Question Bank

UNIT-1 VEHICLE STRUCTURE AND ENGINES

PART-A

1. What is meant by self-propeller vehicle?
   A vehicle producing power within itself for its propulsion is known as self-propeller vehicle.

2. What is built by Karl Benz? State its significance.
   Karl Benz of Germany built a tricycle with an I.C. engine in 1885-86 which was working an Otto cycle. The speed of the engine was 10mph. and produced 8.H.P.

3. Mention the various products of scooters India Ltd.
   Vijay deluxe, Vijay super, Lambretta cento 100 scooters are manufactured by them.

4. Give any four world's leading automobiles manufacturers.
   1. Toyota
   2. Nissan
   3. Hyundai
   4. Mercedes Benz Ltd.
5. State the major types of automobiles according to the fuel used.
   (a) Petrol vehicles
   (b) Diesel vehicles
   (c) Gas vehicles
   (d) Electric vehicles
   (e) Solar vehicles
6. Classify automobiles with respect to the drive of the vehicle.
   1. Left hand drive
   2. Right hand drive
7. How automobiles are streamlined based on transmission?
   a) Conventional automobiles
   b) Semi-automatic automobiles
   c) Automatic automobiles.
8. Give any four names for the automobiles.
   i) Motor vehicles
   ii) Motor coach
   iii) Motor wagon
   iv) Horseless carriage
9. Mention the various parts of a car.
   Generator, starter, steering, clutch, rear axle, differential, universal joints, wheel, tyres, body, lamp etc.

10. Define lift force.

Aerodynamic lift force is the vertical

component of the resultant force caused by the pressure distribution on the body.

11. Why are rings provided on piston?

They are used to maintain air tight sealing between piston and cylinder to prevent gas leakage.

12. What are the methods of cooling in IC engines?
    1. Air cooling
    2. Water cooling
13. What are the types of water cooling?
    a. Thermosymphon system
    b. Pump circulation system
14. What is meant by lubrication?

The process of reducing the friction between moving parts is known as lubrication.

15. What is EGR?

The form of excessive nitrogen oxides due to peak combustion temperature which is greater than 1950^{o}c is known as EGR.

PART-B

1. Describe the brief history of the automobile.
2. Classify automobiles.
3. Explain the various forces acting on the body and its aerodynamic affects.
4. What are the different types of cooling system and explain any two in detail.
5. What are catalytic converters? Explain the working principles of 3-way catalytic converters with chemical reaction.

UNIT- 2 - ENGINE AUXILIARY SYSTEM

PART-A

1. What is carburetor?

The carburetor is a device used for atomizing and vaporizing the fuel and mixing it with the air in varying proportions to suit the changing operating conditions of vehicle engines.

2. What is meant by carburetion?

The process of breaking up and mixing the fuel with the air is called carburetion.

3. Define the terms vaporization and atomization.

Vaporization is a change of state of fuel from a liquid to a vapor.

Atomization is a mechanical breaking up of the liquid into small particles so that every minute particle of the fuel is surrounded by the air.

4. What does a mixing chamber do?

   The mixing chamber has two butterfly valves. One is to allow air into the mixing chamber and known as choke valve. The other is to allow air- fuel mixture to the engine and known as throttle valve.

5. Mention the different circuits involved in solex carburetor?
   a. Float circuit
   b. Starting circuit
   c. Idle and low speed circuit
   d. Normal running circuit
   e. Acceleration circuit
6. Give few models of zenith carburetor.
   i) Zenith VE type carburetor
   ii) Zenith stromberg carburetor
   iii) Zenith 30 VIG II carburetor
   iv) Zenith NV type carburetor
   v) Zenith DBE type carburetor
   vi) Zenith WIA type carburetor etc.
7. State the carburetor trouble shooting according to poor engine pickup.

Sl. No.	Causes	Remedies
1.	Obstructed main jet.	Clean the main jet.
2.	Obstruction in emulsion.	Clean the tube.
3.	Defect in acceleration pump.	Clean the pump.

8. State the important units of electric fuel injection system.
   1. Fuel delivery system
   2. Air induction system
   3. Sensors and air flow control system
   4. Electronic control unit
9. List any two batteries used in automobiles.
   i. Lead acid battery
   ii. Alkaline battery
10. Define battery life.

    The duration of the battery is up to the discard from starting of operation in any places.

11. List the factors affecting the battery life.
    1. Electrolyte level
    2. Overcharging
    3. Corrosion
    4. Sluphation
    5. Mounting etc.

12. Define cycling.

Cycling is the process of discharging and charging of the battery.

13. Name the two types of alkaline battery.
    1. Nickel-iron type
    2. Nickel-cadmium type

14. What is the purpose of Cut-out relay?

It prevents the reverse flow of current from the battery to the generator.

