ADVANCED LEVEL NATIONAL EXAMINATIONS, 2013, TECHNICAL AND PROFESSIONAL TRADES

EXAM TITLE: Automotive Electricity and Electronics

OPTION: Motor Vehicle Mechanics (MVM)

DURATION: 3hours

INSTRUCTIONS:

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

Section **I**: Eighteen **(18)** questions, **all Compulsory**		**55marks**
Section **II**: Five **(5)** questions, Choose any **Three (3)**		**30marks**
Section **III**: Two **(2)** questions, Choose any **One (1)**		**15marks**

Section I : Attempt all the 18 questions   55marks

01. Define the following terms: **4marks**

a) Insulator

b) The electrical field

c) Conductor

d) Junction rule

02. What is the equipment used to measure the current in electrical circuit and how it can be connected?   **2marks**

03. Show clearly with a simple sketch the relay including the diode.**2marks**

04.   State at least four methods used to generate voltage.   **2marks**

05. a) How many cells can have the battery of 12volts?   **1mark**

b) State four (4) electrical measurements that can be done often in electrical workshop.   **2marks**

06. State four advantages of electronics components use.   **2marks**

07. Write down in full the meaning of the following: **2marks**

AFT, TPS, CKPS, WTS

08. a) Indicate with formulas the values of **a)** U_t **b)** I_t and **c)** R_t in a circuit having three resistances connected in series.   **3marks**

b) Give the unit for each value.   **3marks**

09. Define the following:

a) Inductor   **1mark**

b) Capacitor   **1mark**

10. Using a sketch, show how to test the diode with ohmmeter.   **3marks**

11. Sketch the symbols of transistors used in electronic circuits.   **2marks**

12. What are the values of a Gasoline's engine ratios of Air-fuel mixture for the following conditions: **2marks**

a) Cold engine starting;   b) Idling engine;

c) Part throttle opening;   d) Full acceleration;

13. State four (4) applications of a transistor.   **2marks**

14. A 9 volt battery supplies power to a cordless curling iron with a resistance of 18 ohms. Determine the current flowing through the curling iron.   **2marks**

15. With net sketch of a closed electrical circuit show the way of move of electrons.   **5marks**

16. Draw the electrical diagram of:

    a) Alternating current;   b) Direct current;   **4marks**

**17.** Identify any safety precautions to be applied when you are performing battery maintenance.   **5marks**

18. With sketches explain how electrolyte reacts chemically with leads plates during charging /discharging process.   **5marks**

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

19. In electrical circuit below the values of the resistances are the following: **10marks**

    $R_1 = 2\ \Omega$ $R_2 = 1\ \Omega$ $R_3 = 2.6\ \Omega$ $R_4 = 4\ \Omega$

    Calculate: R_T, I_T, I of AB, I of CD, U1, U2, U3, U4
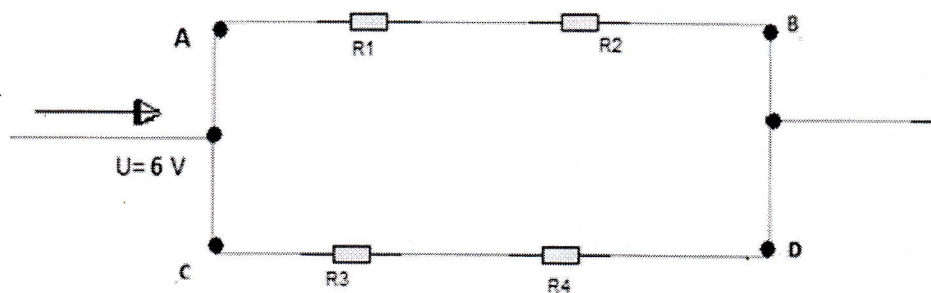
20. a) State and distinguish with a net sketch between the internal alternator circuits.   **9marks**

    b) State two electrical behaviors of materials.   **1mark**

21. Here are given some components used in electrical circuit: wires, simple relay, motor and switch;

    a) Make a circuit in which a switch is opening.   **4marks**

    b) Draw the electronic circuit where the transistor is used as amplifier.   **6marks**

22. Here below are given electrical components: voltage generator relay, wires,two horns and horn's switch;

    a) Draw a circuit diagram in which a relay is closing.   **5marks**

    b) List five(5) basic electrical workshop rules.   **5marks**

23. **a)** List five (5) physical health symptoms to be observed if serious contact with hazardous materials while working in an electrical workshop.   **5marks**

    b) Give five (5) reasons of spark missing at all speed and their solutions.   **5marks**

24. a)   What are the five basic types of the computer gates?   **10marks**

    b)   List ten possible causes and remedies of an alternator which does not supply the electrical consumers with energy and not charges the starter battery.   **5marks**
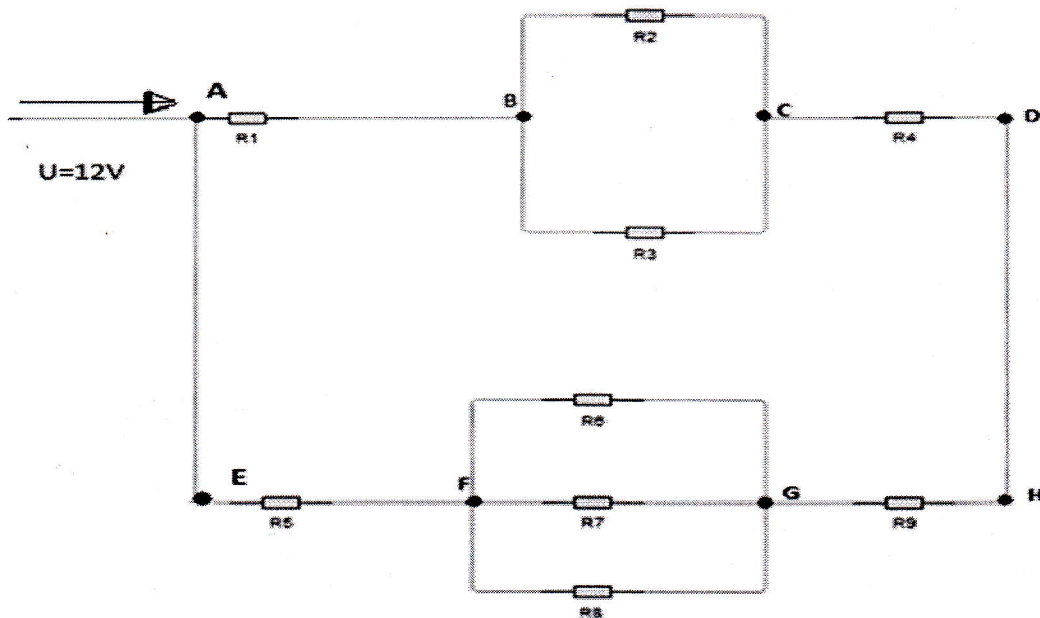
25. a) The values of resistances in an electrical circuit below are:

    $R_1=1\Omega$, $R_2=2\Omega$, $R_3=2\Omega$, $R_4=1\Omega$, $R_5=1.4\Omega$, $R_6=5\Omega$, $R_7=2.6\Omega$, $R_8=1.3\Omega$, $R_9=2\Omega$

    Calculate: I_T, U of BC,EG,5,6,8 and 9   **14marks**

    b) State the ways of heat transmission.   **1mark**