SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Department of Mechatronics Engineering

16MC417 - AUTOTRONICS

QUESTION BANK

2 MARKS QUESTIONS

UNIT-1 INTRODUCTION

1. **What are the functions of a frame?**
   To support the chassis components and the body
   To withstand static and dynamic loads without undue deflection or distortion
   To carry the load of the passengers or goods carried in the body.

2. **List out the various materials used in the construction of chassis frames.**
   Low Carbon Steel - 0.18 or 0.20 % carbon content
   High Carbon Steel - 0.25 % carbon content
   Alloy Steel – With alloying elements like Ni & Cr

3. **Write down any two main sections of vehicle construction.**
   Chassis construction
   Body construction

4. **What are two types of vehicle suspensions?**
   Rigid axle suspension
   Independent suspension

5. **What loads are coming to axle?**
   Vertical bending load due to vehicle weight
   Driving torque
   Braking torque
   Side thrust

6. **What are the functions of a gear box?**
   It has to provide torque multiplication
   It has to provide neutral position
   It has to provide the means to reverse a vehicle

7. **Why you need a gear box?**
   When a vehicle is moving on a road, it has to encounter different resistances depending upon the road surface, vehicle speed and road gradient. Hence, wheel torque required at road wheels is different for different operating conditions. To satisfy this requirement, a gearbox is necessary in a vehicle.

8. **Name the different kind of resistances to vehicle motion.**
   Air resistance
   Rolling resistance
   Gradient resistance

9. Why is the frame narrow at front?

The frame is narrowed at the front to provide a better steering lock.This also permits smaller turning circle radius

10. List out the various materials used in the construction of vehicle body

Wood Metals
Plastics
Mixed construction of all these materials

11. Why are the side members of the frame upswept at two places?

The frame is upswept at the rear and front to accommodate the movement of the axles due to springing. It also keeps the chassis height low.

12. What is the function of a bumper?

A bumper is the front-most or rear-most part, which is designed to allow the vehicle to sustain an impact without damage to the vehicle's safety systems

13. What are the stresses to which the frame members are subjected to?

Frame longitudinal members – bending stress
Frame side members – twisting stress

14. Name few components of engine.

- Cylinder block
- Cylinder head
- Crankcase
- Cylinder
- Piston
- Connecting rod
- Crankshaft
- Camshaft
- Valves
- Spark plug (in the case of petrol engine)
- Fuel injector (in the case of diesel engine)

15. What are the types of frames?

- Ladder type frame
- Perimeter type frame
- X type frame
- Backbone type frame

16. What is meant by self-propelled vehicle?

A self propelled vehicle is known as an “Automobile”

17. List the various manufacturers of automobile products in India.

Maruti, Hyundai, Nissan, Ford – Passenger Vehicles Tata, Ashok Leyland – Heavy Commercial Vehicles Bajaj, Hero Honda, TVS Suzuki – Two Wheelers Bajaj, Mahindra – Three Wheelers

18. State the major types of automobiles according to the fuel used.

- Petrol Engines (SI engines)
- Diesel Engines (CI engines)
- Gas Engines (either SI or CI mode)

19. Classify automobiles with respect to the drive of the vehicle.

- Front wheel drive
- Rear wheel drive
- All four wheel drive
- Left hand drive
- Right hand drive

20. What is meant by the term Chassis?

A complete vehicle without a body structure is known as Chassis. It comprises of basic structure, power unit, transmission system, controls and auxiliaries.

21. How automobiles are classified into different types?

- Based on Make & Model
- Based on Fuel
- Based on Body Style
- Based on No. of Wheels
- Based on Drive
- Based on Transmission

22. What are the two types of cylinder liners?

- Dry liners
- Wet liners

23. What are the functions of piston rings?

To provide a gas tight seal between the piston and cylinder liner to prevent the escape of gases from top side of the piston to the underside.

24. What are the two types of piston rings?

- Compression rings
- Oil rings

25. What are the different methods of engine cooling?

- Air cooling
- Oil (or) Water cooling

26. What are the advantages of air-cooled engines?

- Less weight-power ratio
- Does not require radiator and water pump
- No antifreeze agents required
- No salt and mud deposits in the system
- Air cooled engines are cheaper

27. What are the components of water cooling method?

Water pump, radiator tube, upper tank, lower tank, thermostat valve etc.

