19GET201 – Automotive Component Design

Unit 1

Two Marks Questions

1. Define a vehicle frame and explain its primary function.
2. What is the significance of load analysis in vehicle frame design?
3. Explain the term 'bending moment' and its importance in frame member design.
4. What is shear force, and how does it affect the design of frame members?
5. List two key factors to consider when designing a vehicle frame.
6. What is the role of the cross-section shape in vehicle frame design?
7. Describe the type of load typically experienced by a front axle during braking.
8. How does the moment of inertia of an axle affect its performance?
9. What material properties are crucial for the design of a front axle beam?
10. Explain why fatigue strength is important for front axle beam design.
11. What is the function of a wheel spindle bearing in a vehicle?
12. Identify one common failure mode of wheel spindle bearings.
13. In the design experiment of a vehicle frame, what is a crucial step in ensuring the frame's stability?
14. During the front axle design experiment, why is it important to test for stress concentration?
15. How do load distribution and stress analysis contribute to the safety of a vehicle frame?

Unit 2

1. What is meant by ‘true rolling’ in the context of vehicle wheels?
2. State the condition required for a wheel to achieve true rolling.
3. Briefly explain the Ackermann steering principle.
4. Why is the Ackermann principle important for vehicle maneuverability?
5. Name two critical components of a steering system and their functions.
6. What is the role of the steering linkage in the overall steering mechanism?
7. What is a primary design consideration when designing leaf springs for a vehicle?
8. How does the number of leaves in a leaf spring affect its performance?
9. Mention one key factor that affects the spring rate of a coil spring.
10. What is the impact of coil spring diameter on its load-carrying capacity?