

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF AGRICULTURAL AND BIORESOURCES ENGINEERING
HARMATTAN SEMESTER EXAMINATION 2019/2020

PROCESSING AND DRYING OF AGRICULTURAL PRODUCTS (PME 517)
TIME: 3HOURS

ANSWER ANY FOUR QUESTIONS INCLUDING NO. 1 COMPULSORY

1a. Define the following terms:

- (i) Degree of superheat
- (ii) Humid heat
- (iii) Relative humidity
- (iv) Wet-bulb temperature
- (v) Dry bulb temperature
- (vi) Enthalpy
- (vii) Latent heat of evaporation
- (viii) Latent heat of vaporization
- (ix) PSI stands for *... square inch*
- (x) Dry air is known to contain gases. State them.

2a. What do you understand by "vapour pressure theory of drying?"
b. State its limitations
c. Briefly explain "time of retention"

3a. State four (4) factors that determine magnitude of rate of drying.
b. State five (5) mechanisms that may affect internal moisture movement.
c. Drying of farm crops involves two (2) processes. State them.

4. **CONFIRM THE FOLLOWING STATEMENTS TO BE TRUE OR FALSE**

- a. Moisture does not move from the center of the grain to the drying air until the product is heated.
- b. Another name for psychrometric chart is Humidity chart.
- c. Roller dryers are not suitable for ceramic industry.
- d. The expression representing movement of moisture during falling rate period is based on:
(i) Hooke's law (b) Newton's law (iii) Archimedes principle

In drying, the critical moisture content occurs

- (i) Between constant rate period and falling rate period
- (ii) Before constant rate period
- (iii) After falling rate period

- 5a. List at least seven (7) drying equipment known to you;
 - b. Diagrammatically represent any of the 3 above listed.
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- 6a. State Gibb's Dalton's law of partial pressure?
 - b. State the relevance of the law in drying.
 - c. State factors affecting constant rate period of drying