53 (FPT 402) FPTC II

2014

FOOD PRODUCT TECH. II

(Cereals & Legume Processing Technology)

Paper : FPT 402

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

INSTRUCTIONS :

(i) Make suitable assumption(s) wherever applicable.

(ii) Illustrate your answers with suitable sketches and examples wherever necessary.

(iii) Preferably, write the answer in sequential order.

1. *(a)* A sponge-iron industry uses a reciprocating screen of *5mm* apperature to separate oversize from undersize fines which is then recycled to the furnace. The screen analysis of the furnace output was found to contain 25% fines. The screen efficiency was known to be 50%. The underflow from the screen contains around 95% fines if the furnace production rate is 100 *ton/hour*, find the product rate and amount of fines present in it. 10

(b) A sand mixture was screened through a standard 12 mesh screen. The mass-fraction of the over-size material in feed, overflow and underflow were found to be 0·4, 0·8 and 0·2 respectively. Calculate the screen effectiveness based on the oversize materials. 10

2. *(a)* Discuss the comparative cost-analysis of raw and parboiled rice. 10

(b) Draw the flow diagram of rice-processing in a modern mill. 10

3. *(a)* Find the powder required for crushing 5 *tonne/h* of lime stone (Rittinger's number = 0·0765 m^2/J) if the specific surface areas of the feed and the product are 100 and $200\,m^2/kg$ respectively. If the machine consumes a power of 4 *h.p.*, calculate its efficiency. 10

(b) Particles of the average feed size of $50\times10^{-4}\,m$ crushed on average product size of $10\times10^{-4}\,m$ at the rate of 20 *t/h* At this rate, the crusher consumes 40*KW* of power of which 5*KW* are required for running the mill empty. Calculate the power consumption if 12 *tonne/hour* of this product is further crushed to $5\times10^{-4}\,m$ size in the same mill ? (Assume that Rittinger's law is applicable). 10

4. *(a)* What is crushing or grinding efficiency ? How are the energy and power consumption related to above terms ? 7

(b) How the energy and power consumption play an important role in size reduction ? 7

(c) Why do we require more and more power to grind smaller and smaller particles ? 6

5. Write short notes on : 5×4=20

(i) Popped corn

(ii) By product utilization of rice

(iii) Tempering of wheat

(iv) Cyclone separator

(v) Vibratory screen.

6. (a) Draw Flow diagram of corn wet milling process. 10

(b) List out the names of milling equipment used for rice.

(c) Draw need labelled diagram of

(i) Corn Kernel

(ii) Wheat. 2+2=4

7. *(a)* Explain the unit operations involved in the production of parboiled rice. 6

(b) With *two* advantages discuss horizontal abrasive whitener. 8

(c) What do you mean by husking ? Write down different methods of husking. 6
