GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK

Subject Name & Code:

AUTOMOBILE ENGINEERING- 3161920

Unit 1: Introduction & Vehicle Layouts

Repeated Questions:

1. Explain different types of vehicle bodies with neat sketch. (S25 - Q1c, 07 marks) | (W24 - Q1c, 07 marks) | (W25 - Q1c, 07 marks)
2. Classify automobile vehicles. (W25 - Q1b, 03 marks) | (W24 - Q1a, 03 marks) | (S24 - Q1a, 03 marks)
3. Compare Front wheel drive layout and rear wheel drive layout for passenger car. (W22 - Q1a, 03 marks) | Draw the vehicle layout of (1) front engine front wheel drive (2) four wheel drive in automobile. (S25 - Q1a, 03 marks) | Draw the vehicle layouts showing (1) Front engine front wheel drive and (2) Four wheel drive in Automobile. (W25 - Q1a, 03 marks)
4. List the different component which included in chassis. Classify the chassis and explain functions of chassis. (S22 - Q1c, 07 marks) | Explain function of Automobile chassis. (S24 - Q1b, 04 marks) | What are the functions of chassis? List components installed on chassis. (W25 - Q1b, 04 marks)

Other Important Questions:

1. Draw the Four-wheel drive vehicle layout. State three advantages and three disadvantages of it. (S22 - Q2c, 07 marks)
2. What is automotive system? Classify the vehicle with respect to its body types. (S22 - Q1a, 03 marks)
3. Give a brief history of automobile development. (S23 - Q1a, 03 marks)
4. Discuss functional requirements of vehicle body. (S24 - Q1c, 07 marks)
5. Describe the development stages of automobile. (W23 - Q1a, 03 marks)
6. Explain in brief the specifications of automobile bodies. (W23 - Q1b, 04 marks)
7. Write four functional requirements of vehicle body. (W24 - Q1b, 04 marks)
8. List various types of automobile layouts and its arrangement. For any one, write two advantages and two disadvantages with neat sketch. (W24 - Q1c, 07 marks)
9. Discuss various types of materials used in automobile body construction. (W24 - Q2a, 03 marks)
10. Write two advantages and two disadvantages of frameless construction of automobile vehicles. (W24 - Q2b, 04 marks)
11. Classify automobile vehicles based on any four criteria. (S25 - Q1b, 03 marks)
12. Analyze the selection of body member cross sections. (S22 - Q2a, 03 marks)
13. Explain function of frame. (S22 - Q1b, 04 marks)

Unit 2: Road Load Analysis

Repeated Questions:

1. Explain rolling resistance, gradient resistance and wind resistance. (W23 - Q1c, 07 marks) | (S25 - Q2a, 04 marks)
2. Discuss different types of resistances acting on vehicles in motion. (W24 - Q2c, 07 marks) | Explain various resistance to motion of a vehicle in detail. (S25 - Q2 OR c, 07 marks) | Discuss three types of resistances acting on Automobile vehicles. (S22 - Q2b, 04 marks)
3. Explain the stability of a vehicle in motion around the curve. (S24 - Q2 OR c, 07 marks) | (W24 - Q2 OR c, 07 marks)
4. Define road resistance, gradient resistance and tractive force. (W25 - Q2a, 03 marks) | Explain Rolling resistance, Grade resistance and Tractive force (with uniform speed and with acceleration) for a vehicle in motion, with neat sketch. (W22 - Q2c, 07 marks)

Other Important Questions:

