

**QUESTIONS AND ANSWERS FOR
AUTOMOBILE STUDENTS AND MECHANICS:
A BOOK OF
SELF-INSTRUCTION FOR AUTOMOBILE
STUDENT AND MECHANICS, AS WELL AS
FOR ALL THOSE INTERESTED IN MOTORING**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649518227

Questions and Answers for Automobile Students and Mechanics: A Book of Self-Instruction for Automobile Student and Mechanics, as Well as for All Those Interested in Motoring by
Thomas H. Russell

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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THOMAS H. RUSSELL

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A book of Self-Instruction for Automobile
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all those interested in Motoring.

-BY-

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Boats: Construction and
Operation," etc., etc.*

1911

The Charles C. Thompson Co.
Chicago, Ill.

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PREFACE

The Questions and Answers in this book will be found useful by every student and mechanic of motor cars and motoring, as a handy means of reviewing systematic study or in daily work.

It has long been recognized that the Question-and-Answer method is most effective in fixing in the memory facts gained by study or problems that confront the mechanic in his daily work; hence it is adopted for the purpose.

The more important subjects connected with motor cars, are treated individually, there being a separate set of Questions and Answers for each. For the greater convenience of the reader, the Questions and the Answers in each set appear on separate pages; the Questions can thus be used alone for self-instruction, while the Answers if needed are close at hand for reference.

Minor subjects are covered in a special catechism, which deals with all the factors which go to make up the power plant of a modern motor car.

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STUDY HELPS.

Questions for Review.

No. I.—MOTOR CARS.

1. What are the characteristic features of a motor car?
2. Name the principal types of motor vehicles.
3. What are the essential parts of a gasoline car?
4. How is the body attached to the car?
5. What is understood by the "power plant"?
6. Where is the engine generally situated?
7. What is a chassis?
8. How is the power generated in a gasoline motor?
9. How is the power transmitted?
10. How is the speed changed and checked?
11. What is meant by chain drive and gear drive?
12. How is an automobile controlled?
13. Describe the operating mechanism.
14. How many cylinders are used in automobile engines?
15. What is a starting handle and what is its function?
16. What is the general purpose of the clutch?
17. What becomes of the exhaust gases?
18. What is the function of a differential gear?
19. What is a carbureter?
20. What is an ignition system?
21. How is a motor car steered?
22. What are the essential parts of an electric car?
23. Name some of the advantages of electric vehicles.
24. Name some of their disadvantages.
25. What are the essential parts of a steam car?
26. What is the function of the generator?
27. Where is the generator usually carried on a car?
28. Name some advantages of the steam car.
29. What are its disadvantages?
30. How are motor trucks propelled?

STUDY HELPS.**Answers to Questions for Review.****I.—MOTOR CARS.**

1. A motor car is a self-propelled vehicle driven by means of a motor borne on the vehicle. In American usage the term "automobile" is usually confined to carriages or passenger vehicles, while "motor car" is applied to all forms of self-propelling vehicles, whether for pleasure or commercial use.

2. Motor vehicles may be classified under four different types, according to the nature of the motive power, which may be (1) internal combustion engines; (2) steam engines; (3) electric motors supplied with current from a storage battery; (4) electric motors using current generated on the car by means of an internal combustion engine. Vehicles of the latter type are called "gasolene-electrics."

3. The complete gasolene car contains the following essential parts: The frame, the road wheels, the engine, the clutch, the transmission gear, the steering gear, the brakes, the ignition system, the carbureter, and the various controls of the engine and the car; also a body adapted to the purpose for which the car is to be used.

4. The body of a car is supported on springs attached to the frame and axles of the car.

5. The power plant includes the engine or motor, with its accessories, and the transmission gear, though the term is sometimes limited to include the engine or prime mover alone.

6. The engine of a gasolene car is generally carried in the front portion of the car, being attached to and supported by the frame, or is sometimes carried on a sub-frame, suspended from the frame proper.

7. The term "chassis," adopted from the French, strictly applies to the frame of a car, but as generally used by motorists it includes not only the frame, but also the wheels, springs, engine, gear, etc.—in fact, everything but the body.

8. The power is generated by the formation of an explosive hydrocarbon gas, which is sucked into the cylinder head by an outward stroke of the piston, then compressed by the return stroke, then ignited or fired, when it expands, and the expansion drives the piston outward again in a power stroke.

9. The power developed by the expansion of the gases after combustion is transmitted from the piston through a connecting rod to the crankshaft, which revolves a flywheel the motion of which is taken up by means of a clutch connected with the rear or driving axle by what is known as the transmission gear.

10. The speed may be changed by the operation of variable gearings, and is checked by the use of brakes. The change speed gear usually provides for two, three or four speeds forward and reverse.

11. In chain-driven automobiles the power is transmitted to the road-wheels by means of sprocket wheels and a chain or chains running to sprockets on the rear or driving axle. In gear-driven systems the power is usually transmitted by a propeller shaft to a system of bevel gearing on the rear axle and then communicated to the road-wheels.

12. There are two systems of control. The operation of the engine is controlled by regulation of the quality or quantity of explosive gas admitted to the combustion chamber, and by a governor. The movements of the car are controlled by the clutch pedal, change speed lever or levers, brakes and steering gear.

13. The control mechanism of a modern automobile includes the steering wheel, placed on top of a hollow shaft which operates the steering mechanism attached to the front axle. A spark lever and hand throttle lever are situated on