

**B.Tech Odd Semester (CBCS) Exam.,
December—2017**

AGRICULTURAL ENGINEERING

(7th Semester)

Course No. : AE-704 (C)

(Renewable Energy Sources)

Full Marks : 75

Pass Marks : 30

Time : 3 hours

- Note :*
1. Attempt **one** question from each Unit.
 2. Begin each answer in a new page.
 3. Answer parts of a question at a place.
 4. Assume reasonable data wherever required.
 5. The figures in the margin indicate full marks for the questions.

UNIT—1

1. (a) Define sun's declination, hour angle and solar azimuth angle. 3
- (b) Explain the indirect type solar dryer with neat sketch. 7
- (c) Draw the neat diagram of solar water heater. 5

2. (a) Explain solar distillation with neat sketch and write down the application of solar still. 8
- (b) Write down the benefits of solar cooking. 2
- (c) Draw the neat diagram of solar cooker. 5

UNIT—2

3. (a) Explain the updraft gasifier with neat sketch. Write its advantages and application. 10
- (b) Explain the process involved in supplying producer gas to a diesel engine. 5
4. (a) What is producer gas? Write its uses. What are the feedstocks used for the generation of producer gas? Explain the mechanism of generation of producer gas. 10
- (b) What are the factors on which generation of the producer gas depends? Explain. 5

(3)

UNIT—3

5. (a) What is biodiesel? Write its uses. What are the feedstocks used for the production of biodiesel? Write the advantages of biodiesel. 10
- (b) Explain the procedure for the production of biodiesel from a non-edible vegetable oil with free fatty acid content of 22%. 5
6. (a) Explain the aerodynamic principle of a wind turbine blade. 10
- (b) What are the uses of windmill? Explain various types of wind turbine blades used. What is COP of a wind turbine? 5
- UNIT—4
7. (a) Write a short note on flexi biogas plant. 2
- (b) Explain Janata biogas plant. 10
- (c) Draw the neat diagram of roller press briquetting machine. 3
8. (a) Draw the neat diagram of Deenbandhu biogas plant. 7
- (b) What do you mean by briquetting? 2
- (c) Write down the different applications of briquettes. 6

(4)

UNIT—5

9. (a) What do you mean by payback period? Give any example. 5
- (b) Explain the net present worth and benefit cost ratio. 10
10. The total cost of the solar distillation unit is ₹ 13,780. Calculate net present worth, benefit cost ratio and payback period. Assume the following assumptions : 15
- (a) The operating life of the system is 10 years(n)
- (b) The operating cost is ₹ 780
- (c) The solar still can operate for 8 hours per day
- (d) Annual sunny day is 200 days
- (e) A discount rate of 10 percent was used (i)
- (f) Selling cost of distilled water @ ₹ 25 per litre

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