1. Define and discuss the air resistance, rolling resistance and gradient resistance. (S23 - Q1b, 04 marks)
2. What is equivalent weight of vehicle? Derive the equation for equivalent weight for a vehicle. (S23 - Q1c, 07 marks)
3. Explain different forces acting on vehicle in motion. (S24 - Q2b, 04 marks)
4. Discuss stability of a vehicle in motion around the curve. (S24 - Q2c, 07 marks)
5. Define Transmission efficiency. (S24 - Q2a, 03 marks)
6. Derive the equation of maximum speed of vehicle while taking a left turn on road for its stability. (W25 - Q2b, 04 marks) | (W22 - Q2 OR c, 07 marks)
7. Derive maximum possible velocity to avoid skidding for the vehicle moving on a level curved path. (S23 - Q5b, 04 marks)
8. Describe various forces acting on vehicle body with neat sketch. (W22 - Q1b, 04 marks)
9. Describe the change in reaction force on tyres of car for following conditions (1) Starting with acceleration if car has front wheel drive (2) Starting with acceleration if car has rear wheel drive (3) While taking a right curve with uniform velocity (4) While applying a short break. (W22 - Q1c, 07 marks)
10. Write the various types of loads acting on vehicle body. Explain any one with neat sketch. (W23 - Q2b, 04 marks) | (S25 - Q2b, 04 marks)
11. Explain the importance of aerodynamic shape of car body. (W23 - Q2a, 03 marks)
12. Write a short note on vehicle aerodynamics. (S22 - Q2 OR c, 07 marks) | (S25 - Q2c, 07 marks)
13. Explain various resistance to motion of a vehicle in detail. (S25 - Q2 OR c, 07 marks)

Unit 3: Power Transmission Systems

Repeated Questions:

1. Explain construction and working of single plate clutch with neat sketch. (S24 - Q3c, 07 marks) | (W23 - Q2c, 07 marks) | Explain the single plate clutch with neat sketch. (W23 - Q2c, 07 marks)
2. Why differential gear box is used in vehicles? (W25 - Q4a, 03 marks) | (W22 - Q3a, 03 marks) | Why the differential is needed in automobile? (S23 - Q2c, 07 marks) | Explain the necessity of a differential in an automobile. (S22 - Q3 OR c, 07 marks)
3. Compare Hotchkiss drive with Torque tube drive. (W25 - Q5 OR b, 04 marks) | (S22 - Q3 OR a, 03 marks) | (S25 - Q3 OR b, 04 marks)
4. Explain the construction and working of sliding mesh gear box using neat sketch. (W22 - Q3c, 07 marks) | Explain working and construction of sliding mesh gear box. (W25 - Q4c, 07 marks)
5. Explain with figure construction and working of multi plate clutch. (W25 - Q2c, 07 marks) | Explain the working of multi plate clutch. (W24 - Q3b, 04 marks)
6. What is Continuous Variable Transmission (CVT)? (S24 - Q3 OR a, 03 marks) | What is a CVT? Describe its principle of working in detail with the help of simple diagrams. Discuss also its main advantages and limitations. (S23 - Q5 OR c, 07 marks)
7. Explain semi centrifugal clutch with neat sketch. Also compare it with centrifugal clutch. (W25 - Q2 OR c, 07 marks) | Compare semi centrifugal and centrifugal clutch. (S24 - Q3b, 04 marks)
8. Explain torque converter with neat sketch. (S23 - Q2 OR c, 07 marks) | (W23 - Q3b, 04 marks)
9. How automatic transmission works? (S22 - Q4 OR a, 03 marks) | (W24 - Q3 OR a, 03 marks) | Explain automatic transmission in detail. (W23 - Q2 OR c, 07 marks)
10. Explain the necessity of transmission in a vehicle. (W25 - Q4b, 07 marks) | State the necessity of transmission in an Automobile vehicle. (S22 - Q4a, 03 marks)

Other Important Questions:

