CEL\&ETL - Technical Drawing and Knowledge of Materials T015 Thursday, 30/11/2017 08:30-11:30 AM

WORKFORCE DEVELOPMENT AUTHORITY


# ADVANCED LEVEL NATIONAL EXAMINATIONS, 2017, TECHNICAL AND PROFESSIONAL STUDIES 

## EXAM TITLE:

TECHNICAL DRAWING AND KNOWLEDGE OF MATERIALS

## OPTIONS: Computer Electronics (CEL) <br> Electronics and Telecommunication (ETL)

DURATION: $\mathbf{3}$ hours

## INSTRUCTIONS:

The paper is composed of three (3) main Sections as follows:
Section I: Fourteen (14) compulsory questions. 55 marks
Section II: Attempt any three (3) out of five questions. $\mathbf{3 0}$ marks
Section III: Attempt any one (1) out of three questions. $\mathbf{1 5}$ marks

## Note:

Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.

Use drawing materials where required.

1. Inscribe a regular octagon in the circle of 25 mm of radius.

4 marks
02. What is malleability property of material?
03. List out any five physical property of material.
04. Draw angle $O M N$ of $65^{\circ}$ and make bisect of that angle.
05. Identify five among different types of cast iron.
06. The graph below shows tensile strength versus perlitic microstructure of cast Iron as mechanical properties of cast iron. List at least one (1) graphite's effect on tensile strength.

2 marks

07. Define drawing.

2 marks
08. State two types of drawing and give four subtypes of engineering drawing.

4 marks
09. Define a tangent to a circle. Draw a tangent to a circle from any point on the circumference by given a radius of cycle $R=30 \mathrm{~mm}$. And says in briefly ways of its construction.

6 marks
10. Write in fully and correctly the sentence by filling in the following statements.

5 marks

- Metal which contains Iron is called.
- Non- ferrous metal
- Ferrous metal
- Alloy metal
- Non-metal material
- Cast iron is an example for. $\qquad$
- Alloy metal
- Non- ferrous metal
- Ferrous metal
- Non-metal material
- Steel is an example for
- Non-metal material
- Ferrous metal
- Alloy metal
- Non- ferrous metal
- Aluminium is an example for
- Non-metal material
- Ferrous metal
- Alloy metal
- Non-ferrous metal
- Brass belongs to $\qquad$
- Non-ferrous metal
- Non-metal material
- Ferrous metal
- Alloy metal

11. Give the functions of the following drawing instruments:
a) Compass:
b) French Curves
c) T-square:
d) Protractor:
e) Divider:

5 marks
12. What is meant by sectioning?
13. What is "direction of sight" in sectioning?
14. Construct three circles, each one touching the other two externally, their radii being 12,18 and 24 mm , respectively.

5 marks
15. 3-D pictorials of two objects are shown with labeled surfaces. Identify those surfaces on the corresponding 2-D orthographic projections.

10 marks


| Surface <br> Number | Enter Corresponding Surface Letter |
| :--- | :--- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

16. Draw the Top view, Front view, Left view for the following isometric view. First-angle projection.


## 3D Representation

17. Identify which type of section each of the drawings use and the material that the part is made from for $\mathbf{A}, \mathbf{B}, \mathbf{C}$.

10 marks

18. Classify plastic materials into two categories, describe their important properties and give two examples of each.

10 marks
19. Give the distinctive features, limitations, and applications of the following alloy groups: titanium alloys, refractory metals, superalloys, and noble metals.
20. Sketch the front, top and right side views of the following object.

21. Compare white and nodular cast irons with respect to
a) composition and heat treatment,
b) microstructure,
c) Mechanical characteristics.
22. Draw common external tangents to circles of diameters 60 mm and 32 mm whose centers are located 80 mm apart.

