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Question Paper Code: 53A02

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

Third Semester

Agricultural Engineering

15UAG302 - UNIT OPERATIONS IN AGRICULTURAL PROCESSING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Energy balances are often complicated because forms of energy can be ____ CO1-R
(a) Inter connected (b) Inconvenient (c) Inter converted (d) Incorporated
2. A linear relationship exists between the _____ at which two solutions CO1-R
exert the same vapour pressure.
(a) Volumes (b) Pressure difference (c) No. of moles (d) Temperatures
3. A shape factor is defined as _____. CO1-R
(a) q/p (b) D/p (c) Dq (d) QP
4. Rate of filtration is defined as _____. CO2 -R
(a) Resistance / Driving force (b) Driving force / Resistance
(c) Driving force / conductance (d) Conductance / Driving force
5. Which of the following law reported the power requirement for crushing CO3 -R
operation?
(a) Classius (b) Bond (c) Kick (d) Rittinger
6. Roller mills have _____. CO3 -R
(a) Pins (b) Rolled sheets
(c) Finely fluted rolls (d) Rolled balls of different Sizes

7. The solvent rich phase is called as _____ CO4 -R
 (a) Raffinate (b) Solute (c) Solvent (d) Extract
8. The simple _____ process includes separation of two immiscible liquids. CO4 -R
 (a) Leaching (b) Expression (c) Extraction (d) Sedimentation
9. Concentrations can be expressed in _____. CO5- U
 (a) Mole fraction (b) Distillation (c) Filtration (d) Crystallisation
10. The simple distillation is effective only when the liquid boiling points differ greatly by _____. CO5- U
 (a) 15°C (b) 25°C (c) 35°C (d) 45°C

PART – B (5 x 2= 10 Marks)

11. Define the law of conservation of mass and energy. CO1 - U
12. State stokes law. CO2 - U
13. Define Rolling efficiency. CO3 - U
14. List the factors affecting rate of gas absorption in contact equilibrium process. CO4 - U
15. Differentiate between slow cooling and sublimation. CO5 - U

PART – C (5 x 16= 80Marks)

16. (a) Explain the process involved in engineering unit operations such as
 (i) Evaporation CO1-U (4)
 (ii) Filtration CO1-U (4)
 (iii) Mechanical drying CO1-U (4)
 (iv) Concentration by freeze drying CO1-U (4)

Or

- (b) Explain the types of evaporators with the help an illustration. CO1-U (16)
17. (a) Define filtration. Explain the factors affecting filtration with an expression. CO2-U (16)

Or

- (b) Explain the types of filtration equipment's with neat sketch CO2-U (16)

18. (a) Explain the laws regarding the crushing efficiency of agricultural product with an illustration. CO3-U (16)

Or

(b) Explain about Roller mill, Attrition mill, Hammer mill and Ball mill with the principle, working and labeled diagram. CO3-U (16)

19. (a) Skim milk is prepared by the removal of some of the fat from whole milk. This skim milk is found to contain 90.5% water, 3.5% protein, 5.1% carbohydrate, 0.1% fat and 0.8% ash. If the original milk contained 4.5% fat, Calculate its composition assuming that fat only was removed to make the skim milk and that there are no losses in processing. CO4-App (16)

Or

(b) A solution of common salt in water is prepared by adding 20 kg of salt to 100 kg of water, to make a liquid of density 1323 kg m^{-3} . Calculate the concentration of salt in this solution as a

(a) weight/weight fraction,

(b) weight/volume fraction,

(c) mole fraction,

(d) molar concentration.

20. (a) Explain crystallization and stage equilibrium CO5-U (16)

Or

(b) Explain the flash, differential distillation and steam distillation with neat sketch. CO5-U (16)