28. State the difference between S.I and C.I engine. Parameter SI Engine CI Engine

Type of fuel Petrol Diesel

Compression Ratio Low (6 to 10) High (12 to 24) Operating cycle Otto cycle Diesel or Dual cycle Thermal efficiency Low High

29. What is clearance volume? And what are its effects?

The volume above the piston, when it reaches TDC is known as clearance volume. The clearance volume is inversely proportional to the compression ratio.

30. What are the functions of piston, connecting rod, crank shaft and cylinder head?

Piston – The piston assembly transfers the force from the power stroke to the crankshaft Connecting rod – converts reciprocating motion of piston into rotary motion of crankshaft Cylinder head – it acts as a top cover to the cylinder block. The valves are placed in the cylinder head in an overhead valve engine.

31. What is the purpose of cooling system?

The purpose of cooling system is to cool the engine components in order to keep their temperature below certain limit and thereby avoiding excessive thermal stress in those components.

32. State the merits and demerits of air and water cooling system. Air Cooling

Merits

1. Less weight-power ratio
2. Does not require radiator and water pump
3. No antifreeze agents required
4. No salt and mud deposits in the system
5. Air cooled engines are cheaper

Demerits

1. Cooling efficiency is lower
2. Non uniform cooling
3. Engines are noisier.
4. It needs impellor or blower to blow air over the fins

Water Cooling

Merits

1. Cooling efficiency is better
2. More uniform cooling
3. Engine operation is silent in nature
4. It does not need an impeller or blower

Demerits

1. More number of components like radiator, water pump
2. Antifreeze agents needed (Ethylene Glycol, Methanol)
3. More salt and mud deposition in the system
4. Engines are costlier

33. What is the purpose of lubricating system? State its types.

The purpose of lubrication system is to supply the lubricating oil between the moving parts of the engine in order to

1. Reduce the friction

2. Provide the cooling effect
3. carry away the deposits formed due to wear and tear

Types: -

Mist lubrication

- Splash lubrication
- Pressure feed lubrication
- Combined splash & pressure feed lubrication

34. What is meant by turbo charging?

Increasing the density of inducted charge/air by using a compressor which gets its power from exhaust driven turbine is known as Turbo charging.

16 Mark Questions

1. **List out various engine terminologies with neat sketch.**
2. **Explain the construction and working details of the two stroke petrol engine with neat sketch.**
3. **Enumerate the working principle of the four stroke engine with neat sketch.**
4. **Discuss any 5 components of the IC engines and specify the functions and materials.**
5. **List out the different layouts in vehicles construction based on chassis, frame and body.**
6. **Discuss and explain about lean burn engines with neat sketches.**

UNIT-2 IGNITION AND INJECTION SYSTEMS

2 MARKS QUESTIONS

35. What is meant by turbo charging?

Increasing the density of inducted charge/air by using a compressor which gets its power from exhaust driven turbine is known as Turbo charging.

35. What are the various pollutants in I.C engine?

HC

CO

NOx

Particulates

SO2

CO2

36. What is meant by P.C.V? And what are its effects?

PCV – Positive Crankcase Ventilation

It is used to reduce the blow-by and thereby unburned hydrocarbon emissions

37. What is a Catalyst?

Catalyst is a chemical substance which increases the rate of chemical reaction. Examples are Platinum, Palladium and Rhodium.

38. Write down the firing order a 4 cylinder and 6 cylinder engine

4 cylinder engine firing order: 1-4-3-2

6 cylinder engine firing order: 1-5-3-6-2-4

39. What is Gasoline Direct Injection?

The gasoline (petrol) is directly into the cylinder at the end of compression stroke as such in diesel engines. This is called Gasoline Direct Injection (GDI)

40. What is conventional ignition system?

The conventional ignition system gets its electrical voltage either from battery or dynamo, which will be boosted to a very high voltage due to which spark is produced in the cylinder to combust the mixture.

41. Define common rail injection system.

A common rail which is maintaining high fuel pressure is connected to individual fuel injectors of a multi cylinder engine.

42. What is unit injection system?

It is an integrated direct fuel injection system for diesel engines, combining the injector nozzle and the injection pump in a single component

43. What is a rotary distributor?

The rotary distributor has a rotating element, which releases a high intensity spark to the individual spark plugs according to the engine firing order.

44. What is the function of a spark plug?

The spark plug is a device to produce electric spark to ignite the compressed air-fuel mixture inside the cylinder.

