Total No. of printed pages = 4

**FPT-3201/FEO-II/2nd Sem/2013**

# FOOD ENGINEERING OPERATIONS – II

Full Marks – 100

Pass Marks – 30

Time – Three hours

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

Instructions :

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

(ii) Make suitable assumptions wherever applicable.

(iii) Preferably write the answers in sequential order.

(iv) Answer any *five* questions.

1. (a) How do you classify various evaporation equipments ? 5

(b) Describe different feeding methods in a multiple effect evaporator. 10

(c) What are the various applications of a evaporator in food processing ? 5

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2. (a) What are the various types of extraction processes ? Classify them. 8

(b) Describe leaching process with neat labelled diagram. 7

(c) What are the various applications of extraction in food processing ? 5

3. Differentiate the following : 5×4=20

(a) Single screw extrusion and twin screw extrusion

(b) Falling film evaporator and rising film evaporator

(c) Constant rate drying and falling rate drying

(d) Extraction and decoction.

4. Write short notes on : 4×5=20

(a) Cabinet dryer

(b) Flash evaporation

(c) Blanching

(d) Distillation

(e) Microwave radiation.

5. (a) What do you mean by extrusion ? 10

(b) Describe the basic principle and types of extrusion. 10

6. (a) How much power is required to crush 2 ton/hour of a material if 80% of the feed passes through IS-sieve No. 480 (4·75mm opening) and 80% of the product passes through IS sieve No. 50 (0·5 mm opening). Given the work index of the material is 6·30. 10

(b) In a wheat milling experiment it was found that to grind 4·33 mm sized grains to sieve 35 (0·351 mm opening). The power requirement was 8 Kw. Calculate the power requirement for milling of wheat by the same mill to sieve No. 15 (0·157 mm opening) using

(i) Rittinger's law

(ii) Kick's law.

Feed rate of milling is 200 kg/hour. 10

7. (a) What do you mean by freezing ? 5

(b) Discuss the different freezing equipments with its application. 10

(c) Write a note on the effect of freezing and frozen storage on product quality. 5