

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

Course Code

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 1 | M | E | 5 | 5 | 4 |
|---|---|---|---|---|---|---|

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> |
|------------------------|--|--------------|---------------------|
| <u>Module-1</u> | | | |
| 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) |
| (OR) | | | |
| 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) |
| <u>Module-2</u> | | | |
| 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) |
| (OR) | | | |
| 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) |
| <u>Module-3</u> | | | |
| 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) |
| (OR) | | | |
| 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) |

** ** *