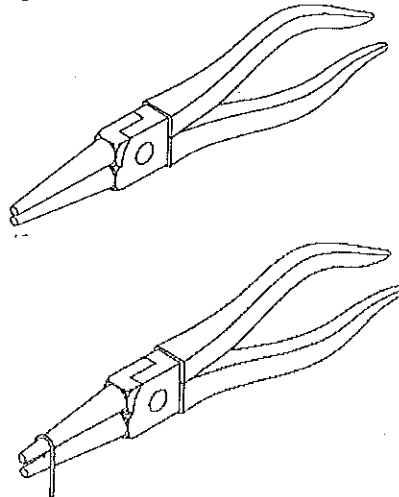
Flat nose plier

- Flat Nose Pliers has tapered jaws with flat gripping surfaces which may be either smooth or serrated
- It is used for bending and folding narrow strips of thin jobs.



Round nose pliers

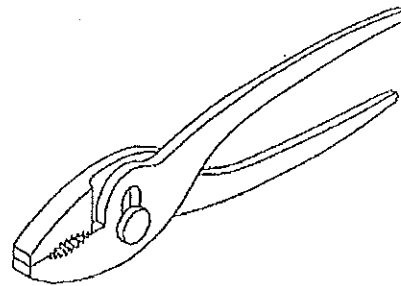
- This type of pliers is made with tapered roundshape
- They are used to shape loops in wires and form curves in light metal strips



Slip – joint pliers

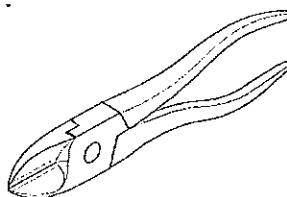
These pliers are available in different ranges of with different shapes of pivot pins so that they have various range of jaw opening.

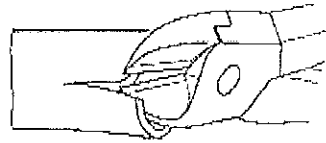
Mainly used for gripping the object.



End cutting & side cutting pliers

- They are used for shearing off wires in confined spaces and cutting of wires close to surface level
- They are also used for spreading the cotter pin

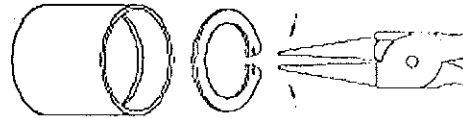
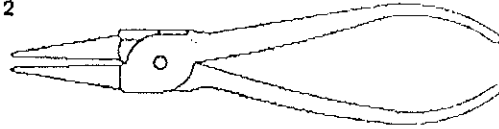




Internal & external circlip pliers

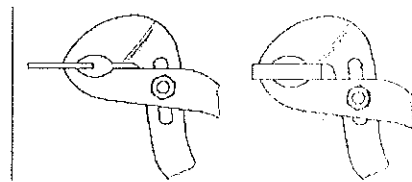
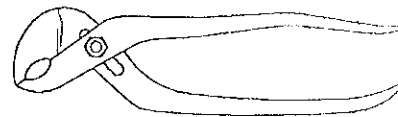
- Internal circlip pliers are used to fit and remove internal circlip in the groove
- External circlip pliers are used to fit and remove the external circlip in grooves of the shaft

2



Slip-joint, multigrip pliers

- Slip joint pliers are has more openings in the legs
- It gives range of jaw opening
- It allows parallel gripping by the jaws in number of positions.
- The shape and length of multi-grip pliers are different from those of the slip joint pliers







School of Automotive Skills

Session: 2021-22 (Winter Semester)

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

2nd 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 Friction disc is splined to the

a) Transmission input shaft

Q. 2 When the clutch pedal is depressed, the release bearing pushes the pressure-plate fingers inward. This causes the pressure plate to move away from

b) Friction disc

Q. 3 To help reduce the shock of engagement ,the friction disc has a series of

c) Cushion springs

Q. 4 Technician A says in a greatest, speed reduction means torque increase. Technician B says speed increase means torque reduction. Who is right?

c) A and B both

Q. 5 A synchronizer does all the following EXPECT

d) Attaches directly to the shift rail

Section – B

02X03 = 6 Marks

Q. 6 List the various systems under transmission of rear wheel drive automobile.

Ans: Following systems are used:

- Clutch Assembly
- Gear Box
- Propeller shaft
- Differential



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- Drive shafts

Q. 7 List out the major components of Clutch Assy.

Ans Following are the components of Clutch Assy:

1. Flywheel
2. Clutch disc
3. Pressure plate
4. Release bearing
5. Release bearing hub
6. Fork
7. Clutch cable
8. Clutch Paddle

Q. 8 What is the functional difference between the differential of FWD and RWD.

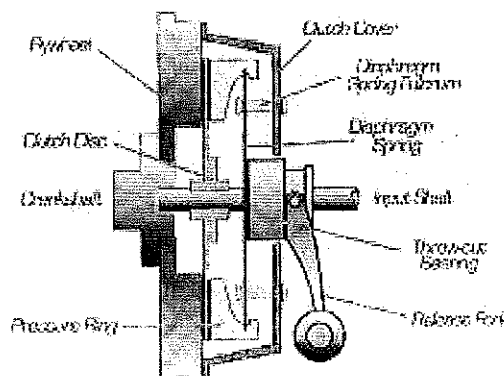
Ans Following are the functional difference between FWD and RWD

- For RWD vehicle motion needs to be shifted to 90 degrees for which bevel gear arrangement is used, which is not required for FWD.
- For RWD vehicle, propeller shaft is required to connect gear box with differential, in case of FWD gear box and differential is single unit called transaxle.