45. What is an Electronic ignition system?

The ignition system, in which the mechanical contact points are replaced by electronic triggering and switching devices, is known as electronic ignition system

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46. What are the functions of Turbo chargers?

• To produce more power from the same size engine
• To provide the altitude compensation
• To improve more complete combustion & hence less emissions

47. Why the engine emissions to be controlled?

Some of the engine emissions are carcinogenic. Moreover, the engine emissions led to green house effect. For these reasons, the engine emissions need to be controlled.

48. What are the advantages of petrol injection?

- High power can be developed
- It has quick starting characteristics
- It has lowest specific fuel consumption
- Less engine emissions than carbureted engines

49. What is super charging?

The process of increasing the density of inducted charge/ air is known as supercharging. It is performedfor the following reasons.

• To produce more power from the same size engine
• To provide the altitude compensation

• To improve more complete combustion & hence less emissions

50. What is meant by carburetion in I.C engine?

The method of preparing the air-fuel mixture in an IC engine is known as carburetion

51. What are the advantages of electronic fuel injection system over conventional injection?

- Cold starting is easier
- High fuel economy
- Less engine emissions
- Quick response to varying engine operating conditions

53. What is the function of an ignition system in I.C engine?

The function of an ignition system is to ignite the air-fuel mixture at the end of the compression stroke.

54. State the requirements of ignition system? And state its types

- It should consume minimum of power and produce high intensity spark across spark plug electrodes
- It should have a sufficient spark duration which is sufficient to establish burning of air-fuel mixture under all operating conditions
- It should provide sufficient ignition energy over the entire speed range of the engine
- Good performance at high speed
- Longer life of contact breaker points and spark plug
- Adjustment of spark advance with speed and load

Types:

- Battery ignition
- Magneto ignition
- Electronic ignition

55. What is the ignition advance?

When the speed of the engine increases, the ignition timing also needs to be advanced for proper combustion. This process is known as ignition advance.

56. What are the difference between battery coil ignition and magneto ignition system? Battery Ignition

Battery is needed No battery needed. Battery supplies current in primary circuit Magneto produces the required current for primary circuit. A good spark is available at low speed also during starting the quality of spark is poor due to slow speed Occupies more space Very much compact.. Recharging is a must in case battery gets discharged

Magneto Ignition

No such arrangement required Mostly employed in car and bus for which it is required to crank the engine Used on motorcycles, scooters, etc

Battery maintenance is required

No battery maintenance problems

57. What is the function of carburetor?

The function of a carburetor is to prepare the air-fuel mixture according to the engine operating conditions.

59. What are the merits and demerits of mono point and multi point fuel injection system?

1	Single injector is sufficient	Separate fuel injector for individual cylinders
2	Low cost	High cost
3	Low injection pressure	Comparatively higher injection pressure
4	Slightly higher SFC and emissions	than MPFI
5	Low SFC and engine emissions	

63. What is the purpose of Stator in the Torque Converter?

The stator resides in the center of the torque converter. Its job is to redirect the fluid returning from the turbine before it hits the pump again. This dramatically increases the efficiency of the torque converter.

16 MARKS QUESTIONS

1. **What are the different types of ignition systems? Explain in detail with the neat sketches.**
2. **Explain the working principle of electronic ignition systems.**
3. **With a suitable sketch, explain the electronically controlled diesel injection system.**
4. **What is 3 way catalytic converter? Explain its working principle.**
5. **Explain the unit injector system with the neat sketch.**
6. **What is carburetor? Explain in detail with the neat sketches.**

UNIT-3 SENSOR AND ACTUATORS

2 MARKS QUESTIONS

72. What is the function of clutch?

The function of the clutch is to connect and disconnect the engine with road wheels. The clutch has to be disengaged during gear shifting, idling etc.

73. What are the types of clutch?

Friction clutches

- Single plate clutch
- Multi plate clutch
- Cone clutch
- Semi centrifugal clutch
- Centrifugal clutch Fluid clutches
- Fluid flywheel

74. State the requirements of an automotive clutch

a) Torque transmission should be maximum
b) Gradual engagement of clutch plates
c) Heat dissipation should be more
d) Dynamic balancing of clutch components
e) Vibration damping
f) Size should be small
g) Inertia should be low
h) Clutch free pedal play should be sufficient
i) Ease of operation

75. What is the function of gear box? State its types.

The functions of the gearbox are

i). To provide the leverage ratio

ii). To provide the neutral position

iii). To provide a means to reverse the vehicle.

