University of Sadat City	Final Exam:		Course Code:	SPO10	Percentage		Environmental Studies and Research Institute
	Academic Year:	2017/2018	Academic Program:	PhD	N. of Exam Paper	Two	
	Level:	PhD	Department:	Survey of Natural Resources	Date:	3/1/2018	
	Course Name:	Solar Energy and the Environment	Total score:	60 Degrees	Time allowed:	2 hours	

Instructions of Exam:

1. Answer the obligatory questions.
2. Use the blue pen and pencil in answer sheet
3. Allow one sheet answer for every student
4. Is not allowed to borrow the tools (pen, pencils, drawing tools, calculator ...etc)
5. Is not allowed to use the cell phone or any of its application during the time of exam

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1st question (20 Degrees)

A) Indicate whether the following statements are true or false (correct the false sentences): (10 degrees)

i- A solar cell converts solar radiation directly into electricity.
ii- Solar energy comes to us in the form of electromagnetic radiation.
iii- PV systems can be connected to the electric utility without using batteries or generators
iv- Thermal collectors convert solar radiation into electricity.
v- Concentrating Solar Thermal Collectors are Used to generate electricity
vi- Solar thermal collectors are less efficient than PV collectors.
vii- Solar energy produces greenhouse gases, which are linked to global warming and climate change.
viii- The conversion efficiency of the solar cells increases by increasing temperature.
ix- PV- modules can be used singly, or connected in series and parallel into an array with a larger current & voltage output
x- The amorphous silicon solar cells have higher efficiencies than single crystalline solar cells.

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Staff Course	Dr. Hoda Hafez, Dr Mohamed Azzazi, Dr Ismail Aly	Department Head	Dr. Mohamed Azzazi
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B) Distinguish between the following: (10 degrees)

i- **Stand alone and grid connected PV systems.**

ii- **Flat plate collector and Concentrating solar thermal collectors**

2st question **(20 Degrees)**

A) Define five of the following terms: (10 degrees)

ii- **Global radiation**

iii- **Air mass**

iv- **Azimuth Angle**

v- **Solar cell**

vi- **Solar collector**

vii- **Global warming**

B) What are the factors affecting solar cells efficiency. (10 degrees)

3rd question **(20 Degrees)**

A) **Briefly discuss the relation between the solar energy and the Environment, giving an example.** (10 degrees)

B) Describe basic components of PV system (5 degrees)

C) What are the benefits of solar energy in our environment, Giving Examples? (5 degrees)

With best wishes

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