Section – C

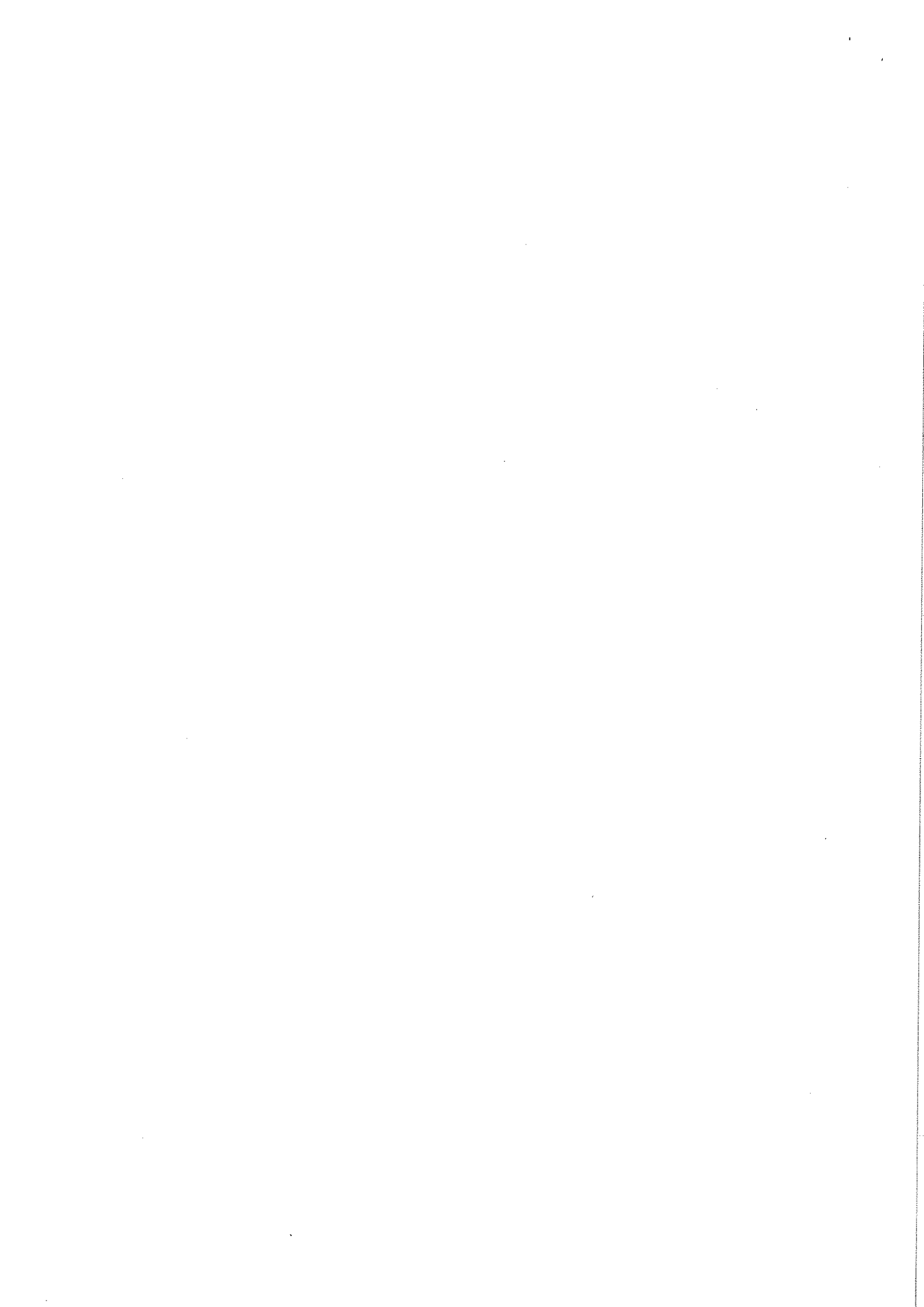
03X03 = 9 Marks

Q. 9 Draw a labeled diagram of Clutch Assembly and explain operation of Diaphragm clutch.



Ans:

Working of Clutch: In the engaged position the spring pivots on the inner pivot rings as it is held on the clutch cover so that its outer rings contact with the pressure plate. Again in this conical position the spring exerts through pressure to keep the pressure plate in firm contact with the clutch plate and flywheel.





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When the pedal is depressed the linkage moves release bearing towards the flywheel to disengage the clutch. As the bearing contacts with inner position of the conical springs it moves that position forward which cause the link to move backward. This removes the pressure on the pressure plate and release the clutch plate from contact with other driving members.

Q. 10 What is the advantage of using synchromesh gear box over conventional one?

Synchromesh gearbox is the latest version of Constant mesh type. It is a manually operated transmission in which, change of gears takes place between gears that are already revolving at the same speed. In this type of gearbox, gears can rotate freely or it are locked on layout shaft. Synchromesh is really an improvement on dog clutch. The synchronizer is the main part of this gearbox that stabilizes the speed. A synchronizer is a kind of clutch which lets components turning at different speeds. To synchronize the speeds cone friction is used.

It is better on following points

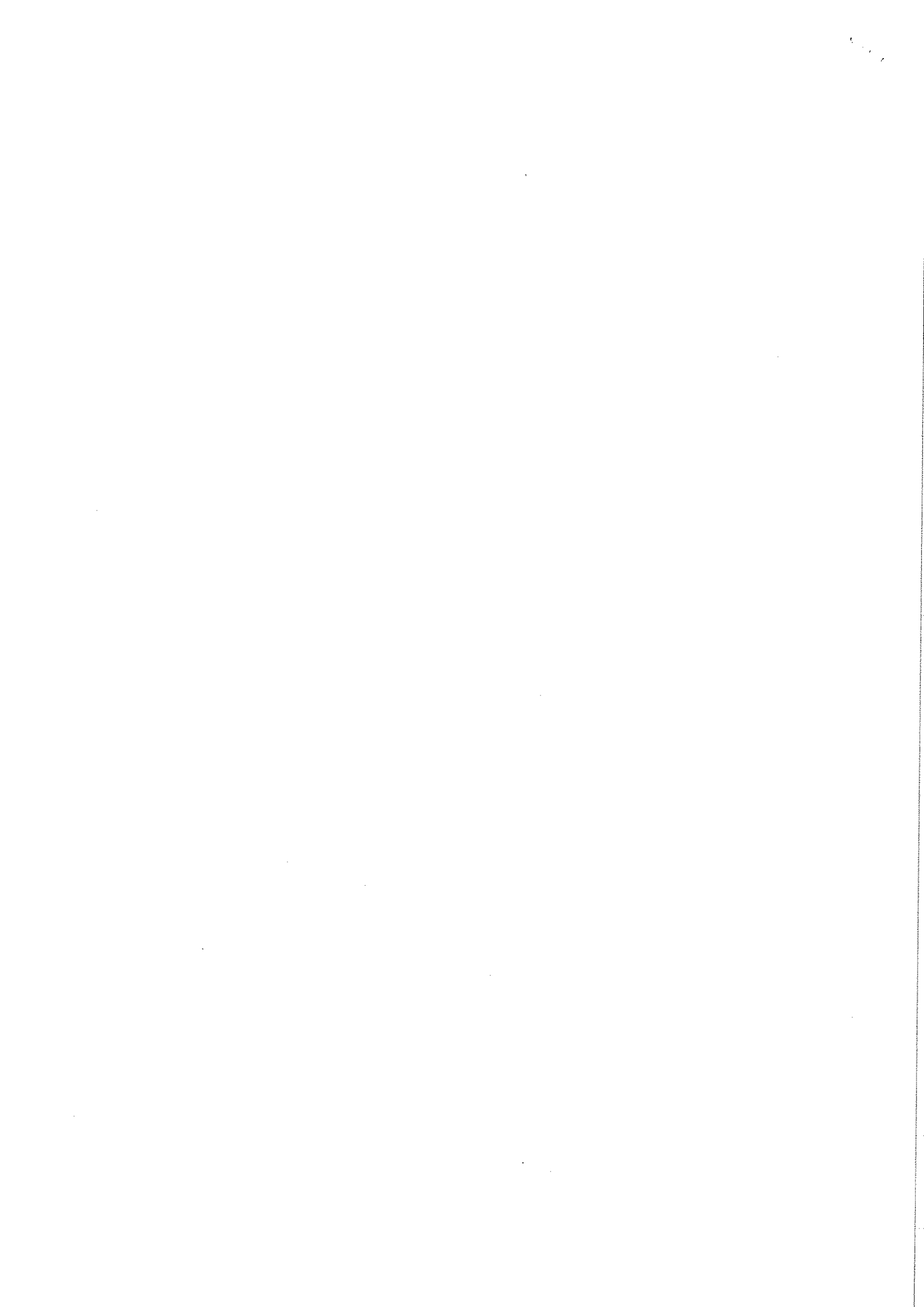
- 1) No need of double-declutching as in case of constant mesh gearbox.
- 2) Smooth engagement of higher gears due to the synchromesh device.
- 3) Less noisy as helical gears are used.
- 4) Less vibration.

