

Hall Ticket Number:

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

Code No. : 13165 N/O (K)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. III-Semester Main and Backlog Examinations, Jan./Feb.-2024**Non-Conventional Energy Sources (OE-I)**

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B****Part-A (10 × 2 = 20 Marks)**

| Q. No. | Stem of the question | M | L | CO | PO |
|----------------------------------|---|---|---|----|---------|
| 1. | Define the photovoltaic effect | 2 | 1 | 1 | 1,2,3,4 |
| 2. | Sketch the I-V characteristics diagrams for a solar cell under various illumination levels | 2 | 4 | 1 | 1,2,3,4 |
| 3. | Outline the function of wind vane and anemometer | 2 | 2 | 2 | 1,2,3,4 |
| 4. | Define the terms pyrolysis and incineration | 2 | 1 | 2 | 1,2,3,4 |
| 5. | List out the raw materials for producing bioethanol | 2 | 2 | 3 | 1,2,3,4 |
| 6. | The operating temperature is highest in which type of fuel cell? | 2 | 4 | 3 | 1,2,3,4 |
| 7. | Give any two applications of geothermal energy | 2 | 2 | 4 | 1,2,3,4 |
| 8. | State the source of tidal energy and what is the minimum tidal range required for a practical tidal plant | 2 | 1 | 4 | 1,2,3,4 |
| 9. | Define the photovoltaic module and array | 2 | 1 | 1 | 1,2,3,4 |
| 10. | Compile a list of applications for wind energy | 2 | 2 | 2 | 1,2,3,4 |
| Part-B (5 × 8 = 40 Marks) | | | | | |
| 11. a) | Explain why there is a need for non-conventional energy sources | 4 | 2 | 1 | 1,2,3,4 |
| b) | Derive the expression of maximum output power of solar cell and draw the I-V characteristic diagram indicating the maximum power point tracking | 4 | 2 | 1 | 1,2,3,4 |
| 12. a) | Discuss the applications of wind energy | 4 | 2 | 2 | 1,2,3,4 |
| b) | With a neat diagram explain the production of electricity from wind energy | 4 | 2 | 2 | 1,2,3,4 |
| 13. a) | Illustrate the process of biochemical conversion | 4 | 3 | 3 | 1,2,3,4 |
| b) | Describe the construction and working of solid oxide electrolyte fuel cell with chemical reaction equations | 4 | 3 | 3 | 1,2,3,4 |

Contd... 2

| | | | | | |
|--------|---|---|---|---|---------|
| 14. a) | Discuss the limitations of tidal power generation | 4 | 2 | 4 | 1,2,3,4 |
| b) | Explain the operation of open ocean thermal energy conversion (OTEC) plant | 4 | 2 | 4 | 1,2,3,4 |
| 15. a) | State the merits and demerits of non-conventional energy sources | 4 | 1 | 1 | 1,2,3,4 |
| b) | Analyze the nature of wind speed variation with the height with a neat characteristic diagram | 4 | 4 | 2 | 1,2,3,4 |
| 16. a) | Examine the advantages and disadvantages of biomass energy | 4 | 4 | 3 | 1,2,3,4 |
| b) | Demonstrate how electricity can be generated using vapour dominated geothermal plant with a neat layout diagram | 4 | 3 | 4 | 1,2,3,4 |
| 17. | Answer any <i>two</i> of the following: | | | | |
| a) | List out the applications of solar energy | 4 | 1 | 1 | 1,2,3,4 |
| b) | Draw the diagram of the waste recovery management scheme and illustrate it | 4 | 3 | 2 | 1,2,3,4 |
| c) | Illustrate the construction and working of molten carbonate fuel cell with chemical reaction equations | 4 | 3 | 3 | 1,2,3,4 |

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

| | | |
|------|-------------------------------|-----|
| i) | Blooms Taxonomy Level – 1 | 20% |
| ii) | Blooms Taxonomy Level – 2 | 40% |
| iii) | Blooms Taxonomy Level – 3 & 4 | 40% |

55/50
①