Types

- Sliding mesh gearbox
- Constant mesh gearbox
- Synchromesh gearbox
- Automatic gearbox – Torque converter

76. Why is gear box necessary in automobile?

- The variation of resistance to vehicle motion at different speeds
- The variation of tractive effort of the vehicle required at various speeds
- For above said reasons, a gearbox is necessary in an automobile

77. What is tractive effort?

It is the force available at the road wheels for propelling the vehicle.

$$T = \mu W$$

Where, T = Tractive effort

μ– Coefficient of friction between tyre & road surface

W – Load of the vehicle

78. Why is sliding mesh gear box not preferred?

- More noise
- More wear and tear on the gears
- For smooth, quiet and quick change of gears, the driver requires great skill
- For the above-said drawbacks, the sliding mesh gearbox is generally not preferred.

79. What is automatic transmission?

In the automatic transmission, for changing the gear ratios, manual effort is not at all needed. The change of gear is performed automatically according to the vehicle speed.

80. What is an over drive?

When the speed of the output shaft is greater than the speed of the input shaft, then the drive is known as overdrive. Example: 0.8:1 or 0.9: 1

81. What is a universal joint? What are its types?

Universal joint is a type of flexible joint between two shafts who axes intersect and may assume different inclinations at different times. It is used to transmit power even at inclined angles of the shaft. Types

- Yoke joint
- Single cardan joint
- Double cardan joint
- Rag joint
- Canfield joint

82. State the functions of a slip joint.

The function of a slip joint is to accommodate the propeller shaft length variations, when a vehicle is moving over a bump or bit.

83. What is the necessity of a propeller shaft?

The propeller shaft is used to transmit the power from the gearbox to the final drive. It is also used to cover the span between these two components.

84. What is Hotchkiss drive and Torque Tube drive?

In Hotchkiss drive, the loads such as vehicle weight, driving torque, braking torque and side thrust all are taken by leaf springs. Two universal joints and one slip joint are must needed. In Torque tube drive, the driving torque and braking torque are taken by torque tube while the vehicle weight and side thrust are taken care of by leaf springs. One universal joint is just sufficient.

85. What is the function of differential unit?

The function of a differential unit is to permit the vehicle turns without wheel skidding. It permits higher speed for outer wheels and reduced speed for inner wheels during turning.

86. What is the function of pressure plate in a clutch?

The function of a pressure plate is to hold the friction (clutch) plate tightly against the engine flywheel.

87. What is meant by differential lock?

A Differential lock will transmit the same amount of power to both wheels on the axle - which is very useful in 4WD applications where a truck might be stuck and have problems getting out of deep mud or snow.

88. What is a fluid coupling?

Fluid coupling is device which transmits torque due to the kinetic energy of the moving fluid. In a fluid coupling, two members namely impeller and turbine are present.

89. What is the use of torque convertor?

The torque converter is device which provides a varying torque ratio using fluid energy. In a torque converter, three members namely impeller, turbine and stator are present.

90. State the forces act on the rear axle

- Shear force due to vehicle weight
- Bending moment due to vehicle weight
- Driving torque
- Shear force due to side thrust
- Bending moment due to side thrust

91. What are the different types of rear axles?

- Semi floating rear axle
- Full floating rear axle
- Three quarter floating rear axle

92. What is the purpose of Stator in the Torque Converter?

The stator changes fluid flow between the turbine and pump and thus permits the torque multiplication. Without a stator, a torque converter will simply act as a fluid coupling.

93. Why Synchronizer is required in the automotive transmission system?

Synchronizer is used to equalize the speed of two mating surfaces, before the contact is established. By doing so, wear & tear and noise can be avoided.

94. What is transfer box? Where it is used?

The transfer box is used to convert 2 wheel drive into 4 wheel drive. This is mainly used in hilly regions.