1. What are the essential properties required for clutch facing materials? (S23 - Q2a, 03 marks)
2. Why is a synchronizer ring sometimes used in gear-box? What are its merits and demerits compared to sliding mesh. (S23 - Q2b, 04 marks)
3. Draw a neat diagram and explain its operation [of differential]. (S23 - Q2c, 07 marks)
4. Classify types of clutch. (S24 - Q3a, 03 marks)
5. Explain function of propeller shaft. (S24 - Q3 OR b, 04 marks) | What is the function of propeller shaft? Also draw its figure. (S22 - Q3 OR b, 04 marks)
6. Discuss fault and diagnosis of power transmission system. (S24 - Q3 OR c, 07 marks)
7. Explain working of differential gear box with neat sketch. (S24 - Q4c, 07 marks) | Describe construction and explain working of differential gear box. (W24 - Q3c, 07 marks) | Explain the conventional differential gear box with neat sketch. (W23 - Q3 OR b, 04 marks)
8. Derive expressions for effective mean radius and torque transmitted in case of a single plate clutch assuming different conditions. (S23 - Q4c, 07 marks)
9. Explain in detail - Double Declutching. (S23 - Q4 OR a, 03 marks)
10. With the help of road performance curve explain the necessity of gear box in an Automobile. (W23 - Q3c, 07 marks)
11. What is the purpose of providing universal joint and slip joint with the propeller shaft? (W23 - Q3a, 03 marks)
12. Distinguish between the cross type and ball trunnion type universal joint. (W23 - Q3 OR a, 03 marks)
13. What is synchronesh device? Describe the working of synchronesh gear box. (W23 - Q3 OR c, 07 marks)
14. Differentiate between single plate and multi plate clutch. (W22 - Q2b, 04 marks)
15. Why bike has a lever to engage and disengage clutch but in car it is missing? (W22 - Q2a, 03 marks)

16. Differentiate between manual transmission and continuously variable transmission. (W22 - Q3b, 04 marks)
17. Explain with a neat sketch the working of a Synchromesh mesh type gear box used in automobiles. (S22 - Q4c, 07 marks)
18. Explain constant mesh gearbox working with neat sketch. (S25 - Q3c, 07 marks)
19. Draw the layout of transmission system. (S25 - Q3b, 04 marks)
20. Point out need of clutch in automobile. (S25 - Q3a, 03 marks)
21. Give the function of (1) propeller shaft and (2) universal joint. (S25 - Q3 OR a, 03 marks)
22. Explain the necessity, construction and operation of the differential. (S25 - Q3 OR c, 07 marks)
23. Write types of manual gear boxes used in automobile vehicles and explain working of any one in detail. (W24 - Q3 OR c, 07 marks)
24. Fault and diagnosis of power transmission system. [From Syllabus Image]
25. Describe construction and explain working of centrifugal clutch with neat sketch. (S22 - Q4 OR c, 07 marks)
26. How centrifugal clutch is different from normal clutch? Explain its construction and working with neat sketch. (W22 - Q3 OR c, 07 marks)

Unit 4: Axle, Suspension & Steering System

Repeated Questions:

1. Define caster, camber, King pin inclination. (S25 - Q4a, 03 marks) | (W23 - Q4 OR a, 03 marks) | Write short note on camber angle and castor angle. (S23 - Q3b, 04 marks)
2. Explain wishbone type suspension system. (W25 - Q3c, 07 marks) | Explain double wishbone suspension system. (S25 - Q4c, 07 marks) | Explain with neat sketch wishbone type suspension system. (W23 - Q4 OR c, 07 marks)
3. What is toe in and toe out? When they are used in vehicle design? (W25 - Q3 OR b, 04 marks) | (W22 - Q3 OR b, 04 marks)
4. Compare Disc brake and Drum brake. (S25 - Q4 OR b, 04 marks) | Compare Drum and Disc types of brakes. (S22 - Q3b, 04 marks)
5. List advantages and disadvantages of telescopic shock absorber. (S22 - Q3a, 03 marks) | (S25 - Q4 OR a, 03 marks)
6. Explain working of power steering. (S22 - Q4 OR b, 04 marks) | Write a short note on power assisted steering. (S24 - Q4 OR c, 07 marks) | Write a short note on electric power steering. (W25 - Q3 OR c, 07 marks)
7. What are the functions of suspension system? (W25 - Q3a, 03 marks) | What is function of suspension system in automobiles? (S24 - Q4 OR a, 03 marks)
8. Explain telescopic type shock absorber with neat sketch. (S23 - Q3c, 07 marks) | Explain with sketch telescopic shock absorber. (W23 - Q4c, 07 marks)
9. Explain types of suspension systems. (S24 - Q4b, 04 marks) | Which are the functional requirements of suspension system? Explain working of air suspension system. (W22 - Q4c, 07 marks)

