 Province of the

EASTERN CAPE

EDUCATION

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

**HOME SCHOOLING SELF-STUDY WORKSHEET ANSWER SHEET**

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| --- | --- | --- | --- | --- | --- |
| **SUBJECT** | ELECTRICAL TECH: POWER SYSTEMS | **GRADE** | 12 | **DATE** |  |
| **TOPIC** | THREE-PHASE MOTORS AND STARTERS | **TERM 1**  **REVISION** | (Please tick) | **TERM 2 CONTENT** | (✓) |

ANSWER SHEET

* 1. Define the term synchronous speed of the motor. (2)

Is the speed of the rotating magnetic field✓ in the stator windings.✓

* 1. Describe the operation of the squirrel-cage induction motor. (7)
* When a three-phase supply is connected to the stator winding, a rotating magnetic flux is produced.✓
* This flux will cut the metal rod of the rotor, inducing an e.m.f in it✓ which is responsible for the flow of current in the rotor.✓
* This current will create a magnetic flux.✓
* The stator and rotor magnetic flux will react to each other ✓and a force will be produced.✓
* The force will cause the rotor to rotate in the direction of the rotating magnetic flux.✓
  1. A three-phase motor with 18 poles is supplied from a 380V/50Hz supply.

Given:

VL

f

number of poles

Calculate the:

* + 1. Synchronous speed in r/min (4)

The total of18 poles = 6 poles per phase = 3 poles per phase therefore p=3✓

NS ✓

✓

✓

* + 1. Percentage slip if the rotor speed is 955 r/min

% slip ✓

✓

✓

* 1. Table 1.1. below shows the name plate of a three-phase induction motor. Answer the questions that follow.

TABLE 1.1: NAME PLATE OF A THREE-PHASE INDUCTION MOTOR

|  |  |
| --- | --- |
| MOTOR MANUFACTURER SPECIFICATION |  |
| Phase | 3 |
| Voltage | 380V |
| Current | 1,3A |
| Speed | 1500 r/min |
| Power | 7,5kW |
| Frequency | 50Hz |
| Cos Ø | 0,8 lagging |
| Frame No. | 22SP27 |

* + 1. State the amount of current the motor will draw from the supply at full load. (1)

1,3A✓

* + 1. Explain why the motor is suitable for use in South Africa. (2)

The motor can be used in South Africa because of the supply voltage of 380V✓ with a frequency of 50Hz✓.

* + 1. State what the 7,5 kW on the name plate indicates. (1)

The 7,5 kW signifies the rated output power✓ the motor can deliver to drive the load.

* + 1. Determine the total number of poles. (5)

p✓

✓

✓

Therefore total number of poles

✓✓

* + 1. PIN✓

✓

n

✓

✓

OR

n✓✓

✓