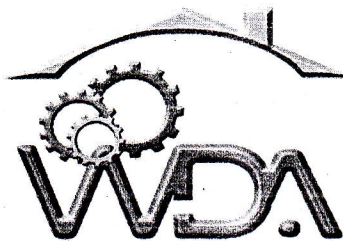


**CEL – Technical Drawing and
Knowledge of Materials**

T103

Friday, 16/11/2012, AM

WORKFORCE DEVELOPMENT AUTHORITY



P.O. Box 2707 Kigali, Rwanda Tel. : (+250)255113365

**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2012,
TECHNICAL AND PROFESSIONAL TRADES**

**EXAM TITLE: TECHNICAL DRAWING AND
KNOWLEDGE OF MATERIALS**

OPTION: COMPUTER ELECTRONICS (CEL)

DURATION: 3HOURS

INSTRUCTIONS:

The paper comprises Two main parts as follows:

PART I: Bench work, Metrology and Knowledge of materials

35marks

PART II: Technical Drawing.

65marks

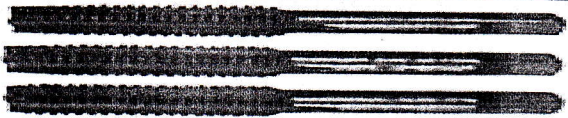
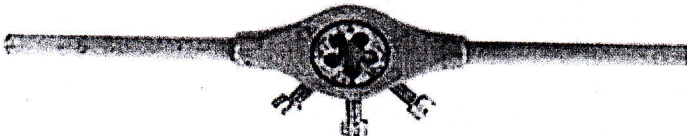
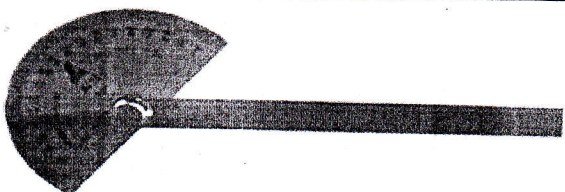
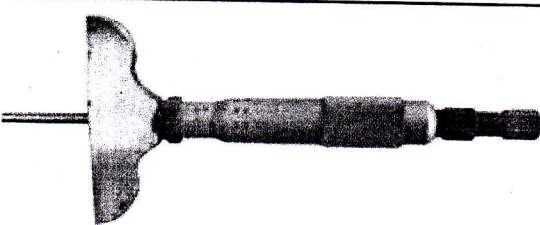
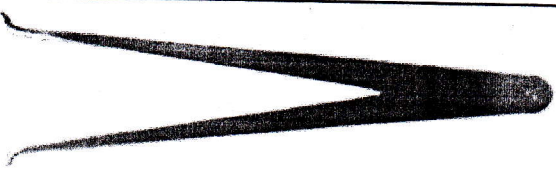
Part I. Bench work, Metrology and Knowledge of materials. 35marks

Section A. Attempt all questions (/20marks)

01. Differentiate stress from strain. **2marks**
02. Describe the principle of a dial indicator or dial gauge. **3marks**
03. Identify different types of micrometers. **3marks**
04. A force of 10 kN is acting on a circular rod with diameter 10 mm.
Determine the stress in the rod in MPa. **4marks**
05. Describe the different metal casting techniques. **4marks**
06. Identify the factors used to categorize different files. **4marks**

Section B. Choose and Answer any three (3) questions (/15 marks)

07. Identify the functions of a reamer and specify its different types. **5marks**
08. Identify the function of the tools shown below. **5marks**

N°	TOOL	FUNCTION
a)		
b)		
c)		
d)		
e)		

09. Identify different types of cast iron based on the form of carbon present and specify when the technique of casting is used. **5marks**
10. Identify the specific advantages of non-ferrous metals over ferrous metals and give one example of such material. **5marks**

11. Identify different types of Steels and specify why alloying additions are very important in steels. **5marks**






PART II. Technical Drawing. 65marks

Section A. Attempt all questions. (35marks)

