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**Question Paper Code: 59A21**

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Elective

Agriculture Engineering

15UAG921- BIO AND THERMO CHEMICAL CONVERSION OF BIOMASS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. \_\_\_ as a soil amendment enhances plant growth and reduces need for water and fertilizer CO1- R  
(a) Biochar                      (b) Biomass                      (c) Night Soil                      (d) Airmass
2. There are \_\_\_\_\_ types of biomass today. CO1- R  
(a) 3                              (b) 5                              (c) 4                              (d) 6
3. Gas production of continuous plant is higher than \_\_\_\_\_ plant. CO2- R  
(a) Batch plant                      (b) Dome plant                      (c) Drum plant                      (d) Drum plant
4. \_\_\_\_\_ type of plant is a floating gas holder plant. CO2- R  
(a) Batch plant    (b) Continuous plant  
(c) Semi-batch plant    (d) Semi-continuous plant
5. How many types of gasifiers are there? CO3- R  
(a) 2                              (b) 3                              (c) 4                              (d) 5
6. The percentage of CO in a producer gas from a gasifier is \_\_\_\_\_ percent CO3- R  
(a) 12-19                              (b) 13-19                              (c) 19-25                              (d) 25-30
7. The waste plastics are converted into liquid fuel by \_\_\_\_\_ process. CO4- R  
(a) Pyrolysis                              (b) Hydrolysis                              (c) Cracking                              (d) Incineration

8. Biomass derived alcoholic fuels contain\_\_\_\_\_which is absent in petroleum fuels. CO4- R  
 (a) Hydrogen (b) Oxygen (c) Carbon (d) Carbon
9. Which of the following product(s) are possible to derive by catalytic pyrolysis of waste plastic? CO5- R  
 (a) Gasoline and LPG (b) Diesel and LPG (c) Diesel and LPG (d) All of these
10. The major part of syn gas cleaning is the removal of\_\_\_\_\_ CO5- R  
 (a) Dust (b) Tar (c) Particulate (d) Soot

PART – B (5 x 2= 10 Marks)

11. What is Biomass? CO1- R
12. Define HRT and SRT. CO2- U
13. Define Torrefaction . CO3- U
14. Draw a schematic diagram of a cross draft gasifier. CO4-U
15. What is a pyrolysis? CO5- U

PART – C (5 x 16= 80 Marks)

16. (a) What are the fuels from biomass, energy plantations, green house mitigation and forest carbon sinks? CO1- U (16)  
 Or  
 (b) Explain about the determination of physical and chemical properties of biomass? CO1- U (16)
17. (a) Write about fixed dome biogas plants, its principle and operation with illustrations. CO2- U (16)  
 Or  
 (b) Explain about ethanol production from biomass in detail with process flow chart. CO2- U (16)
18. (a) Describe about terrified biomass, its properties, pros and cons CO3- U (16)  
 Or  
 (b) Explain about slagging and fouling due to agricultural biomass. CO3- U (16)

19. (a) Define Biomass Gasification? With a neat sketch explain the working of a updraft gasifier with gasification chemistry. CO4- U (16)
- Or
- (b) In detail write about a fluidized bed gasifier. With a neat sketch illustrate a complete biomass gasification system. CO4- U (16)
20. (a) Draw and discuss the process of syn gas cleaning and its conversion to liquid fuels in detail. CO5- Ana (16)
- Or
- (b) With neat diagrams explain the process of pyrolysis for biochar and bio-oil synthesis? CO5- Ana (16)

