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4136/1**BGCSE**

FOR EXAMINER'S USE ONLY		
✓ Tick the questions answered		
Section A total		
11		
12		
14		
15		
16		
TOTAL FOR EXAM		

School Number	Candidate Number
Surname and Initials	

AUTO MECHANICS

PAPER 1 4136/1

Wednesday 9 MAY 2018 1:00 P.M.–3:10 P.M.
(includes 10 mins. reading time)

Additional materials:
Answer booklet
Calculators may be used

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS
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BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided at the top of this booklet.

Answer **ALL** questions in Section A and **THREE** questions from Section B.

Write your answers to Section A in the spaces provided on this question booklet and your answers to Section B in the answer booklet provided.

It is recommended that you spend approximately **45 minutes** on Section A. This section is worth 40 marks.

You are to spend **1 hour 25 minutes** on Section B. This section is worth 60 marks.

You are advised to use **10 minutes** reading Section B before making your choice of questions.

Use sketches wherever possible to help illustrate your answers.

INFORMATION FOR CANDIDATES

The number of marks available is shown in brackets [] at the end of each question or part question. The total number of marks for this paper is 100.



This question paper consists of 12 printed pages.

SECTION A

Answer **ALL** questions. Write your answers in the spaces provided.

Questions 1 – 4 are Multiple Choice. Circle the letter to the correct response.

1. Which of the following statements about safety glasses is true?
 - a. They should offer side protection.
 - b. The lenses should be made of shatterproof material.
 - c. Some service operations require that additional eye protection be worn with safety glasses.
 - d. All of the above. [1]

2. Gasoline is
 - a. highly volatile.
 - b. highly flammable.
 - c. dangerous, especially in vapour form.
 - d. all of the above. [1]

3. Which of the following is **NOT** recommended when trying to extinguish a flammable liquid?
 - a. Foam.
 - b. Carbon dioxide.
 - c. Water.
 - d. Dry chemicals. [1]

4. Chassis wiring consists of all vehicle wiring that is not connected with the vehicle's _____ .
 - a. engine.
 - b. lighting.
 - c. drive train.
 - d. Both A and C. [1]



Questions 5 and 6 are Short Answer Questions.

5. How many possible firing orders are there for a four cylinder four cycle engine?

_____ [1]

6. Give **THREE** reasons for crankshaft wear.

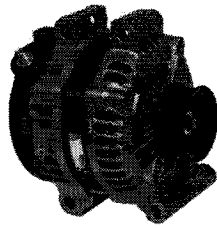
- (i) _____

- (ii) _____

- (iii) _____
_____ [3]

7. Identify the following automotive parts and state the function for each.

(a)

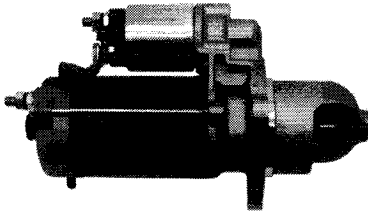


Name: _____ [1]

Function: _____

_____ [2]

(b)



Name: _____ [1]

Function: _____

_____ [2]

(c)



Name: _____ [1]

Function: _____

_____ [2]

(d)

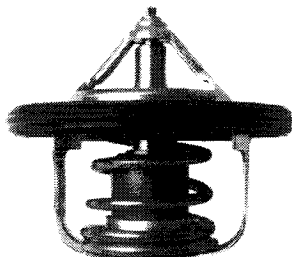


Name: _____ [1]

Function: _____

_____ [2]

(e)



Name: _____ [1]

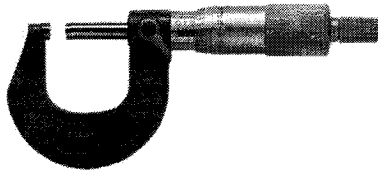
Function: _____

_____ [2]



8. State the name of the following automotive tools and give one use for each.

(a)



Name: _____ [1]

Use: _____

_____ [1]

(b)

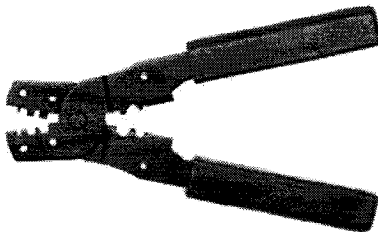


Name: _____ [1]

