# KINGS

COLLEGE OF ENGINEERING

## DEPARTMENT OF MECHANICAL ENGINEERING

### QUESTION BANK

**Subject Name: AT1360- AUTOMOBILE ENGINEERING** **Year/Sem: III / VI**

### UNIT-I VEHICLE STRUCTURE AND ENGINES

### PART A (2 MARKS)

1. State major types of automobiles according to the fuel used.
2. List any four components of a chassis.
3. Mention any two requirement of an automobile.
4. List any four characteristics of a good chassis.
5. Give any two requirement of good frame.
6. Define cross wind force.
7. State any four functions of lubrication.
8. State purpose of providing radiator in cooling systems.
9. Name any four air pollutants.
10. What do you mean by Electronic Engine Management system?

### PART B (16 MARKS )

01. Explain the construction of various frames used in automobiles with neat sketch. (16)
02. Discuss the Construction and working principles of 3-way Catalytic controller (16)
03. Explain the following terms :
    Load distribution in frames
    Frame types with neat sketch
    Frame materials
    Frame testing. (16)
04. i) Explain the operation of the typical turbocharger with sketch. (8)
    ii) Discuss the principle of operation of a four stroke cycle S.I. Engine with a neat sketch. (8)
05. With the help of neat sketch explain in detail about the construction and working of different engine components? (16)
06. i) What are the functions of a cooling system? (2)
    ii) Sketch and explain different types of lubrication systems used in automotive engines. (14)
07. i) What do you know about emission norms? Discuss. (7)
    ii) With a block diagram discuss the operational features of electronics engine management system. (9)

08. i) What are the desirable properties of a good lubricant? (8)
ii) Draw the layout of an automobile and indicate the various components. (8)
09. Discuss various methods to reduce the level of pollutants in the exhaust gases. (16)

## UNIT II

## ENGINE AUXILLARY SYSTEM

### PART A (2 MARKS)

1. What is carburetor?
2. What are the requirements of a spark plug?
3. List out the main functions of a battery.
4. What is a variable jet carburetor?
5. What is the function of ORC in a starting motor?
6. Name the components of battery coil ignition system used in vehicle.
7. What is the purpose of Cut-out relay?
8. What are the important units electronic fuel injection system?
9. Mention the two ways of determining the stste of charge.
10. What are the factors to be considered for comparing magneto and coil ignition system?

### PART B (16 MARKS )

01. Briefly discuss the working principle of a simple Carburator system. (16)
02. Describe the construction and working principles of Battery-Coil ignition system. (16)
03. i) What is carburetion? Explain principle of carburetor. (8)
ii) With suitable sketch explain the principle of the MPFI. (8)
04. i) Explain CDI ignition system with a suitable diagram. (8)
ii) Sketch and explain the starting circuit of the cranking motor. (8)
05. i) Differentiate Electronic Fuel Injection system from Conventional Fuel Injection system. (4)
ii) Describe about Multi Point Fuel Injection System of an automotive engine. (12)
06. With the help of neat sketches explain in detail about Battery, Magneto coil and Electronic Ignition Systems. (16)
07. i) Discuss the construction, operation and maintenance of lead acid battery. (8)
ii) Explain the different tests conducted to assertain the condition of the battery. (8)
08. With suitable sketches explain mono point and multi point fuel injection systems and bring out the comparative features. (16)
09. i) Explain the working features of a starter motor with a neat diagram. (8)
ii) Explain the operation of a MPFI system and compare it with TBI system. (8)

## UNIT III

## TRANSMISSION SYSTEM

### PART A (2 MARKS)

1. What are the function of clutch?
2. What is the function of Synchromesh unit in a gear box?
3. State the function of differential unit.
4. What are the functions of universal joint?
5. List out the functions of a propeller shaft.
6. Why epicyclic gears are used in overdrive units?
7. Classify gear box.
8. Why is double cluching technique used?
9. How torque converter gearbox differs from fluid flywheel?
10. State the phenomenon of torque multiplication.