Q. 11 Write the various function of Flywheel in detail.

Ans: A flywheel is a rotating mass attached to the driveshaft of a reciprocating (piston and crank) engine, the whose main purpose is to store kinetic energy in the form of inertia. This has both an upside and a downside, when applied to motor vehicles.

Apart from this it serves following two function more

1. Provide ring gear at the circumference of flywheel for the self-starting purpose. The pinion of starter motor meshes with the ring gear teeth to provide starting torque to the engine.
2. Flywheel also serves as an, integral part of transmission, by provide surface connection the friction disc which is pressed against the flywheel surfaces





School of Automotive Skills

Session: 2021-22 (Winter Semester)

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

2nd In-Sem. Examination

Course Code: AUT1115

Time: 1 Hours

Course Name: Basics of Automobile

Max. Marks: 20

Instruction:

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3. Answer all questions from section C, each question carries six mark.

Section – A

05X01 = 5 Marks

Q.1 The Friction disc is splined to the

- | | |
|-----------------------------|---------------|
| a) Transmission input shaft | c) Flywheel |
| b) Pressure Plate | d) Crankshaft |

Q. 2 When the clutch pedal is depressed, the release bearing pushes the pressure-plate fingers inward. This causes the pressure plate to move away from

- | | |
|---------------------|------------------|
| a) Release bearing | c) Friction disc |
| b) Pressure springs | d) Transmission |

