KUMARAGURU
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Register Number: ……..

M.TECH. DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester

BIOTECHNOLOGY

P14BTS001**:** Biofuels Engineering

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions

PART A (10 x 1 = 10 Marks)

1. Match the following: CO3 [K_2]

Generation	Feedstock
A. First generation bioethanol feedstock	1. Algae biomass
B. Second generation bioethanol feedstock	2. Grain/sugar biomass
C. Third generation bioethanol feedstock	3. Lignocellulosic biomass
D. Fourth generation bioethanol feedstock	4. Genetically Consummated biomass

Codes:

	A	B	C	D
a)	2	3	1	4
b)	1	2	3	4
c)	4	3	2	1
d)	3	1	2	4

2. Which of the following is NOT one of the steps necessary to incorporate biofuels into existing petroleum distribution modes? CO1 [K_3]

a) increased corrosion resistance for pipelines, tankers & storage facilities

b) changes in state/federal standards, regulation, and policies

c) rerouting of the existing distribution infrastructure

d) abolish UL certificates for pumps dispensing biofuel blends of E15 or higher

3. The biomass energy source with the highest degree of proven viability is: CO1 [K_4]

a) ethanol from cellulose

b) diesel or jet fuel from algae

c) ethanol from grain or sugar d) lignocellulosic biomass

4. Green Diesel is produced by genetically modifying _____, to produce a plant with a higher lipid content CO4 [K_3]

a) wheat b) algae

c) sorghum d) corn

5. Biogas is produced through anaerobic digestion. Anaerobic digestion involves: CO4 [K_2]

1. Acidogenesis
2. Acetogenesis
3. Methanogenesis
4. Ethanologenesis

The correct sequence of the steps is

a) 1,2,3 b) 1,3

c) 2,3 d) 1,2 and 4

6. The term cellulase refers to which of the following? CO2 [K_2]

a) a class of bacteria b) a class of fungi

c) a class of virus d) a class of enzymes

7. Synthsis gas or “syngas’ is produced by which of the following processes? CO5 [K_3]

a) Fermentation b) Combuation

c) Gasification d) Pyrolysis

8. Ethanol produced from glucose through the following steps: CO2 [K_3]

1. Glycolysis converts glucose to acetic acid
2. Glycolysis converts glucose to pyruvate
3. Conversion of pyruvate to acetaldehyde
4. Oxidation of acetaldehyde to acetic acid
5. Reduction of acetic acid to ethanol

The correct sequence of the steps is

a) 1-5-3-2-4 b) 2-3-4-5-1

c) 1-2-3-4-5 d) 3-4-5-2-1

9. The following items consist of two statements, one labeled as the CO3 [K_3]

"Assertion (A)" and the other as "Reason (R). You are to examine those two statements carefully and select the answers to these items using the codes given below:

Assertion (A): Feed stocks for biodiesel production contain lipids.

Reason (R) : Lipids contain fatty acids

Codes:

a) Both A and R are individually true and R is the correct explanation of A

b) Both A and R are individually true and R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

10. Production of biodiesel from free fatty acid value greater than 4% involves the following steps: CO5 [K_4]

1. Transesterification
2. Esterification
3. Drying
4. Washing

The correct sequence of the steps is

a) 1-2-4-3

b) 2-1-4-3

c) 1-2-3-4

d) 2-1-3-4

PART B (10 x 2 = 20 Marks)

11. Give the significance of acid value of fat? CO1 [K_2]
12. Write short notes on biogas. CO1 [K_2]
13. Write the reaction for biodiesel production. CO2 [K_4]
14. List the significance of cold filter plugging point in engines. CO2 [K_2]
15. Compare and contrast high speed diesel and biodiesel. CO3 [K_3]
16. Write the ASTM specifications for biodiesel. CO3 [K_1]
17. Differentiate resistant and non-resistant starch. CO4 [K_3]
18. Give a short account on saccharification. CO4 [K_2]
19. What are the co products of biorefinery? CO5 [K_2]

20.	Outline on the economics of biorefineries.	CO5	[K_4]

PART C (6 x 5 = 30 Marks)

21.	Give a brief account on food-fuel conflict.	CO1	[K_3]
22.	Write brief notes on characterization of biodiesel.	CO2	[K_4]
23.	What is the necessity of engine performance test in biofuels?	CO3	[K_5]
24.	What happens when bioethanol blends with biodiesel?	CO3	[K_5]
25.	Write the merits, demerits and applications of biohydrogen.	CO4	[K_2]
26.	Give a brief account on anaerobic digestion of biomass.	CO5	[K_3]

PART D (4 x 10 = 40 Marks)

27.	Elaborate sequence of steps in purification of biodiesel with suitable examples.	CO2	[K_3]
28.	Discuss on ethanologenic microorganisms used for ethanol fermentation.	CO4	[K_4]
29.	Describe the applications of biorefineries in pharmaceutical and polymer industries.	CO5	[K_4]
30.	Explain in details about the thermal gasification of biomass and its significance.	CO1	[K_3]

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