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Code No. : 16109 N(D)

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (CBCS) VI-Semester Main Examinations, May-2019**

**Solar Power & Applications**  
 (Open Elective-VI)

Time: 2 hours

Max. Marks: 50

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

Q.No.	Stem of the question	M	L	CO	PO
<b>Part-A (5 × 2 = 10 Marks)</b>					
1.	Define the terms: i) Beam radiation ii) Diffuse radiation.	2	1	4	1
2.	Classify the Concentrating type solar collectors.	2	2	4	1
3.	Draw the ideal equivalent circuit of solar cell.	2	3	3	1
4.	What do you understand by solar module?	2	2	2	1,2
5.	Which process is responsible for production of energy in the sun? Also give chemical reaction.	2	1	4	1
<b>Part-B (5 × 8 = 40 Marks)</b>					
6.a)	Explain with a neat sketch the construction and operation of Sunshine recorder.	5	2	1	1,2
b)	Define the terms: i) Terrestrial radiation ii) Extra-terrestrial radiation iii) Solar constant	3	1	4	1
7.a)	With a neat sketch, explain the construction and operation of solar water heater.	4	2	4	1
b)	Compare flat plate and concentrating type solar collectors.	4	2	4	1
8.a)	Describe the constructional details and operation of Box-type solar cooker with a neat sketch.	6	3	4	1
b)	Calculate the extra-terrestrial radiation in $W/m^2$ on April 27, 2019.	2	5	4	1
9.a)	Draw the P – V characteristics of solar cell. Also give the performance indices of solar cell.	4	3	3	1
b)	Classify solar cells and discuss them briefly.	4	2	3	1,2
10.a)	With a schematic diagram, describe the operation of stand- alone solar PV System.	6	3	2	1,2
b)	What is the purpose of Transformer in a Grid – interactive solar PV system?	2	1	2	1,2
11.a)	Draw I – V characteristics of solar cell with variation of temperature and insolation.	3	3	3	1
b)	A PV system feeds a dc motor to produce 3 hp power at the shaft. The motor efficiency is 90%. Each module has 32 cells arranged in a 9 X 4 matrix. The cell size is 125mm X 125mm and the cell efficiency is 15%. Estimate the number of modules required. Solar radiation is $1000W/m^2$ .	5	5	2	1,2

Contd... 2

12.a)	Explain about the central tower receiver solar collector with a neat sketch.	4	2	2	1,2
b)	Explain the effect of shadowing on solar cell in solar module with a neat sketch. Also mention the advantage of array diode or blocking diode in solar PV system.	4	2	2	1,2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	57.6
2	Knowledge on application and analysis (Level-3 & 4)	31.8
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	10.6