### PART B (16 MARKS )

01. Explain the construction and working principles of a typical automobile gear box. (16)

02. Discuss the working principles of
    (i) Torque tube drive. (8)
    (ii) Hotchkiss drive. (8)

03. i) What is clutch? Explain the operation of centrifugal clutch. (8)
    ii) Explain the working principle and application of a freewheel drive in a transmission system. (8)

04. i) Explain different type of rear axles with neat sketch. (10)
    ii) What is differential? Explain its operation with sketch. (6)

05. Explain in detail about any one type of Synchromesh Gear Box with neat sketches. (16)

06. i) What are the effects of wheel bearing layout on axle loading? (8)
    ii) What do you mean by double reduction axle? Explain in detail (8)

07. i) What are the features of a good quality clutch? Explain the working of multi plate clutch with a neat sketch. (12)
    ii) What is the function of a clutch? List out the requirement of a clutch. (4)

08. Discuss the fully floating axle and three-quarter floating axle with neat sketches. (16)

09. Explain with suitable sketches the operational features of sliding mesh gearbox. (16)

## UNIT IV

## STEERING BRAKES AND SUSPENSION

### PART A (2 MARKS)

1. List out the types of front axle.
2. What is meant by bleeding of brakes?
3. Classify independent rear suspension system.
4. What are the functions of suspension system?
5. Define slip angle.
6. Define overall steering ratio.
7. What is meant by centre point steering?
8. Define caster angle.
9. What is meant by term 'tread'?
10. Compare the advantages of radial tyre over cross ply tyre.

### PART B (16 MARKS )

01. Sketch and explain the working of power steering system. (16)

02. Explain the working principles of Hydraulic braking system with simple sketches. (16)

03. i) Sketch and explain various steering geometries. (8)
    ii) Describe with the help of simple diagram the different type of stub axles. (8)

04. i) Give short note on leaf spring suspension system. (4)
    ii) Explain the operation of Hydraulic braking system with neat sketch. (12)

05. With the aid of neat sketches, Explain in detail about construction and working of disk brake system. (16)

06. Explain in detail about a typical front suspension with neat sketches. (16)

07. i) Discuss air suspension system with a sketch. (8)
    ii) How wheel alignment done in automobiles? Explain. (8)

08. i) Explain with the help of a suitable sketch the construction of the disc wheel. (8)
    ii) Draw and explain the cross section of an automobile tyre. (8)

09. Discuss the construction details of leaf, coil and torsion bar springs. (16)

10. Sketch and explain a typical power steering gear box and compare it with ordinary steering system. (16)

11. Discuss the working of telescopic suspension system used in cars. (16)

## UNIT V

## ALTERNATIVE ENERGY SOURCES

### PART A (2 MARKS)

1. What is meant by a fuel cell and how it works?
2. List down the properties of alternate fuels.
3. State any two advantages of methane as fuel in automobiles.
4. What is meant by reformulated and oxygenated gasoline?
5. What is meant by reversible fuel cell?
6. Mention the various methods of storing hydrogen.
7. What is meant by transesterification?
8. Why biodiesel mixed with conventional diesel?
9. How can be fermentation process defined?
10. What are the advantages and limitations of alcohols are engine fuel?

### PART B (16 MARKS )

01. Discuss the operation of an LPG propelled Automobile with neat sketch. (16)

02. Explain the construction and working principle of Fuel cells, with simple sketches. (16)

03. How bio diesel is produced? Explain and its usage in automobile. (16)

04. Explain the operation of Hydrogen fueled vehicle with neat sketch. (16)

05. Discuss in detail about different alternate fuels for automotive engines with respect to the following aspects :
    - (i) Emission
    - (ii) Cost
    - (iii) Reliability
    - (iv) Availability
    - (v) Engine modifications needed. (16)

06. i) What is fuel cell? What are the advantages of Fuel Cells? (4)
ii) Explain in detail about different types of Hybrid vehicle constructions with neat sketches. (12)

07. i) Explain the method of biodiesel production through transesterification process. (8)
ii) Discuss the alternative fuel suitable for compression ignition engine driven automobiles. (8)

08. i) Briefly explain the methods of using natural gas as diesel engine fuel. (8)
ii) List out the different properties of hydrogen relevant to its use of I.C. Engines. (8)

09. i) Explain the series and parallel hybrid drive trains. (8)
ii) Discuss the drive system of an electric vehicle. (8)