

detention time = 40 days
diameter to depth ratio of digester = 1:2.5
capacity of gas holder and digester = 10
capacity of gas holder = 60% of plant capacity
biogas requirement per day/person = 300 l.

Also calculate

Number of animals required for feed stock. Gas requirement to run a 4 kW engine if operated 2 hrs in a day in a dual-fuel mode. Make other necessary assumptions. 10

7. Write down the short notes on screw press briquetting machine. 10
8. Write down short notes on biomass. 10

M. Tech Odd Semester Examination, February, 2023

Agricultural Engineering (3rd Semester)

Course No.: 3ST206/MASH-A06
[Open Elective (Waste to Energy)]

Full Marks: 50

Pass Marks: 25

Time: 2 hours

- Note:**
1. Attempt any five questions.
 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 right margin indicate full marks for the question.
 6. All the mathematical symbols and abbreviations have their usual meanings.

1. Explain the updraft gasifier with neat sketch. Write its advantages and application. 10
2. Write down short notes on solar water heater. 10
3. Write down short notes on box type solar cooker. 10
4. Determine the local solar time and declination at a location latitude $23^{\circ} 15' N$, longitude $77^{\circ} 30' E$ at 12.30 IST on June 5. Equation of time correction is given from standard table or chart = $-(1^{\circ} 01')$. 10
5. What is biogas? Write its uses. Explain the Pragati biogas plant with neat sketch. 10
6. Determine the size of digester and gas holder or a biogas plant required to produce 10 m^3 biogas per day based on the data given below:

manure available per animal per day = 10 kg

gas production rate per kg fresh manure = 50 l.

Turn Over