Use: _____

_____ [1]

(c)

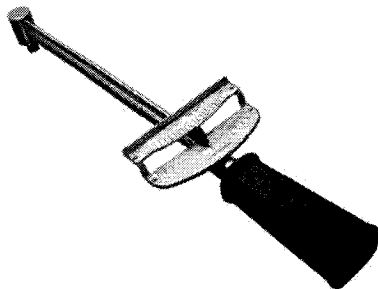


Name: _____ [1]

Use: _____

_____ [1]

(d)



Name: _____ [1]

Use: _____

_____ [1]



9. Calculate the total displacement of an 8 cylinder engine that has a cylinder bore diameter of 4" and a stroke length of 3.5" (Use $D = \pi \times R^2 \times L \times N$)

[3]

10. (i) How many complete revolutions does the crankshaft make during a complete four stroke cycle?

[1]

- (ii) How many complete revolutions does the crankshaft make during a complete two stroke cycle?

[1]

- (iii) Name the processes that occur on the same stroke in a two stroke cycle engine.

(a) _____ [1]

(b) _____ [1]

- (iv) What are **TWO** disadvantages of the two stroke engine that make it unsuitable for use in an automobile?

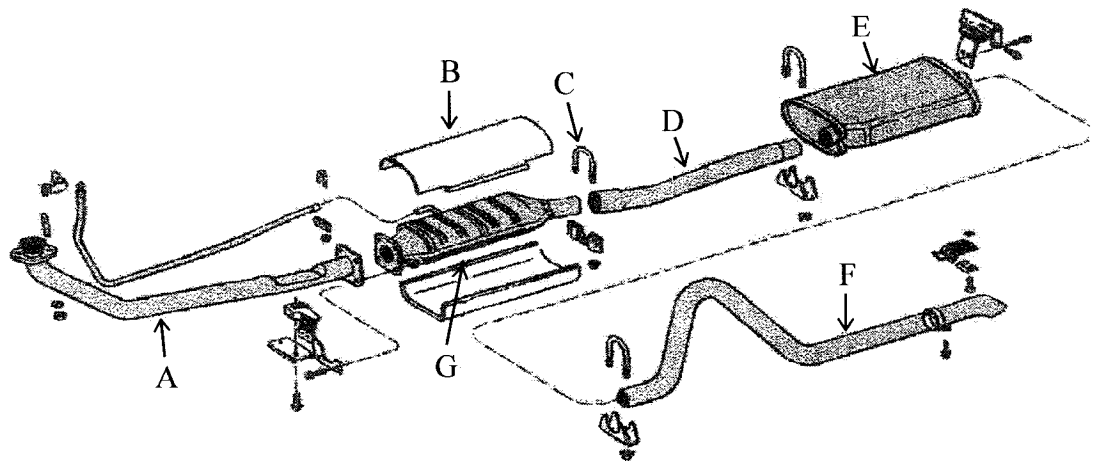
[2]



SECTION B

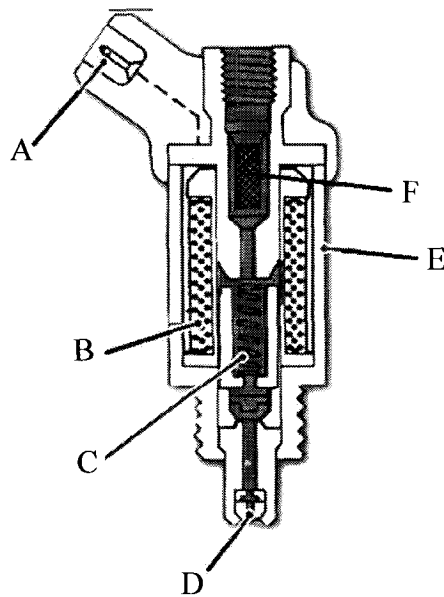
Answer any **THREE** questions from this section in the answer booklet provided. You are advised to spend **10 minutes** reading these questions before making your choice.