15. What does generator and motor do?

The generator converts mechanical energy into electrical energy whereas the motor converts electrical energy into mechanical energy.

PART-B

1. Sketch and explain the construction and operation of a simple carburetor.
2. Explain the principle of operation of a carburetor used in two wheelers with a sketch.
3. Explain the trouble shooting of carburetor.
4. Draw a typical ignition coil and name the parts.
5. Explain with a sketch the working of an electronic fuel injection system (any one type).

UNIT-3 - TRANSMISSION SYSTEMS

PART-A

1. State the functions of transmission system.
    i. It enables the running engine to be connected or disconnected from the driving wheel smoothly.
    ii. It enables the reduction of engine speeds.
    iii. It enables the turn of the drive round through 90^o.
    iv. It enables the driving wheel to be driven at different speeds.
2. What is a clutch?

Clutch is a mechanism used to connect or disconnect the engine from the rest of the transmission elements.

3. List the various parts of a single plate clutch.
    1. Fly wheel
    2. Clutch plate
    3. Pressure plate
    4. Clutch cover assembly
    5. Release mechanism
    6. Withdrawal force and rearing
    7. Primary shaft

4. Why multi-plate clutches are used in automobiles?

As compared to single plate clutch, these are smoother and easier to operate due to their assembly of friction surfaces contact.

5. Give the two types of multi-plate clutches.
   a. Wet type and b. Dry type
6. How is dog and spline clutch disengaged?
   The sleeve is moved back on the splined shaft to have no contact with the driving shaft.

7. What do you mean by fluid flywheel?
   The member which couples the driving member with driven member through a media of fluid is known as fluid coupling.

8. What is the function of a gearbox?
   Gearbox is a speed and torque changing device.

9. List out the various resistances to motion.
   1. Air resistances
   2. Gradient resistances
   3. Miscellaneous resistances
10. Define tractive effort.
    The torque available on the wheel produces a driving force which is parallel to the road is known as tractive effort.

11. Why is double clutching technique used?
    Even though there is no measure to allow easy measuring of gears, “double clutching” technique must be acquired for shifting gears properly.

12. Write down the methods of operating automatic gearbox.
    1. Hydramatic transmission
    2. Torque converter transmission
13. Name the two types of propeller shafts.
    1. Solid or open type
    2. Hollow or enclosed type
14. Classify universal joints.
    a. Variable velocity joints
    b. Constant velocity joints
15. List down the types of liver rear axles.
    1. Semi-floating
    2. Three-quarter floating
    3. Full-floating

PART-B

1. What is meant by clutch? List out the requirements.
2. Explain the working of a single plate clutch with a diagram.
3. Explain the sliding mesh gearbox with a suitable sketch.
4. Explain the principle and working of a differential with a neat sketch.
5. What are the functions of a Hotchkiss drive? Compare its merits with torque tube drive.

UNIT-4 - STEERING, BREAKS AND SUSPENSION

PART-A

1. How is power developed in automobiles?
   The power is transferred to rear axle through clutch, gearbox, propeller shaft and differential unit.

2. Classify wheels.
   a. Disc wheel
   b. Wire wheel
   c. Split wheel
   d. Light alloy wheel
3. Write down the types of tread patterns in tyres.
   a. Rib pattern
   b. Lug pattern
   c. Rib-and-Lug pattern
   d. Block pattern
4. What is meant by the term 'tread'?
   The tread is an external rubber layer preventing the carcass from wear and external damage which are produced by the road surface.

5. State the important parameters in radial type.
   1. Performance of the tyre
   2. Shape of the tyre
6. Name the various materials used in manufacturing of tyres.
   i. Nylon
   ii. Terylene
   iii. Rubber
   iv. Glass fiber
   v. Steel
7. Write down the basic constituents of a tyre.
   1. Rubber – natural or synthetic
   2. Nylon or Rayon cord fabric
   3. Steel
8. What are the inspecting methods used in tyres?
   1. Visual inspection
   2. Thorough inspection.
9. Describe 154 SR-14 in tyre designation.
   The code 154 SR-14 refers to the tyre having speed rating upto 170kmph of radial tyre and the width of W=154mm with D=14inches.

10. Define tube vulcanization.
    The process of repairing a punctured tube is known as tube vulcanization.

11. What is meant by camel block?
    Fresh tread material is known as 'Camel Block' is placed around the tread and put in retreading machine and clamped.

12. What is wheel balancing?
    Balancing the wheel assemblies correctly to avoid such vibration is known as wheel balancing.

13. Classify wheel balancing.
    1. Static balance
    2. Dynamic balance
14. Classify air suspension system.
    a. Bellow type air suspension
    b. Piston type air suspension
15. State Pascal's law.
    It states that the total pressure acting on the transmission system is equal to the sum of pressures acting in all directions without any losses.

