

T 160_ Automotive electrical starting and charging system

SECTION A: Attempt all questions

(55 marks)

01. What is the purpose of starting the system in motor vehicle? (3marks)
02. Give any four (4) functions of the charging system. (4marks)
03. What is the role of the positive diodes in the alternator? (2marks)
04. What does cause a metallic grinding noise during starting system? (4marks)
05. What do the following alternator labeling: B, IG, S, L, E. stand for? (5marks)
06. What is the meaning of the following designation of the charging system? KC→14V40A. (5marks)
07. Give the function of the following parts of a vehicle starter motor: (5marks)
 - a) Armature,
 - b) Field coils,
 - c) Commutator,
 - d) Starter pinion gear,
 - e) Starter clutch.
08. Why do we prefer to use the three-phases in the alternator output? (3marks)
09. Explain why you should never crank a starter motor longer than 15 seconds. (2marks)
10. Indicate whether the following statements are **True** or **False**: (5marks)
 - a) An electronic voltage regulator cannot be repaired (.....)
 - b) An alternator fan cools windings and diodes to prevent overheating and damage (.....)
 - c) A diode that is forward -biased will act as insulator, blocking current flow (.....)
 - d) A fully charged battery should read under 12.6. (.....)
 - e) To reduce output of the alternator, the electronic voltage regulator introduces more resistance between the rotor windings and stator (.....)
11. A 2-Ω resistor and a 4-Ω resistor are connected in series with a 12-volt battery. If the current through the 2-Ω resistor is 2 A, what is the current through the 4-Ω resistor? (4marks)

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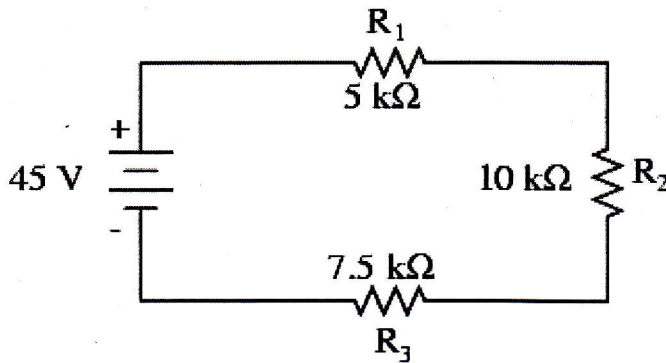
12. A charging system of a vehicle failed to charge a starter battery. **(2marks)**

Select the True statement among the following:

- a)** To supply full-fielded current to the alternator, and the charging voltage and current increases to normal levels, you usually have a bad regulator.
- b)** alternators can be full- field by grounding the alternator output battery terminal,
- c)** a and b are correct,
- d)** Neither a nor b.

13. Answer the following questions:

- a)** Why is a gear reduction starter motor used? **(2marks)**
- b)** What would cause low current draw in a starter? **(2marks)**
- c)** What is the total resistance of the following circuit? **(4marks)**



14. Describe any three various tests performed to the rotor. **(3marks)**

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Section B: Attempt any three (3) questions

(30 marks)

15. If Alternator telltale lamp does not light up when the engine is stationery and ignition switch is on; as technician discuss the possible failure causes and corrections. **(10marks)**
16. Discuss the different tests to be performed on the charging system to make sure that the electrical power needed by a vehicle is generated. **(10marks)**
17. Identify the steps to be followed while disassembling a gear reduction starter motor. **(10marks)**
18. Complete the following statements related to safety rules for working with alternator charging circuits by using the term(s) in bracket: **(10marks)**
- (Polarize, Black, Adjustments, Open, Short, Running, Red, Negative, Rosin, Cleaning)
- a) Never attempt to the..... circuit.
 - b) Be sure the battery is in good operating condition before making any tests or.....
 - c) Never operate the alternator in an.....circuit, except when instructed in the technical manual.
 - d) Never..... or ground the alternator terminals.
 - e) Do not disconnect the voltage regulator while the alternator is.....
 - f) Disconnect the battery cable first when removing the alternator or battery.
 - g) Do not use acid-core solder on the alternator terminals; use only a.....core solder.
 - h) Never immerse the circuit components in.....solution.
 - i) When perform jump starter battery thecable is connected to the positive terminal while the..... cable is connected to the negative terminal.
19. A DC motor fails to crank the engine when switched on. Propose the possible reasons and remedies for this kind of failure. **(10marks)**

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Section C: Attempt only one (1) question

(15 marks)

20. Explain in details the use of a voltmeter in making voltage drop tests to detect excessive resistance in starting system components. **(15marks)**
21. a) Overtightening an alternator belt is a common mistake that ruins the alternator bearings. True or false? Justify your answer. **(3marks)**
- b) If a malfunction occurs in the charging system, do not automatically assume that the alternator is causing the problems. Discuss the other possible causes of charging system failure? **(12marks)**

END OF ASSESSMENT