11. a. (i) State **THREE** functions of the exhaust system. [3]
- (ii) List **TWO** types of muffler design. [2]
- (iii) What is the purpose of the resonator? [1]
- (iv) Modern exhaust systems produce a great deal of heat. What must be in place when installing catalytic converters and exhaust pipes to prevent damage to adjacent parts? [1]
- b. (i) Name **THREE** vehicle devices that may be connected to the exhaust system on modern vehicles. [3]
- (ii) Dual exhaust systems are used primarily on what type of engine? [1]
- (iii) State **TWO** adverse effects of excessive exhaust system back pressure. [2]
- (iv) Using the letters A – G, identify the parts of the exhaust system illustrated below. [7]



TOTAL MARKS [20]

12. a. The fuel management system consists of two subsystems. Name the **TWO** subsystems. [2]
- b. State the function of the:
- (i) electric fuel pump. [2]
- (ii) fuel pressure regulator. [2]
- c. Define the terms:
- (i) direct injection system. [2]
- (ii) indirect injection system. [2]
- d. What parts of the fuel management system would you find in the fuel tank? [4]
- e. The following cutaway illustration depicts an electronic fuel injector with an internal integral fuel filter. Using the letters A – F, identify the parts indicated. [6]

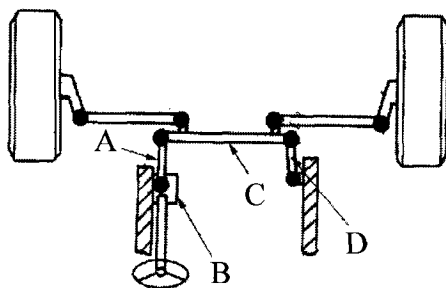


Source: <https://www.howacarworks.com/illustrations/an-electronic-injector>

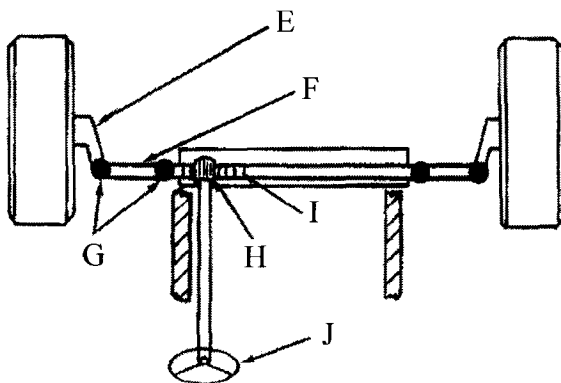
TOTAL MARKS [20]



13. a. (i) Using the letters A – D, identify the parts indicated. [4]

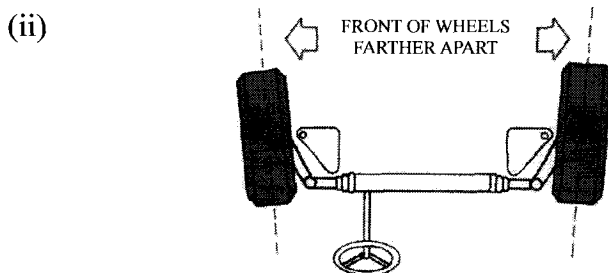
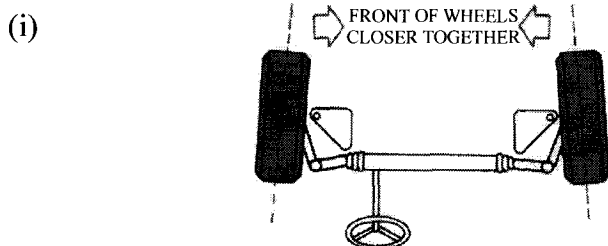


- (ii) Using the letters E – J, identify the parts indicated [6]



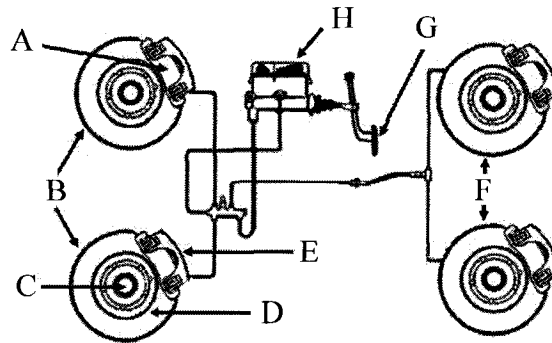
- b. (i) Explain the difference between a positive and negative castor. [2]
(ii) Give an example of an everyday item that uses a negative and positive castor. [2]

- c. Name the type of alignment fault **and** give the reason for each. [6]