PART-B

1. What are the different types of wheels? Discuss their relative merits.
2. What are the different types of steering gears used in an automobile?
3. Explain the rack and pinion steering system of an automobile.
4. Explain the operation of a telescopic type shock absorber with a sketch.
5. Explain the working of Disc brake system.

UNIT-5 - ALTERNATIVE ENERGY SOURCES

PART-A

1. What are the alternative fuels available?
   Natural gas, LPG, Biodiesel, Gasoholo, Hydrogen, Electricity and Fuel cells.

2. Define volatility.
   Volatility indicates a fuel's ability to vaporize under different temperatures and pressures.

3. What is meant by Octane number?
   Octane numbers measures a fuel's tendency to knock in a spark ignition engine.

4. Define flame speed.
   The speed at which a flame front propagates through a fuel/air mixture can affect engine performance and emissions.

5. Which gas has the highest ignition temperature?
   Hydrogen has the highest auto-ignition temperature at about $1,065^{o}F$.

6. Define flash point.
   The flash point is the lowest temperature at which combustible mixture of fuel vapor and air form above the fuel.

7. What is the composition of natural gas?
   Natural gas has at least 88% methane with the balance being higher weight hydrocarbons.

8. List out the various forms of natural gas.
   Methane, ethane, methanol, ethanol, reformulated and oxygenated gasoline.

9. Write down the components of LPG equipment.
   1. LPG fuel tank
   2. Vaporizer
   3. Fuel metering

10. What are types of LPG vehicles available in the market?
    1. Passenger cars
    2. Two/three wheelers
    3. Buses

11. How is biodiesel prepared?
    The majority of biodiesel is made from soybean or canola oils, but it is also made from waste stream sources such as used cooking oil or animal fats.

12. Mention the methods of producing hydrogen gas.
    1. Steam reforming of natural gas.
    2. Electrolysis of water.

13. List down the vehicles that use electricity as fuel.
    1. GM “EV1”
    2. Toyota RA V-4 Electric vehicle.

14. What is meant by reversible fuel cell?
    Some fuel cells can be run in reverse under certain conditions which produces hydrogen via systems.

15. What is a turbo alternator?
    If a turbine engine is directly coupled to a generator, it is often called turbo generator or turbo alternator.

PART-B

1. Explain the various components of CNG conversion kit used in S.I. engines.
2. Describe the salient features of using LPG as an alternate fuel.
3. Discus the properties of hydrogen.
4. What are the advantages and limitations of electric vehicle?
5. Discus the principle of operation of a fuel cell with a neat sketch.

Automobile Ebgineering - Question Bank

UNIT-1

Part A

1. .What are the functions of frame?
2. List out the various materials used in the construction of chassis frames.
3. Write down any two main sections of vehicle construction.
4. What are two types of vehicle suspensions?
5. What loads are coming to axle?
6. What is the function of gear box?
7. Why you need a gear box?
8. Name the different kind of resistances to vehicle motion
9. Why is the frame narrow at front?
10. List out the various materials used in the construction of vehicle body
11. Why are the side members of the frame upswept at two places?
12. What is the function of a bumper?
13. What are the stresses to which the frame members are subjected to?
14. Name few components of engine.
15. What are the types of frames?

Part B

16. Compare the merits and demerits of a frameless construction with those of the conventional framed construction. (16)
17. Explain the following terms:
(i) Load distribution in frames (ii) Frame types with sketch (iii) Frame materials (iv) Frame testing. (16)
18. Explain the construction of various frames used in automobiles with neat sketch. (16)
19. (i) Define chassis, frame, body and suspension. (4)
(ii) Explain briefly about structure of passenger car with neat sketch. (12)
20. (i) Discuss the various resistances to vehicle motion (8)(ii) Discuss the need of a gear box. (8)
21. Explain any five components of engine with neat sketch. (16)
22. Explain the materials used to manufacture the components of engine (16)
23. Explain briefly the various types of chassis construction with suitable diagrams. (16)
24. Discuss briefly the details of a two wheeler frame. (16)
25. Explain integral and semi integral type vehicle body construction. (16)

UNIT- 2

Part A

1. What is gasoline injection?
2. What is conventional ignition system?
3. Define common rail ignition system..
4. What is unit injection system?
5. What is a rotary distributor?
6. What are the functions of a spark plug?

7. Write is Electronic ignition system?
8. What is the functions of Turbo chargers?
9. Why the . Engine emissions to be controlled?
10. What are the advantages of petrol injection?
11. What is super charging?
12. What are the pollutants emitted by automobile?

