

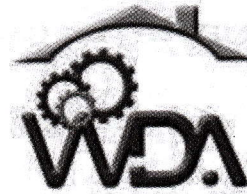
CEL&ETL – Technical Drawing and
Knowledge of Materials

T128

Thursday, 19/11/2015

08:30 – 11:30

WORKFORCE DEVELOPMENT AUTHORITY



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

**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2015,
TECHNICAL AND PROFESSIONAL TRADES**

EXAM TITLE: Technical Drawing and Knowledge of Materials

OPTIONS: - Computer Electronics (CEL)

- Electronics and Telecommunication (ETL)

DURATION: 3hours

INSTRUCTIONS:

The paper is composed of **three (3) Sections:**

Section **I:** Fifteen **(15)** questions, all **Compulsory.**

55marks

Section **II:** Five (5) questions, **Choose Three (3) only.**

30marks

Section **III:** Two (2) questions, **Choose only One (1).**

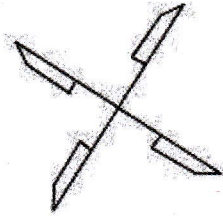
15marks

Every candidate is required to strictly obey the above instructions. Punishment measures will be applied to anyone who ignores these instructions.

Section I. Fifteen (15) Compulsory questions.

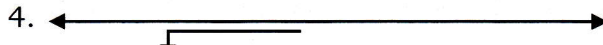


55marks

- 01.** Using the following diagram, how many lines of symmetry does the figure in the diagram have? Explain why? **2marks**

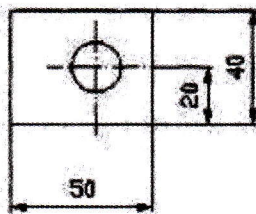


- 02.** What is ductility property of material? **2marks**

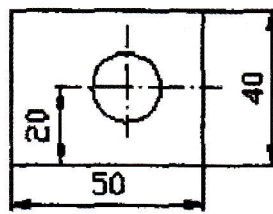
- 03.** Identify the names for the following types of lines: **6marks**

1. _____
2. _____
3. _____
4. 
5. 
6. 

- 04.** Which of the following representation is correct and why? **2marks**



(a)



(b)

- 05.** Describe ferrous metal with supporting examples and list its characteristics which make it extensively used in engineering industry. **6marks**

- 06.** What are the main features of Lettering? **3marks**

- 07.** The title block is an important feature in the drawing because it gives all the information of the prepared drawing. List four (4) items contained within the title block. **4marks**

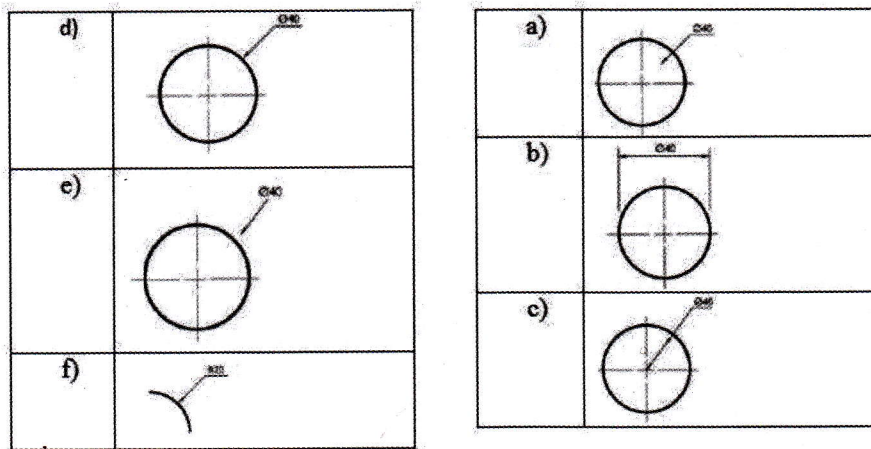
- 08.** Identify the different types of cast iron. **3marks**

- 09.** Explain the different types of stresses. **6marks**

- 10.** A steel bar 6.00 m long and with rectangular cross section of 5.00 cm x 2.50 cm supports a mass of 2000 kg. How much is the bar stretched? The young's modulus Y for steel is $20.0 \times 10^{10} \text{ N/m}^2$. **4marks**

