MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

Semester	: IV (New)	**Term**	: **II**	**Academic Year**	: **2018-19**
Course No.	: PFE 244	**Title**	: **Post Harvest Engineering of Cereals,**		
Credits	: 3 (2+1)		**Pulses and Oil Seeds**		
Day & Date	: Wednesday, 08.05.2019	**Time**	: 14.00 to 17.00	**Total Marks**	: **80**

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A"**.
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a). Enlist and write in short about different unit operations of grain processing.

b) Enlist and explain in detail the screen openings of perforated metal screen and wire mesh screens.

Q.2 Wheat was milled in a burr mill. The ground product was later on analysed in a set of IS screens. The screen analysis is given in below table. Calculate the screen effectiveness of (i) IS 50 mesh and (ii) IS 30 mesh.

IS Screen	Width of opening, mm	% material retained over each screen		
		Feed	Overflow	Underflow
100	1.00	--	--	--
70	0.708	2	9.8	--
50	0.500	14	51.7	3.0
40	0.420	27	19.0	9.0
30	0.296	32	15.0	49.0
20	0.211	18	3.5	23.2
15	0.1157	4	1.0	7.8
Pan	-	3	--	8.0

Q.3 In a wheat milling equipment it was found that to grind 4.53 mm sized grains to IS sieve 35 (0.351 mm opening), the power requirement was 9 kW. Calculate the power requirement for milling of wheat by the same mill to IS sieve 15 (0.157mm opening) using 1) Rittinger's law and 2) Kick's law. Feed rate of milling was 250 kg/hr.

Q.4 a) Explain the psychometric chart in detail with neat sketch.

b) Determine the fineness modulus and average particle size for the following data of screen analysis:

IS sieve No.	100	70	50	40	30	20	15	Pan
Weight of material retainer, g	0.0	1.8	15.9	39.7	80.2	96.0	10.0	8.7

Q.5 a) Explain in detail the size reduction procedures.

b) Define equilibrium moisture content. Explain the methods for determination of equilibrium moisture content and state the Henderson's equilibrium moisture content model.

(P.T.O.)

Q.6 a) Two tones of paddy with 22 per cent moisture content on wet basis were to be dried to 13 per cent moisture content on dry basis. Calculate the weight of dried products and water evaporated.

     b) Write down the various unit operations and equipments used in a modern rice mill.

Q.7 a) Classify the methods of grain drying according to the mode of heat transfer.

     b) In pigeon pea milling experiment with concentric cylinder abrasion mill the following observations were made

         (i) Amount of unhulled grains = 2.5 %, (ii) Recovery of whole split kernels after milling = 71.4 %, (iii) Amount of crushed kernels = 3.6 %, (iv) Amount of powder generated = 11 %, (v) Amount of husk removed = 11.5 %

         The cotyledon to grain ratio of the grains was 86.5. Calculate the milling efficiency of the system.

Q.8 Write short notes (Any Two).

         a) CFTRI method of parboiling

         b) Components of a wheat mill

         c) Wet milling method of pulses

Q.9 a) What is expression? Enlist the expression devices and explain hydraulic press.

     b) Classify the mixing equipments. Explain in short the powder and particle mixers.

Q.10 a) Write short note on belt conveyor idlers.

     b) Enlist the mechanical material handling devices and write down the principles to be followed before selecting the conveying system.

SECTION "B"

Q.11 Define the following terms.

     1) Sorting   2) Aperture   3) Parboiling   4) Bound moisture

     5) Absolute humidity 6) Back logging   7) Mixing   8) Humid volume

Q.12 Fill in the blanks.

     1) Disk separator separates material on the basis of _____.

     2) Fineness of grind in hammer mill is controlled by _____.

     3) In ball mill size reduction is achieved by _____.

     4) The tray separator consists of several indented trays mounted one above the other about _____ cm apart.

     5) In Pantanagar process of dhal milling, the pitted and scratched grains are mixed with _____.

     6) A screw conveyor inclined 15 degrees will carry about _____ of the rated horizontal capacity.

     7) Wheat is dried under constant-rate period when its moisture content exceeds _____ %.

     8) All commercial flow dryers are designed on _____ drying principle.

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