12. Which views are necessary to represent an object? **4marks**
13. Identify five (5) informations included in the part list of a drawing. **5marks**
14. What is the recommended line thickness in mm for object line, dimension line and hidden line respectively? **6marks**
15. Describe what is sectioning or cutting. How is the position of the cutting plane indicated? **6marks**
16. From a set of pencils bellow make an order from a softest to a hardest one
9H, HB, 5B, F **3marks**
17. Identify four (4) types of pencils based on their use. **4marks**
18. Give four (4) instruments included in a drawing instruments box. **4marks**
19. Which paper format is exclusively used in an upright position? **3marks**

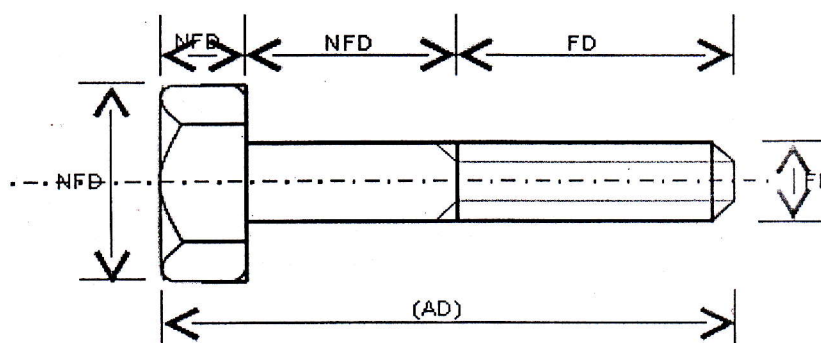
Section B: Choose and Answer any four 4 questions – (20 marks)

20. Specify the application of each of the following lines used in drawing. **5marks**

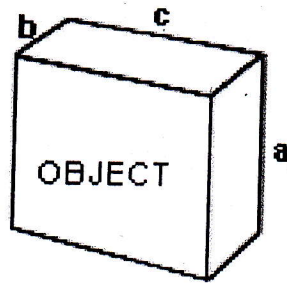
LINE	APPLICATION
	
	
	
	
	

21. Describe the drawing bellow according to the indications:

5marks



22. Given the following object with dimensions a x b x c, determine the horizontal spacing of its views if the drawing space (horizontal) is d. **5marks**



23. Describe the following terms used in technical drawing. **5marks**

- | | |
|----------------------------|-------------------------|
| a) Orthographic projection | b) Isometric projection |
| c) Pictorial projection | d) Diametric projection |
| e) Axonometric projection | |

24. Specify the role of the following drawing instruments: **5marks**

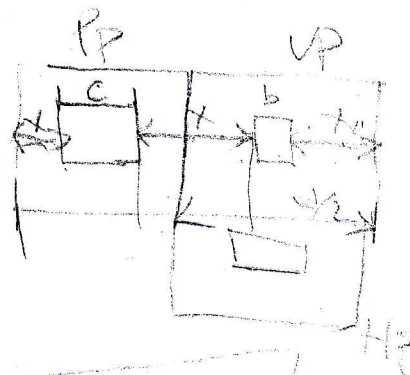
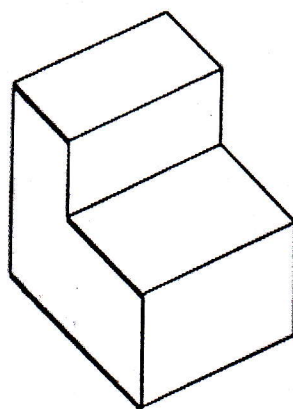
- | | |
|----------------|---------------------------|
| a) Protractor | b) Drawing Pins and Clips |
| c) T-square | d) Drafting machine |
| e) Set squares | |

Section C. Choose and Answer any One (1) question – (10marks)

25. Describe any five (5) formats of standards drawing sheets.
Specify the size in mm. **10marks**

26. Describe the first angle projection and show its symbol. **10marks**

27. For the given object below, represent the front view, the left hand side view and the top view (plan) in the first angle projection. **10marks**



$$\left(\frac{\times}{\circ} \right) = \frac{d - (c + b)}{3}$$