

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO/25)

CLASS: IMSC/ Pre-Ph.D
BRANCH: IMSC FOOD TECHNOLOGY

SEMESTER: IX-Pre-Ph.D
SESSION: MO/25

SUBJECT: FT513 GRAIN STORAGE TECHNOLOGY

TIME: 03 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will not be supplied to the candidates

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- Q.1(a) Write short notes on: (i) Dry bulb temperature (ii) Wet bulb temperature (iii) Humid heat (iv) Relative humidity (v) Percentage humidity [5] Co-1 BL2
- Q.1(b) Define the angle of repose and explain its significance in grain handling. How is bulk density and true density important in designing a storage vessel? [5] Co-1 BL2
- Q.2(a) (i) Unbound moisture (ii) Equilibrium moisture (iii) Typical drying rate curve and bring out its salient features. [5] Co-2 BL2
- Q.2(b) A time of 5 hr was taken to dry a material from an initial moisture of 30% to a final moisture of 7%. Critical and equilibrium moisture are found to be 15% and 2% respectively. How much further time would be required to dry the material to final moisture of 4%. All moisture contents are on wet basis. [5] Co-2 BL2
- Q.3(a) Derive an expression for vertical pressure and the lateral pressure at the bottom of a silo filled with granular solids. [5] Co-3 BL2
- Q.3(b) Calculate the rate of flow of Corn Flour through a circular opening in the floor of a Silo. If the opening is 12 inch in dia., for Corn Flour $n = 2.92$ and particle size is 0.03937 inch. Given $\rho_p = 39 \text{ lb/ft}^3$ and $\sin \alpha_m = \frac{1-K'}{1+K'}$ and $K' = 0.4$ [5] Co-3 BL2
- Q.4(a) Explain about CAP storage structure. Differentiate between Deep and shallow bins [5] Co-4 BL2
- Q.4(b) Discuss about temperature and moisture changes (during winter and summer) in storage structures. [5] Co-4 BL2
- Q.5(a) Describe the major benefit aeration can provide in the storage of grains. Explain the fumigation strategies used in grain storage. [5] Co-5 BL1
- Q.5(b) Differentiate between controlled and modified atmospheric storage of grains. Define mesh and aperture? [5] Co-5 BL2

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