16 Mark Questions

1. **Explain construction and working in detail :-**
   - **i) Mechanical clutch**
   - **ii) Electromagnetic clutch**
2. **Explain the construction and operation of hydraulic and vacuum clutch.**
3. **Enumerate the working principle of manual and automatic gear transmission systems.**
4. **State the difference between the fluid flywheel and torque converter.**
5. **Explain the construction and working of Hotchkiss drive.**
6. **Explain the construction and working of Torque tube drive.**

UNIT- 4
ENGINE CONTROL SYSTEMS
2 MARKS QUESTIONS

95. Define wheel track and wheel base.

The distance between the tyre centers, mounted on the same axle is known as wheel track. The wheelbase is the distance between the centers of the front and rear wheels

96. Give a brief note on damper.

It is used to dampen the vibrations of the suspension springs. It is mostly used in independent suspension.

97. Distinguish between disc brake with drum brake. Sl.No Drum Brakes Disc Brakes

1 Relatively cheaper Costlier
2 More weight Lighter than drum brakes
3 Easily subjected to brake fading Offer resistance to brake fading
4 Non uniform pressure distribution Uniform pressure distribution

98. What is meant by bleeding of brakes?

The process of removing air from the hydraulic brakes is known as bleeding of brakes.

99. Define steering gear.

The steering gear is used to convert the rotational movement of the steering wheel into linear movement of the steering linkage. Moreover it provides mechanical advantage.

100. What are the different types of wheels?

- o Pressed steel disc wheels
- o Wire spoke wheels
- o Light alloy casted wheels

101. What is the purpose of Toe-in and Toe-out?

The purpose of providing a toe in and toe out is straight line stability of the vehicle, after negotiating a turn.

102. What are the different types of tyres used in automobile?

- o Cross ply tyres
- oRadial ply tyres
- oBelted bias tyres

103. What are the different types of springs used in suspension system? o Leaf springs (Rigid axle suspension)
Coil springs (Independent suspension)
Torsion bar (Independent suspension)

104. Define king pin inclination.

The tilt of the king pin from the vertical reference line is known as King Pin Inclination (KPI). It is also called as Steering Axis Inclination (SAI)

105. Give the function of tyre?

Supporting Vehicle Weight
Transferring Traction & Braking forces to the Road Surface
Changing & Maintenance Direction of Travel
Absorbing Road shocks

106. Define castor and camber.

Castor: The tilt of the king pin from the vertical reference line when viewed from side is known as castor.

Camber: The camber angle is the inward or outward tilt of the wheel relative to the vertical reference

107. What are the benefits of anti-lock brake system? o Preventing the wheel from locking at the time of braking o Keeping the wheel rotating
Due to rotating wheel, it helps you to steer away the vehicle from the object, while applying brakes at the same time.
It is even more effective in sand, snow, water, and mud where loss of traction is even higher, as on these surfaces, with normal braking system, it is even easier to lock wheels and loose traction but ABS works excellent in these conditions also and stops the vehicle in a much shorter distance.

108. What is steering ratio?

The steering ratio is defined as the ratio of angle turned on the steering wheel to the angle turned by the stub axle.

Steering ratio = Angle turned on steering wheel Angle turned by the stub axle

109. What is toe in and toe out?

The distance between the front ends of wheels is less than the rear end, the condition is said to be toe-in.
The distance between the front ends of wheels is more than the rear end, the condition is said to be toeout.

110. What are the types of steering gear box? a)
Worm & Worm wheel steering gear
b) Worm and Nut steering gear
c) Worm and Roller steering gear
d) Recirculating Ball steering gear
e) Rack and Pinion steering gear

111. What are main advantages of power steering?

o The manual effort required to turn the vehicle is getting reduced. o This layout also gives road feel to the driver.

112. What is function of suspension system in automobile?

The function of the suspension system is to isolate the vehicle and its occupants from road shocks and vibrations generated by the road surface, while maintaining steering control and stability at all times.

113. What is the function of brake? State its type.

The function of brake is to stop the vehicle within a short distance. Types:

1. Mechanical brakes o Drum brakes

o Disc brakes

2. Hydraulic brakes
3. Power brakes

o Air brakes

o Air-hydraulic brakes
o Vacuum brakes

o Electric brakes

114. What are the functions of front axles?

o It carries the weight of the front of the vehicle

o It carries the horizontal and vertical loads on bumpy roads

o It works as a cushion through its spring for a comfortable side o In a four wheel drive, it also transmits power to the road wheels

o When brakes are provided at the front wheels, it withstands bending stresses and torsional stresses

115. What I section at middle and oval section at end is preferred for front axle?

'I' section is suitable for bending loads and 'circular' or 'oval' section is suitable for torsional loads.

