A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 51007

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

First Semester

Agriculture Engineering

15UCY107 - CHEMISTRY FOR AGRICULTURIST

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. How are bond length and bond energies related? CO1-U

   (a) the lower the bond energy, the shorter the bond length

   (b) the higher the bond energy, the shorter the bond length

   (c) they are not related

   (d) the higher the bond energy, the longer the bond length

2. Which species contains a sp^2-hybridized atom? CO1-U

   (a) BeH_2 (b) BH_3 (c) NH_3 (d) H_3O^+

3. Hardness in water is expressed in forms equivalent of CO2- R

   (a) $CaCl_2$ (b) $MgCl_2$ (c) $CaCO_3$ (d) $MgCO_3$

4. Calgon is a trade name give to CO2- R

   (a) Sodium Silicate (b) Calcium phosphate

   (c) Sodium hexa meta phosphate (d) Sodium Zeolite

5. Which of the following metal protects itself forming a positive layer of its own oxide? CO3-R

   (a) Pt (b) Au (c) Fe (d) Al

6. Iron corrodes faster in CO3-U

   (a) Hard Water (b)Demineralized Water (c) Soft water (d) Distilled Water

7. Which one of the following refers to the nutrient-holding ability of the soil? CO4-U

(a) alkalinity (b) Cation exchange capacity

(c) available Water Capacity (d) Nutrient loading

8. Which of the following is a living organism that is part of the biological Nitrogen fixation process? CO4-U

(a) Nitrosomonas (b) Rhizobium

(c) nitrogenase (d) leghemaglobin

9. Simplest carbohydrate is CO5- R

(a) Glucose (b) Sucrose (c) Glycerldehyde (d) Maltose

10. Sodium bicarbonate is commonly used in cooking as CO5- U

(a) Alum (b) Baking Powder (c) Baking Soda (d) Cream of Tartar

PART – B (5 x 2= 10 Marks)

11. State Pauli exclusion principle. CO1- R

12. Define soft water. CO2- U

13. Define Paint. CO3- U

14. Write the types of minerals particles in soil. CO4- R

15. What are natural food preservatives? CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) (i) Describe the Physical and Chemical properties of ionic compounds CO1-U (8)

(ii) Discuss hydrogen bonding with its consequence CO1-U (8)

Or

(b) (i) With a neat sketch, discuss the molecular orbital diagram for N_2 molecule. Calculate the bond order of it. CO1-U (8)

(ii) State Fajan's rule. Explain the predictability of covalent or ionic bond and polarization concept using the rule. CO1-U (8)

17. (a) (i) Explain the factors responsible for the corrosion of boiler. Discuss the measures for its Prevention CO2-U (8)

(ii) Describe how water is made suitable for domestic use CO2-U (8)

Or

(b) (i) Explain the ion-exchange process of water softening. Write its advantages and disadvantages of the process. CO2-U (10)

		(ii) Discuss the desalination of brackish water using reverse osmosis method.	CO2-U	(6)
18.	(a)	(i) Formulate the Nernst equation for the electrode reaction	CO3- U	(8)
		(ii) What are the factors affecting the corrosion?	CO3- U	(8)
		Or		
	(b)	(i) Discuss mechanism of Wet Corrosion	CO3- U	(8)
		(ii) Explain how corrosion control can be brought about by sacrificial anodic method .	CO3- U	(8)
19.	(a)	(i) Discuss in detail the different types of adsorption isotherm.	CO4- U	(8)
		(ii) Write short notes on buffering capacity of soil.	CO4-U	(8)
		Or		
	(b)	(i) Discuss the factors affecting the sorption of soil.	CO4-U	(8)
		(ii) Briefly describe about the surface properties of inorganic soil materials?	CO4-U	(8)
20.	(a)	(i) Discuss the manufacturing process of ethanol and acetic acid by fermentation methods.	CO5-U	(8)
		(ii) Discuss the properties of food preservators and colouring agents with suitable examples.	CO5-U	(8)
		Or		
	(b)	(i) Describe the changes caused by modern agriculture on food resources	CO5-U	(8)
		(ii) Describe briefly role of vitamins on human health	CO5-U	(8)