 Province of the

EASTERN CAPE

EDUCATION

**DIRECTORATE SENIOR CURRICULUM MANAGEMENT (SEN-FET)**

**HOME SCHOOLING SELF-STUDY WORKSHEET**

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| **SUBJECT** | ELECTRICAL TECHNOLOGY-POWER SYSTEMS | **GRADE** | 12 | **DATE** | APRIL 2020 |
| **TOPIC** | THREE PHASE TRANSFORMERS-SPECIFIC | **TERM 1**  **REVISION** | (Please tick) | **TERM 2 CONTENT** | (√) |
| **TIME ALLOCATION** |  | **TIPS TO KEEP HEALTHY**  1. **WASH YOUR HANDS** thoroughly with soap and water for at least 20 seconds. Alternatively, use hand sanitizer with an alcohol content of at least 60%.  2. **PRACTICE SOCIAL DISTANCING** – keep a distance of 1m away from other people.  3. **PRACTISE GOOD RESPIRATORY HYGIENE**: cough or sneeze into your elbow or tissue and dispose of the tissue immediately after use.  4. **TRY NOT TO TOUCH YOUR FACE.** The virus can be transferred from your hands to your nose, mouth and eyes. It can then enter your body and make you sick.  5. **STAY AT HOME.** | | | |
| **INSTRUCTIONS** | Use **Step Into Electrical Technology Grade 12-Learner guide and read: Chapter 4-Three Phase Transformers** and answer the questions on Worksheets below. |

**WORKSHEET: THREE PHASE TRANSFORMERS EXERCISE- LESSON 1**

* 1. Briefly explain the function of a transformer in a distribution network. (2)

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* 1. List FOUR requirements that must be satisfied for three single-phase transformers to be connected as a three-phase transformer. (4)

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* 1. State FOUR types of transformer connections. (4)

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* 1. Explain why the secondary winding of a step-down transformer has a thicker wire. (2)

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* 1. Describe what would happen to the primary current of a step-down transformer if the load of the transformer were increased. (3)

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* 1. Show by means of neat sketches the difference between a single three-phase transformer and three single-phase transformer connected as a three-phase star-delta transformer. (5)

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* 1. A three-phase transformer with a turns ratio of 30 : 1 is connected in delta-star. Answer the questions that follow.
     1. Determine whether the transformer is a step-down or a step-up transformer. (1)

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* + 1. Describe why the transformer can be used for distributing electrical power to domestic and industrial loads. (3)

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* 1. Describe the operation of a transformer. (5)

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* 1. Refer to the losses that occur in transformers and answer the questions that follow.
     1. Name TWO types of losses that occur in transformers. (2)

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* + 1. State TWO factors that may contribute to the excessive heating of transformers. (2)

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* 1. A 110kVA star-delta transformer has a primary and secondary line voltages of 6kV and 500V respectively.

Given :

S = 10kVA

VLS = 500V

VLP = 6kV

pf = 0,97

Calculate the:

* + 1. Secondary line current. (3)

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* + 1. Transformation ratio. (6)

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* + 1. Input power if the power factor is 0,97. (3)

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* + 1. Efficiency of the transformer if the total loss is 80 W. (3)

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* + 1. Explain why transformers have a better efficiency in comparison to other machines. (3)

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* + 1. State the purpose of the Bulchholz relay in transformers. (2)

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