TOTAL MARKS [20]

14. a. Using the letters A – H identify the parts of the car braking system shown below. [8]



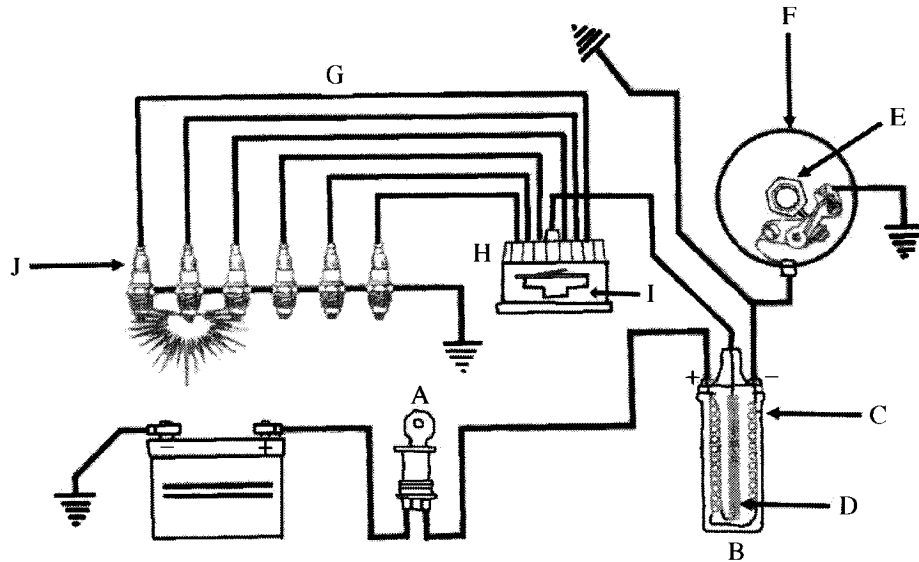
- b. List the **TWO** types of brake rotors [2]
- c. Explain what is meant by a
- (i) diagonally split brake system. [2]
 - (ii) floating caliper [2]
- d. State **THREE** causes of excessive pedal travel to stop a vehicle [6]

TOTAL MARKS [20]



15. The ignition system has many different parts that are divided into two categories: those that operate by battery voltage and those that operate at high voltage. Components that operate by battery voltage are part of the primary ignition circuit. Components that operate by high voltage are part of the secondary ignition circuit.

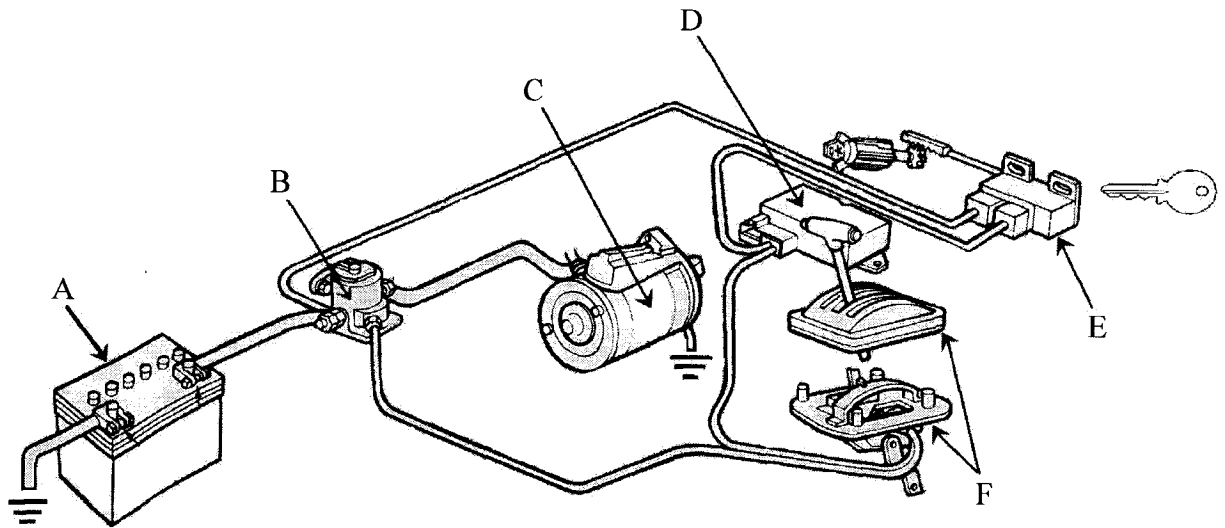
a. Using the letters A – J, identify the components of the ignition system shown below. [10]