Other Important Questions:

1. Explain briefly 1. Castor angle and 2. King pin inclination. (W25 - Q3b, 04 marks)
2. What do you mean by understeer and oversteer? (W25 - Q3 OR a, 03 marks)
3. Draw neat sketch of rack and pinion type steering gear. (S23 - Q3a, 03 marks)
4. What is bleeding of brake? Why it is necessary? Explain the procedure used during bleeding. (S23 - Q3 OR a, 03 marks)
5. Draw a neat diagram of disc type wheel and compare with wire type wheel. (S23 - Q3 OR b, 04 marks)
6. Draw neat schematic diagram showing the layout of an air suspension system. (S23 - Q4 OR b, 04 marks)
7. What is perfect steering? Derive expression for the basic condition for a perfect steering mechanism. (S23 - Q4 OR c, 07 marks)
8. Enlist different types of steering gear and explain any one of them with neat sketch. (S24 - Q4 OR b, 04 marks)
9. What is difference between live and dead axle? (S24 - Q4a, 03 marks)
10. List types of front and rear axles. (W24 - Q4a, 03 marks)
11. Explain multi- leaf suspension system in details with neat sketch. (W24 - Q4c, 07 marks)
12. Explain construction of tubeless tyre in brief. (W24 - Q4 OR a, 03 marks)
13. Write four functional requirements of suspension systems in automobile vehicles. (W24 - Q4 OR b, 04 marks)
14. Identity faults and its diagnosis of suspension and steering system. (W24 - Q4 OR c, 07 marks)
15. Enlist the types of front axle independent suspension system. (W23 - Q4a, 03 marks)
16. Explain re- circulating ball type steering gear with sketch. (W23 - Q4b, 04 marks)
17. Sketch schematic arrangement of vacuum operated brake and explain its working. (W23 - Q4 OR b, 04 marks)
18. Give classification of axle used in vehicles. (W22 - Q3 OR a, 03 marks)
19. Explain different forces acting on front axle of truck with neat sketch. (W22 - Q4a, 04 marks)
20. Define King pin inclination and explain its importance in vehicle. (W22 - Q4b, 04 marks)
21. What are the functional requirements of braking system? (W22 - Q4 OR a, 03 marks)

22. Describe the construction of Leaf spring suspension system with neat sketch. (S22 - Q4b, 04 marks)
23. Describe the construction and explain working of Ackermann steering mechanism with a neat sketch. (S22 - Q3c, 07 marks)
24. What are function of steering system? what are the requirement of good steering system? (S25 - Q4b, 04 marks)
25. Explain double wishbone suspension system. (S25 - Q4c, 07 marks)

Unit 5: Safety, Electrical & Modern Systems

Repeated Questions:

1. Differentiate active and passive safety system. (W25 - Q5a, 03 marks) | (W22 - Q5a, 03 marks) | Explain active and passive safety system in auto vehicle. (S23 - Q5 OR a, 03 marks) | Discuss briefly about active and passive safety systems. (S24 - Q5b, 04 marks)
2. What is the advantage of Air-bags in car? How does Air-bag work? (W25 - Q5 OR a, 03 marks) | (W22 - Q5 OR b, 04 marks) | Explain function of air bag in automobile. (S24 - Q5a, 03 marks)
3. What is the meaning of ABS in vehicle? Explain about it in detail. (W25 - Q4 OR c, 07 marks) | (W22 - Q4 OR c, 07 marks) | Explain Antilock Breaking System in detail. (S25 - Q4 OR c, 07 marks) | What is ABS? List different components of ABS and explain ABS with neat sketch. (S22 - Q5c, 07 marks)
4. Explain the relation between tire pressure and tire wear pattern with neat sketch. (W25 - Q5b, 04 marks) | (W22 - Q4 OR b, 04 marks)
5. Enlist types of hybrid vehicle. Explain any one in details. (W25 - Q5c, 07 marks) | Write a note on Hybrid Vehicles and various technology used for the same. (W22 - Q5 OR c, 07 marks) | Explain layout and components of Electric Vehicle. (S24 - Q5 OR c, 07 marks)
6. What troubles are commonly experienced in the electric system of a car? Suggest suitable remedies to rectify those faults. (W25 - Q5 OR c, 07 marks) | What troubles are commonly experienced in the lighting system of a car? Suggest suitable remedies to rectify those faults. (W23 - Q5 OR b, 04 marks)