- 11.** What is meant by elasticity? **2marks**

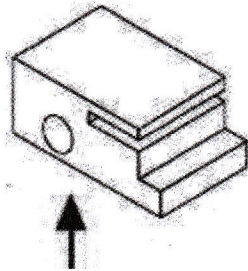
12. Identify five (5) among different chemical properties of materials. **5marks**
13. What is technical drawing? State its main role. **2marks**
14. Identify five (5) among different thermal properties of materials. **5marks**
15. Determine the correct and incorrect dimensioning in the following: **3marks**



Section II. Answer any three (3) questions of your choice

(Do not choose more than three questions). 30marks

16. In the following figure the arrowhead shows the direction of the front view, draw the elevation looking from the front view, the top view and the side view. **10marks**

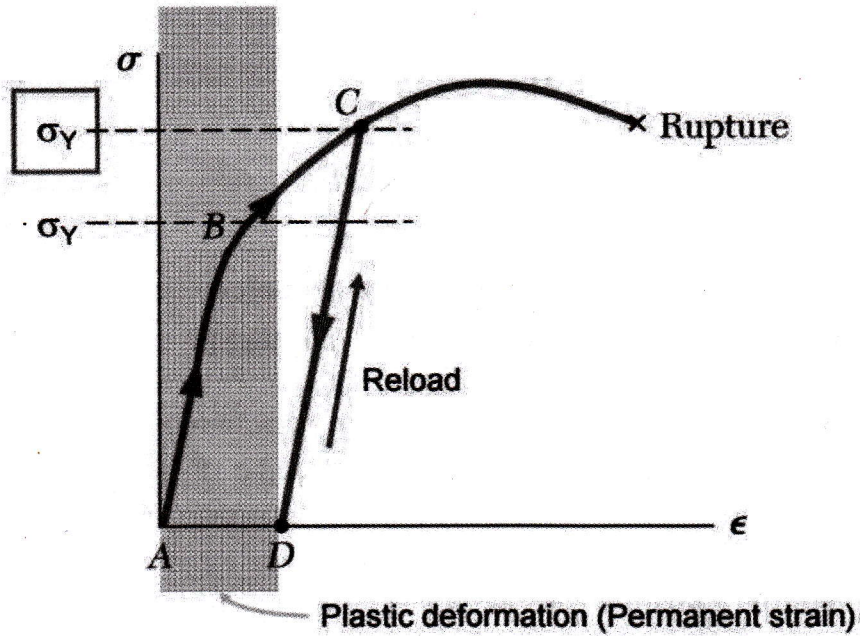


17. a) Describe steel and list different methods of manufacturing the steel. **6marks**
 b) Explain the two types of Steel. **4marks**
18. a) What is stainless steel? **2marks**
 b) List different types of stainless steels and state where they can be used. **8marks**
19. a) Give the expression for the terms 'tensile stress', 'tensile strain' and 'Young Modulus', and state the S.I. units of each term. **6marks**
 b) Determine the drawing instrument used to perform the following tasks: **4marks**
 (i) To draw lines at 30°, 60° and 45° to the vertical and horizontal.
 (ii) To mark or measure angles between 0 and 360°.
 (iii) To fix the Drawing sheet on the Drawing board.
 (iv) To draw circles and arcs of circles.
20. a) Identify different types of thermoplastics. **4marks**
 b) What are the main properties of thermoplastics and their uses? **6marks**

Section III. Answer any one (1) question of your choice

(Do not choose more than one question). 15marks

21. a) Given the standard size of A0 drawing sheet in mm (1189X841) find quickly the size of A1, A2, A3, A4, A5, A6, A7 and A8. **8marks**
- b) The figure below shows the plot of the stress versus the strain for a plastic deformation. Describe shortly the elasticity behavior of a plastic and clearly explain what the point **C** represents on the graph. **7marks**



Where σ is the Stress whereas ϵ represent the strain.

22. Draw the elevation looking from the direction of the arrow FV, plan and right side view, left side view and the top view for the pictorial view shown in figure below.

15marks