- b. What component is part of both the primary and secondary ignition circuit? [1]
- c. If a coil has 200 primary windings and 20,000 secondary windings, what is the ratio between the primary and secondary? [1]
- d. State the condition of the resistance on the
- (i) primary winding [1]
 - (ii) secondary winding [1]
- e. What is the purpose of the iron core in the ignition coil? [3]
- f. Name **THREE** types of ignition triggering devices. [3]

TOTAL MARKS [20]

16. a. Using the letters A – F, identify the components of the starting system shown below **AND** for each component state its function. [12]



- b. In order to crank the car, components B, C, D, E, F shown in the diagram above must be activated in order. Give the order of components B to F for a starting sequence. [4]
- c. List **TWO** faults that would prevent the starter motor from working properly. [2]
- d. Explain the difference between a carbon pile battery tester and a standard load battery tester. [2]

TOTAL MARKS [20]



4136/2**BGCSE**

FOR EXAMINER'S USE ONLY	
Total Marks by Question	
1	
2	
3	
TOTAL FOR EXAM	

School Number	Candidate Number
Surname and Initials	

AUTO MECHANICS

PAPER 2 PRACTICAL TEST 4136/2**17 APRIL–8 MAY 2018 2 HOURS**

Additional materials:
None

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BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION**INSTRUCTIONS TO CANDIDATES****Do not open this booklet until you are told to do so.**

Write your school number, candidate number, surname and initials in the spaces provided on the top of this booklet.

You are required to complete three assignments. You are advised to spend approximately 40 minutes on each assignment which includes 10 minute reading time for each assignment.

Write your answers to the questions where applicable in the spaces provided.

A range of tools have been supplied but you will be responsible for selecting the correct tools for each particular task.

You are required to observe safety rules and regulations at all times.

You are advised to read each assignment carefully before you begin your work.

INFORMATION FOR CANDIDATES

The number of marks available is shown in brackets [] at the end of each question or part question. The total number of marks for this paper is 60.



This question paper consists of 5 printed pages and 3 blank pages.

Using the vehicle assigned to you by the Examiner, students will

Assignment 1 – SPARK PLUG REMOVE, TESTING, INSPECTION AND REPLACEMENT.

- (a) Remove the engine's spark plugs. Place them on a bench arranged according to the cylinder number. [4]
- (b) Carefully examine the electrodes and insulation of each plug. Describe the appearance of each plug.

Report:

 [2]

- (c) Measure the resistance of the plugs from the plug cable terminal to the center electrode. Report your findings.

Resistances:

1. _____

2. _____

3. _____

4. _____ [4]

- (d) Measure the gap of each plug and record your findings.

Findings:

 [4]

- (e) Set the gap between the center and ground electrode to specified gap. [4]
- (f) Replace the spark plugs. [2]

TOTAL MARKS [20]



Assignment 2 – MEASURING CRANKSHAFT END PLAY.

- (a) Using the appropriate service manual, locate the minimum and maximum crankshaft end play specifications.

Record the:

Minimum: _____

Maximum: _____ [4]

- (b) Pry the crankshaft toward the front of the engine. Install a dial indicator and bracket so that its plunger rests against the crankshaft flange and the indicator axis is parallel to the crankshaft axis. [4]

- (c) (i) Use the correct procedure to accurately measure the crankshaft end play. [6]

(ii) Record the reading: _____ [1]

- (d) (i) Is your result within the manufacturer's specification. [1]

(ii) List your conclusions and recommendations.

Conclusions:

_____ [2]

Recommendations:

_____ [2]

TOTAL MARKS [20]



Assignment 3 – STARTER MOTOR

(a) Dismantle the starting motor on the work bench. [4]

(b) Inspect and comment on the condition of the following components:

(i) Brushes

Findings:

 [2]

(ii) Armature

Findings:

 [2]

(iii) Commutator

Findings:

 [2]

(c) Reassemble the starting motor. [6]

(d) Test the starting motor in a test rig on the work bench using a fully charged battery/battery charger. [4]

TOTAL MARKS [20]

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