Hence I section at middle and circular or oval section at ends is provided in the front axle.

116. What are the different types of stub axles? Which is the most preferred one?

o Elliot

o Reversed Elliot

o Lamoine

o Reversed Lamoine

Out of these four types, Reversed Elliot is the most preferred type.

117. What is meant by the term "tread"?

The tread of a tire refers to the patterns on its rubber circumference that makes contact with the road.

118. What is a self energizing brake?

A brake is called self-energizing if it uses the rotational force of the wheel to help stop the automobile.

120. What is disc brake?

These brakes are different from drum brakes in that the drum is replaced by a circular plate and the brakeshoes are replaced by a caliper which supports a pair of friction pads, one on each side of the disc. These pads are forced inward by the operating force and so retard the disc.

121. What is meant by electric brake?

In an electric brake, the current from the battery is utilized to energize an electromagnet within the brakedrum. This actuates a cam to expand the brake shoes. When the current is not supplied, the cam and brake shoes are returned to the release position by retractor springs.

122. What is regenerative braking?

A regenerative brake is an energy recovery mechanism, which slows a vehicle by converting its kinetic energy into another form, which can be either used immediately or stored until needed. This contrasts with conventional braking systems, where the excess kinetic energy is converted to heat by friction in the brake linings and therefore wasted.

16 Mark Questions

1. **Discuss construction and working details of Davis and Ackermann steering mechanism.**
2. **What is meant by power steering systems? List out its advantage over conventional steering systems.**
3. **Enumerate and explain:**
   - **i) Plastic suspension systems**
   - **ii) Air suspension systems**
4. **Explain the construction and working principle of hydraulic and diagonal braking systems.**
5. **What is the purpose Antilock braking system in the vehicles? Explain the construction and working.**

UNIT- 5
CHASSIS AND SAFETY SYSTEMS
2 MARKS QUESTIONS

123. List the advantages of hydrogen fuel used in automobiles. o It can be manufactured from water through electrolysis process
o It does not contain carbon. Hence, CO and unburned HC emissions are not present o The flame speed is highest. Hence it results in high thermal efficiency
o It has wide ignition limits.

124. What is a hybrid vehicle?

A hybrid vehicle is a vehicle that uses two or more distinct power sources to move the vehicle. The term most commonly refers to hybrid electric vehicles (HEVs), which combine an internal combustion engine and one or more electric motors.

125. What is a fuel cell?

A fuel cell is an electrochemical device that converts a source fuel into an electrical current and water. It generates electricity inside a cell through reactions between a fuel and an oxidant, triggered in the presence of an electrolyte.

126. Write the composition of LPG and CNG.

Composition of CNG

CH_4 = 70.9%, C_2H_6 = 5.10%, H_2 = 3%, CO + CO_2 = 22%
Composition of LPG:

Propane= 30 % and Butane = 70 %

127. Define detonation and pre-ignition.

The abnormal combustion occurring in IC engines is called as detonation. This results in sudden rate of pressure rise, abnormal heat release, heavy vibrations of the engine and loud noise operation. The ignition of the air-fuel mixture before the introduction of the spark in the combustion chamber is called as pre-ignition.

128. What are the advantages of an electric car? o No emissions from an electric car

o It does not depend upon the availability fossil fuels

129. State the advantages of fuel cell.

o Higher efficiency than diesel or gas engines.
o Quiet operation.o Fuel cells can eliminate pollution problems

o Don't need conventional fuels such as oil or gas and can therefore reduce economic dependence on oil producing countries, creating greater energy security for the user nation.
o The maintenance of fuel cells is simple since there are few moving parts in the system.

130. What are the types of fuel cell?

o Proton exchange membrane fuel cell o Alkaline fuel cell

o Phosphoric acid fuel cell
o Direct methanol fuel cell
o Solid oxide fuel cell

o Molten carbonate fuel cell

131. What are the alternative fuels?

Alcohols, Hydrogen, Natural Gas, CNG, LNG, LPG, Bio Gas, Producer Gas, Coke oven Gas, Water Gas,
Gasohol, Biodiesel

132. What are the various properties of gaseous fuel?

Advantages

Gaseous fuels due to erase and flexibility of their applications possess the following advantages over solid or liquid fuels:

(a) They can be conveyed easily through pipelines to the actual place of need, thereby eliminating manual labor in transportation.
(b) They can be lighted at ease.
(c) They have high heat contents and hence help us in having higher temperatures.
(d) They can be pre-heated by the heat of hot waste gases, thereby affecting economy in heat.
(e) Their combustion can readily by controlled for change in demand like oxidizing or reducing
(g) They do not require any special burner.
(h) They burn without any shoot, or smoke and ashes.
(i) They are free from impurities found in solid and liquid fuels.

