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Course Code 

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Fifth Semester B.E. Degree Examinations, April/May 2024

**NON-CONVENTIONAL ENERGY SOURCES**

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.  
2. Missing data, if any, may be suitably assumed

| <u>Q. No</u>           | <u>Question</u>  | <u>Marks</u> | <u>(RBTL:CO:PI)</u> |
|------------------------|--|--------------|---------------------|
| <b><u>Module-1</u></b> |  |              |                     |
| 1.                     | a. What do you mean by non-conventional energy? What are its merits and demerits?                                    | 08           | (1 :1 : 1.2.1)      |
|                        | b. Briefly discuss the need and importance of non-conventional energy sources for future power needs of the country. | 06           | (1 :1 : 1.2.1)      |
|                        | c. With a neat sketch, explain the production of oil from oil shale and tar sands.                                   | 06           | (2 :1 : 1.2.1)      |
| <b>(OR)</b>            |  |              |                     |
| 2.                     | a. Give the classification of energy resources.  | 06           | (2 :1 : 1.2.1)      |
|                        | b. Write short notes on (i) Biomass Energy (ii) Ocean temperature energy conversion                                  | 08           | (1 :1 : 1.2.1)      |
|                        | c. Differentiate between convention and non-conventional energy.   | 06           | (1 :1 : 1.2.1)      |
| <b><u>Module-2</u></b> |  |              |                     |
| 3.                     | a. With a neat sketch, explain terrestrial and extra-terrestrial radiation.  | 06           | (2 :2 : 1.3.1)      |
|                        | b. With a neat sketch, explain the working principle of Pyrheliometer.   | 08           | (2 :2 : 1.3.1)      |
|                        | c. Write short notes on (i) solar constant (ii) beam radiation (iii) diffuse radiation                               | 06           | (1 :2 : 1.2.1)      |
| <b>(OR)</b>            |  |              |                     |
| 4.                     | a. With a neat sketch, explain (i) Solar altitude angle (ii) Zenith angle (iii) Azimuth angle.                       | 06           | (2 :2 : 1.3.1)      |
|                        | b. What are the different types of solar thermal collector devices? With a neat sketch, explain air heating system.  | 08           | (2 :2 : 1.3.1)      |
|                        | c. With a flow diagram, explain solar pond electric power plant.   | 06           | (2 :2 : 1.4.1)      |
| <b><u>Module-3</u></b> |  |              |                     |
| 5.                     | a. With a neat sketch, explain liquid flat plate collector.  | 06           | (2 :3 : 1.3.1)      |
|                        | b. Mention the applications of solar flat plate collector.   | 06           | (1 :3 : 1.3.1)      |
|                        | c. What do you mean by transmissivity and how it is obtained? Explain with a sketch.                                 | 08           | (2 :3 : 1.3.1)      |
| <b>(OR)</b>            |  |              |                     |
| 6.                     | a. Write the equations for energy gain and energy loss of a flat plate collector and explain the terms involved.     | 6            | (2 :3 : 1.4.1)      |

**Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)**

- b. With a neat sketch, explain photo voltaic conversion. **8** (2 :3 : 1.3.1)
- c. What are the advantages of solar photovoltaic systems over conventional power systems? **6** (1 :3 : 1.3.1)

**Module-4**

- 7. a. With a neat sketch, explain Vertical Axis wind turbine (VAWT). **10** (2 :4 : 1.3.1)
- b. What are the advantages and disadvantages of horizontal axis wind turbine over vertical axis wind turbine. **10** (2 :4 : 1.3.1)

**(OR)**

- 8. a. What are tides? With a neat sketch, explain single basin arrangement tidal energy. **06** (2 :4 : 1.3.1)
- b. List out the advantages and limitations of tidal power. **06** (1 :4 : 1.3.1)
- c. With neat sketch, explain closed or Anderson ocean thermal energy conversion. **08** (2 :4 : 1.3.1)

**Module-5**

- 9. a. With a sketch, explain typical geothermal field. **06** (2 :5 : 1.3.1)
- b. With a flow diagram, explain liquid dominated single flash type geothermal energy system. **08** (2 :5 : 1.4.1)
- c. What are the sources and advantages of bio-mass? **06** (1 :5 : 1.3.1)

**(OR)**

- 10 a. Differentiate between biomass and biogas. **06** (1 :5 : 1.3.1)
- b. With a neat sketch, explain working of KVIC floating drum type digester. **10** (2 :5 : 1.3.1)
- c. What are the benefits of hydrogen energy? **04** (1 :5 : 1.3.1)

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