**PROFESSIONAL ENGINEER**

**Summary Statement**

**These are the competency Units and Elements. These elements must be addressed in the Summary Statement (see Section C). If you are applying for assessment as a Professional Engineer, you will need to download this page, complete it and lodge it with your application.**

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| **Competency Element** | **A brief summary of how you have applied the element** | **Paragraph number in the career episode(s) where the element is addressed** |
| **PE1 KNOWLEDGE AND SKILL BASE** | | |
| PE1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline | I initiated the project by reviewing various literature, and research papers related to the photovoltaic panel. | A.3.1 |
| I collected the knowledge about how the inductions motors were constructed and operated from different sources. . I studied the book materials and some research papers related to the working mechanism of the induction motor and accumulated information about the torque and speed of the induction motor. | B.3.1 |
| I collected the knowledge about how the inductions motors were constructed and operated from different sources. . I studied the book materials and some research papers related to the working mechanism of the induction motor and accumulated information about the torque and speed of the induction motor. | B.3.1 |
| PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics and computer and information sciences which underpin the engineering discipline | I learned the use of MPPT for greater power harvesting from the solar panel. I studied the use of MPPT to obtain the constant power and voltage characteristics. | A.3.1 |
| I used equation for the rotor current from the equivalent circuit as I2 I2= | B.3.3 |
| I used equation for the rotor current from the equivalent circuit as I2 I2= | B.3.3 |
| PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline | I selected the various component, software tools, and techniques for designing PV solar systems suitable inverters. | A.3.2 |
| I simulated the model of V/F controlled induction motor in MATLAB software. | B.3.4 |
| I simulated the model of V/F controlled induction motor in MATLAB software. | B.3.4 |
| PE1.4 Discernment of knowledge development and research directions within the engineering discipline | I added a snubber to prevent the voltage spikes during switching. I also used the current sensor for the additional protection of the component. | A.3.3 |
| I gathered the idea about various techniques that could be used for controlling the speed of the induction motor by maintaining the constant torque by the motor. | B.3.1 |
| I gathered the idea about various techniques that could be used for controlling the speed of the induction motor by maintaining the constant torque by the motor. | B.3.1 |
| PE1.5 Knowledge of contextual factors impacting the engineering discipline | I generated 18-40 voltage by PV array. Similarly, a flyback converter was used to boost the DC voltage obtained from the PV module. I stepped up the DC voltage to 400 DC voltage. | A.3.3 |
| I improvised the v/f control mechanism of an induction motor by introducing the sensors in the output of the motor. | B.3.7 |
| I improvised the v/f control mechanism of an induction motor by introducing the sensors in the output of the motor. | B.3.7 |
| PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline | I applied sufficient input voltage to the inverter by utilizing a fly back converter to get required output voltage and power from the inverter. | A.3.6 |
| I analyzed the characteristics for the speed and torque of the induction motor when the control mechanism was not implemented. | B.3.5 |
| I analyzed the characteristics for the speed and torque of the induction motor when the control mechanism was not implemented. | B.3.5 |
| **PE2 ENGINEERING APPLICATION ABILITY** | | |
| PE2.1 Application of established engineering methods to complex engineering problem solving | I applied sufficient input voltage to the inverter by utilizing a fly back converter to get required output voltage and power from the inverter. | A.3.6 |
| I applied the open-loop control mechanism to the induction motor and got the T-S characteristics. | B.3.5 |
| I applied the open-loop control mechanism to the induction motor and got the T-S characteristics. | B.3.5 |
| PE2.2 Fluent application of engineering techniques, tools and resources | I performed four switches T1, T2, T3, and T4 where T1 and T2 switches or T3 and T4 were supposed to work in couple to get output. | A.3.3 |
| I analyzed the result for different components and the overall control system of the induction motor. | B.3.5 |
| I analyzed the result for different components and the overall control system of the induction motor. | B.3.5 |
| PE2.3 Application of systematic engineering synthesis and design processes | I used PIC code using controller name PIC16F877A for flyback converter. I used a high-frequency transformer for doing boosting, it turned a ratio of 1:8 as it contained MOSFET, RC snubber, transformer, and freewheeling diode. | A.3.4 |
| I selected the appropriate size of the magnetizing, stator, and rotor reactance along with the rotor and stator resistance. | B.3.3 |
| I selected the appropriate size of the magnetizing, stator, and rotor reactance along with the rotor and stator resistance. | B.3.3 |
| PE2.4 Application of systematic approaches to the conduct and management of engineering projects | I researched on the fundamental idea and scope of the project before preparing project management plan. | A.3.4 |
| I powered the induction motor with the PWM inverter without controlling the speed of the motor. | B.3.4 |
| I powered the induction motor with the PWM inverter without controlling the speed of the motor. | B.3.4 |
| **PE3 PROFESSIONAL AND PERSONAL ATTRIBUTES** | | |
| PE3.1 Ethical conduct and professional accountability | I assigned roles and tasks to each of the team members as per their interest and requirements of the project. | A.3.8 |
| I referred to the IEEE 1683-2014 guide for motor controller standards for designing and analyzing suitable induction motor controllers. I also followed ISO 23570:2009, Industrial automation, and control system standards in this project. | B.3.9 |
| I referred to the IEEE 1683-2014 guide for motor controller standards for designing and analyzing suitable induction motor controllers. I also followed ISO 23570:2009, Industrial automation, and control system standards in this project. | B.3.9 |
| PE3.2 Effective oral and written communication in professional and lay domains | I also lead my project team towards achieving the project goals through cooperation and teamwork between the project members. | A.3.8 |
| I assigned the research and development task for the team members and developed the schedule for the project to implement it efficiently. | B.3.8 |
| I assigned the research and development task for the team members and developed the schedule for the project to implement it efficiently. | B.3.8 |
| PE3.3 Creative, innovative and proactive demeanour | I used an LC filter to remove the noise and distortion frequency. . I added a snubber to prevent the voltage spikes during switching. I used the snubber capacitor for minimizing the dissipation of energy. | A.3.7 |
| I updated the system with the closed-loop feedback system where the comparison was made by the sensors and controllers and the efficiency of the system was improved. | B.3.7 |
| I updated the system with the closed-loop feedback system where the comparison was made by the sensors and controllers and the efficiency of the system was improved. | B.3.7 |
| PE3.4 Professional use and management of information | I coordinated with my supervisor while making important project decisions. I also clearly discussed the plans, issues, and situations with my project team before finalizing any decisions. | A.3.8 |
| I made the resources for the project available and handle all the managerial parts of the project. | B.3.8 |
| I made the resources for the project available and handle all the managerial parts of the project. | B.3.8 |
| PE3.5 Orderly management of self, and professional conduct | I assigned roles and tasks to each of the team members as per their interests and requirements of the project. | A.3.8 |
| I handle the technical problems that arouse during the execution of the project. | B.3.8 |
| I handle the technical problems that arouse during the execution of the project. | B.3.8 |
| PE3.6 Effective team membership and team leadership | I conducted progress review meetings each weekend and maintained the progress report for keeping track of work efficiency. | A.3.8 |
| I learned to manage the project and the team members in the proper way. | B.4.2 |
| I learned to manage the project and the team members in the proper way. | B.4.2 |