Disadvantages

(a) Very large storage tanks are needed.
(b) They are highly inflammable, so chances of fire hazards in their use is high

133. What is CNG?

Compressed Natural Gas. It is typically stored in a tank at a pressure of 3,000 to 3,600 pounds per square inch

134. What is BIO- DIESEL? State its advantages.

Biodiesel is a non-petroleum based diesel fuel which consists of the mono alkyl esters of long chain fatty acids derived from vegetable oil and animal fats.

Advantages

o Domestically produced from non-petroleum, renewable resources
o Can be used in most diesel engines, especially newer ones
o Less air pollutants (other than nitrogen oxides)
o Less greenhouse gas emissions (e.g., B20 reduces CO_2 by 15%)
o Biodegradable
o Non-toxic
o Safer to handle

135. What are advantages of LPG over conventional fuels?

o LPG contains less carbon than petrol
o LPG mixes with air at all temperatures
o In multi cylinder engines, a uniform mixture can be supplied to all cylinders
o Since the vapour in the form of vapour, no crankcase dilution
o Automobile engines can use propane if they use high compression ratio.
o LPG has better antiknock characteristics
o Running on LPG produces fuel saving cost of about 50%
o The engine will have 50% longer life.

136. What are the disadvantages of using alcohol as an alternative fuel?

o A larger quantity of fuel is required to produce a specified power output. For example, in an automobile, more fuel is required for each mile driven.
o Low boiling points and high vapor pressures of methyl and ethyl alcohol indicate that vapor lock could be a serious problem, particularly at high altitudes on warm summer days.
o The relatively high latent heats of methyl and ethyl alcohol cause problems in mixing these alcohols with air and transporting them through the intake manifold of the engine. Heating the intake manifold may be necessary in cold weather or before the engine reaches operating temperatures.
o Without external heat to more completely vaporize the fuel, the engine may be difficult to start and sluggish for a considerable time after starting.
o All of the alcohols are soluble in water, but butyl alcohol is relatively insoluble compared to methyl and ethyl alcohol. Less engine power is produced as the water content of an alcohol increases. Further, vapor lock, fuel mixing and starting problems increase with water.

137. Define flame speed.

The speed at which flame travels inside the combustion chamber is called as flame speed. The unit is m/s.

138. List out the various forms of natural gas.

o Natural Gas (NG)
o Compressed Natural Gas (CNG)
o Liquefied Natural Gas (LNG)

139. Write down the components of LPG equipment.

o Converter
o Mixer
o Gas Injector

140. Write down the parts of a fuel cell.

o Anode
oCathode
oElectrolyte o Fuel

141. What are the properties of CNG?

o Colourless
o Odourless
o Lighter than air
o Non - toxic

142. What are the two types of LPG used for automotive-engine fuel?

o Propane based LPG
o Butane based LPG

143. What are the main components of electric and hybrid vehicles?

o Gasoline engine
o Fuel tank
o Generator
o Electric motor o Battery
o Transmission elements

144. What are the advantages of fuel cell?

o The only by product from the fuel cell is either water or CO2, which can be safely disposed. o It is compact in size
o As long as there is a supply of fuel, there will be generation of electricity.

145. What are the advantages of Gasohol?

Gasohol – It is the mixture of 10 % Ethanol + 90 % unleaded gasoline
o 10 % fuel savings in terms of consumption of petrol
o Less emissions than conventional petrol fuelled vehicles

16 Mark Questions

1. **Explain the production of natural gas with neat sketch in detail.**
2. **With a simple sketch explain the construction and working of fuel cell.**
3. **Discuss the electric and hybrid vehicle with neat sketch.**
4. **Discuss the use of alternate fuels in the automobile engines**
   - **i) Biodiesel**
   - **ii) LPG**
   - **iii) CNG**
5. **Write a short note on Stabilizers and Electric vehicles.**
6. **With a schematic layout, explain the working of series and parallel hybrid cars**