Part B

1. Explain the working principle of electronic ignition system (16)
2. Discuss the merits and demerits of electronic ignition system (16)
3.. With a suitable sketch, explain the Electronically controlled gasoline injection system (16)
4.. With a neat sketch, explain the Electronically controlled diesel injection system. (16)
5.. Explain the turbo charging system with neat sketch. (16)
6. What is 3 way catalytic converter? Explain its working principle. (16)
7. Explain common rail direct injection system with neat sketch. (16)
8. Explain the Unit injector system with neat sketch. (16)

UNIT-3

Part A

1. State the functions of clutch.
2. What is the function of pressure plate in a clutch?
3. What are the different types of clutches?
4. Write the main function of gear box.
5. What are the functions of universal joint?
6. State the function of differential unit.
7. What is meant by differential lock?
8. What is a fluid coupling?
9. State the functions of slip joint.
10. What is the function of a propeller shaft?
11. What are the requirements of an automotive transmission?
12. What are the requirements of a clutch?
13. What are the types of gear box?
14. What is the use of torque convertor?
15. State the forces act on the rear axle.

Part B

16. (i) Explain the working principle of torque tube drive with neat sketch. (8)
(ii) Explain the working principle of hotch kiss drive with neat sketch. (8)
17. Explain the construction and working principle of a typical gear box. (16)
18. (i) What is a clutch? Explain the operation of centrifugal clutch. (8)
(ii) Explain the working principle of synchromesh gear box with neat sketch. (8)
19. (i) Explain the types of rear axles with neat sketch. (12
)(ii) What is the necessity of a gear box? (4)
20. Explain the working principle of fluid flywheel with neat sketch and also mention the limitations. (16)
21. Explain the single plate clutch and multiplate clutch with neat sketch. (16)
22. (i) Explain the working of sliding mesh gear box with neat sketch. (10)
(ii) Explain the working of a cone clutch. (6)
23. (i) Explain the working of a constant mesh gear box. (8)
(ii) Explain the working of universal joint with neat sketch. (8)
24. (i) Explain the working of epicyclic gear box with neat sketch. (8)
(ii) Compare fluid coupling and torque convertor. (8)
25. Explain the construction and working of a differential unit with neat sketch. (16)
26. Explain the principle of working of torque convertor with neat sketch. (16)

UNIT-4

PART - A

1.Define wheel track and wheel base.
2. Give a brief note on damper.
3. Distinguish between disc brake with drum brake.
4. What is meant by bleeding of brakes?
5. Define steering gear.
6. What are the four types of wheels?
7. What is the purpose of Toe -in and Toe-out?
8. What are the different types of tyres used in automobile?
9. What are the different types of springs used in suspension system?
10. Define king pin inclination.
11. Give the function of tyre?
12. Define caster and camber.
13. What are the benefits of anti -lock brake system?

Part B

14. (i) Sketch and explain various steering geometries. (8)
(ii) Explain with the help of simple diagram the different typas of stub axles. (8)
15. Explain the working principles of hydraulic brake with neat sketch. (16)
16 (i) Explain a typical power steering system. (8)

(ii) Explain the wheel ali gnment system. (8)
17. (i) Explain any one type of steering gear box with neat sketch. (12)
(ii) What is the necessity of a steering gear? (4)
18. Explain the steering geometry with neat sketch. (16)
19 Explain the working of power steering with neat sketch. (16)
20. (i) Explain the Ackerman principle of steering with neat sketch. (10)
(ii) Explain the working of torsion bar with neat sketch. (6)
21 (i) Explain the working of rear independent suspension system with neat sketch. (8)
(ii) Explain the working of front independent suspension system with neat sketch. (8)
22. (i) Explain the working of shock absorber with neat sketch. (8)
(ii) What are the objectives and components of suspension system. (8)
23. Explain the mechanical brakes with neat sketch. (16)
24. Explain the pneumatic or air brakes with neat sketch. (16)

UNIT - 5

UNIT-5

PART - A

1. List the advantages of hydrogen fuel used in automobiles.
2. What is a hybrid vehicle?
3. What is a fuel cell?
4. Write the composition of LPG and CNG.
5. Define detonation and pre-ignition.
6. What is the need for CNG?
7. What are the advantages of an electric car?
8. What are the advantages of hybrid system?
9. State the advantages of fuel cell.
10. What are the types of fuel cell?

Part B

11. How bio diesel is produced? Explain and its usage in automobiles. (16)
12. Explain the operation of hydrogen fueled vehicle with neat sketch. (16)
13. Explain the working principle of fuel cell with neat sketch. (16)
14. Discuss the operation of an LPG propelled vehicle with neat sketch. (16)
15. Explain the concept of hybrid vehicles with neat sketch. (16)
16. (i) Explain the usage of gasohol fuel in automobiles. (8)
(ii) Explain the working of an electric car. (8)