Other Important Questions:

1. Explain the working of night vision system in auto vehicle. (S23 - Q5a, 03 marks)
2. Explain in detail the necessity and principle of working of an antilock brake system. Describe its main components and discuss various types of such systems in use. (S23 - Q5c, 07 marks)
3. What is electronic stability control? Explain in brief the working of ESC. (S23 - Q3 OR c, 07 marks)
4. What are the limitations of electrically operated vehicles compared to conventional vehicles? (S23 - Q4a, 03 marks)
5. Explain hydrogen-oxygen fuel cell as a source of energy. (S23 - Q4b, 04 marks)
6. With neat sketch explain leaf spring suspension system. (S23 - Q5 OR b, 04 marks)
7. Write short note on power assisted brakes. (S24 - Q5c, 07 marks)
8. Explain tyre properties. (S24 - Q5 OR a, 03 marks)
9. Explain Tire Pressure Monitoring System (TPMS). (S24 - Q5 OR b, 04 marks)
10. Draw layout of electric vehicle, mention name of components and write use of every component. (W24 - Q5 OR c, 07 marks)
11. How does hybrid vehicle start? (W24 - Q5a, 03 marks)
12. List four electronics components of modern automobile vehicle and state its use. (W24 - Q5b, 04 marks)
13. Explain active safety measures in brief. (W24 - Q5 OR a, 03 marks)
14. State the function of (i) fuel gauge (ii) wiper (iii) speedometer (iv) odometer. (W24 - Q5 OR b, 04 marks)
15. "Battery is the heart of the electrical system of an automobile." Comment on the validity of this statement. (W23 - Q5a, 03 marks)
16. State the functions and requirements of automobile wheel tyre. (W23 - Q5b, 04 marks)
17. Describe, with neat sketch the construction and working of lead-acid battery which is normally used in automobile. (W23 - Q5c, 07 marks)
18. State the principle of starting motor. (W23 - Q5 OR a, 03 marks)
19. Explain modern technology used in automobile. (W23 - Q5 OR c, 07 marks)
20. Explain the working of Hydraulic brake with neat sketch. (W22 - Q5b, 07 marks)
21. What is regenerative braking? How it is achieved? Describe different methods used for the same. (W22 - Q5c, 07 marks)
22. What is Adaptive Cruise Control? How it is useful. (W22 - Q5 OR a, 03 marks)

23. Compare Hotchkiss drive with Torque tube drive. (W25 - Q5 OR b, 04 marks) *[Note: This question is also listed in Unit 3, indicating cross-topic relevance]*
24. Define Braking Distance, Braking Efficiency, Slip Ratio. (S22 - Q5a, 03 marks)
25. List any four types of lights used in modern vehicle and state their purpose. (S22 - Q5b, 04 marks)
26. What is wheel alignment? (S25 - Q5a, 03 marks)
27. What is wheel balancing? explain requirement of wheel balancing. (S25 - Q5b, 04 marks)
28. Draw a simplified wiring circuit for the lighting system of car. (S25 - Q5c, 07 marks)
29. Explain recent trends with modern vehicle. (S25 - Q5 OR a, 03 marks)
30. List the various electronic components used in automobile system. (S25 - Q5 OR b, 04 marks)
31. Describe in detail constructional features of the tube and tubeless tyres for automotive use. Discuss also their relative merits and demerits. (S25 - Q5 OR c, 07 marks)
32. Draw four automobile tyre tread patterns. (W24 - Q4b, 04 marks)

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