Q. 3 To help reduce the shock of engagement ,the friction disc has a series of

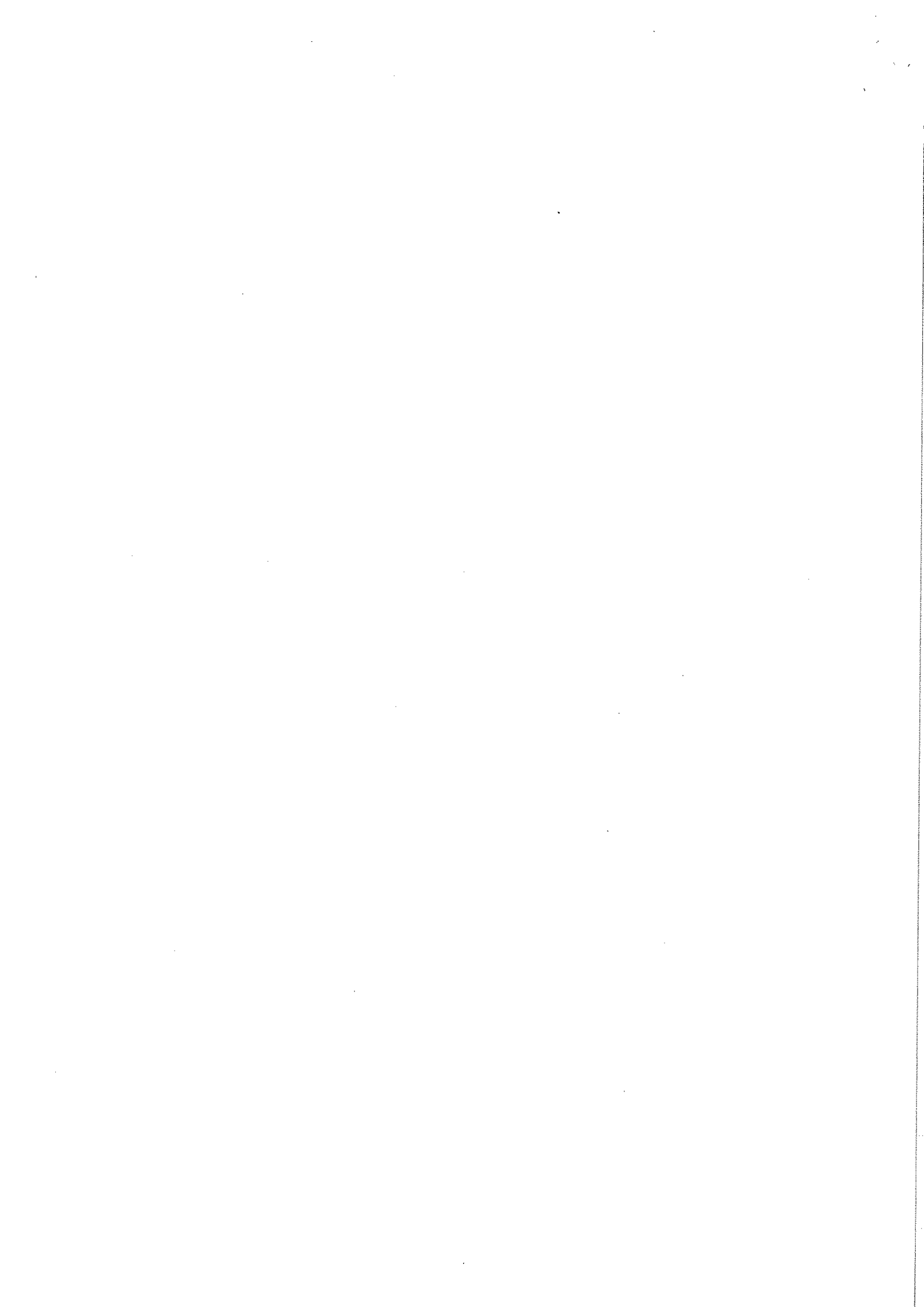
- | | |
|----------------|--------------------|
| a) Cushion pad | c) Cushion springs |
| b) Facing | d) discs |

Q. 4 Technician A says in a greatest, speed reduction means torque increase. Technician B says speed increase means torque reduction. Who is right?

- | | |
|-----------|--------------------|
| a) A only | c) A and B both |
| b) B only | d) neither A nor B |

Q. 5 A synchronizer does all the following EXCEPT

- | | |
|--|--|
| a) Prevents gear clash during shifting | c) Lock a gear to the shaft |
| b) Use friction to make the gear and synchronizer ring at the same speed | d) Attaches directly to the shift rail |





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Section – B

02X03 = 6 Marks

- Q. 6 List the various systems under transmission of Automobile.
- Q. 7 List out the major components of Clutch Assy.
- Q. 8 What is the difference between the differential of FWD and RWD.

Section – C

03X03 = 9 Marks

- Q. 9 Draw a labeled diagram of Clutch Assembly and explain operation of Diaphragm clutch.
- Q. 10 What is the advantage of using synchromesh gear box over conventional one?
- Q. 11 Write the various function of Flywheel in detail.

