

**MVM - Knowledge of Materials and
Automotive Technology**

T058

Wednesday, 06/11/2013

8:30 – 11:30 AM

WORKFORCE DEVELOPMENT AUTHORITY



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**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2013,
TECHNICAL AND PROFESSIONAL TRADES**

**EXAM TITLE: Knowledge of Materials and
Automotive Technology**

OPTION: Motor Vehicle Mechanics (MVM)

DURATION: 3hours

INSTRUCTIONS:

The paper contains **Three (3)** Sections:

Section **I:** Seventeen (**17**) questions, **all Compulsory;** **55marks**

Section **II:** Five (**5**) questions, Choose any **Three (3);** **30marks**

Section **III:** Three (**3**) questions, Choose any **One (1);** **15marks**

Section I: Answer all the 17 questions**55marks**

- 01.** A cooling system contains 15kg of water. Calculate the quantity of heat gained by the water if its temperature rises from 12°C to 88°C on starting. **2marks**
- 02.** What are the advantages of an electrically driven fan? **5marks**
- 03.** By what can the corrosion of a material be influenced? **5marks**
- 04.** What do you understand by case hardening? **2marks**
- 05.** What are three ways in which the rod is attached to the piston? **3marks**
- 06.** Explain the term LH Motronic. **3marks**
- 07.** How many times does the crankshaft turns while the camshaft turns once? **1mark**
- 08.** a) What does the term " Engine efficiency " mean? **3marks**
b) How can it be computed in two ways? **2marks**
- 09.** Name four technological properties of materials. **4marks**
- 10.** A cross-sectional area (CSA) of the piston crown is 48.5cm² and the stroke is 12cm. Calculate the swept volume of the cylinder and the capacity of the engine if it has six cylinders. **4marks**
- 11.** Suppose an engine uses two V- belts to drive the water pump and alternator. Is it all right to replace only one belt if only one is worn? Why? **2marks**
- 12.** What important factors must be borne in mind when laying fuel lines? **4marks**
- 13.** a) How many valves does the radiator pressure cap have? **2marks**
b) How do they work? **2marks**
- 14.** What is likely to happen if the radiator cap is removed quickly when the engine is hot? **2marks**
- 15.** What are the four basic systems that every engine must have? **4marks**
- 16.** Name the four places on the automobile from which pollutants can come. **3marks**
- 17.** What are two parts that change the reciprocating motion of the piston to the rotary motion of the crankshaft? **2marks**

Section II: Choose and Answer any three (3) questions 30marks

- 18.** Name ten important physical properties of materials. **10marks**
- 19.** a) What are the functions of the cylinder and the cylinder head? To what stresses are the cylinder and the cylinder head exposed? **6marks**
b) Which properties is the cylinder meant to have? **4marks**
- 20.** List ten (10) reasons for engine to become overheated. **10marks**
- 21.** Make a list of cooling system tests and check. **10marks**
- 22.** What are the advantages and disadvantages of air cooling? **10marks**

Section III: Answer only one(1) question of your choice. 15marks

- 23.** a) Name the possible causes of low oil pressure and excessive oil pressure. **14marks**
b) What is viscosity? **1mark**
- 24.** After mounting the injection pump to the engine and checking that the alignment and drive coupling clearance are correct, it is necessary to bleed the fuel system and run the engine. Describe the procedure. **15marks**
- 25.** Make a list of possible causes of engine overheating including those not caused by cooling system problems. **15marks**