21MNP5C16L

Sl. No.

M.Tech. (Mineral Processing) V Semester PG Examination, April/May - 2024

MODELLING AND SIMULATION OF MINERAL

PROCESSING UNIT OPERATIONS
(NEP)

Time : 3 Hours   Maximum Marks : 70

Note : Answer **any five** of the following questions with question **No.1** is **Compulsory**. Each question carries **fourteen** marks.

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1. Discuss the following :

   (a) Particle fracture energy.   **4**

   (b) What is the importance of work index ?   **5**

   (c) The important properties of the distribution function *P(dp)*.   **5**

2. (a) Give the four fundamental concepts on which ore dressing simulation tools are developed.   **8**

   (b) Draw a rod and ball mill circuit and explain its simulation.   **6**

3. (a) Describe the Hopstock model for dry low intensity magnetic separator.   **10**

   (b) Discuss % open area in industrial screens and its effect on screen performance.   **4**

4. (a) A floatation plant treats feed whose grade is 0.9% Cu. The plant produces concentrate and tailings. The copper grade of concentrate is 28% and that of tailings is 0.13%.   **10**

   Calculate :

   (i) Cu recovery in concentrate

   (ii) Fraction of feed in concentrate

   (iii) Enrichment ratio

   (b) Sketch the typical size distribution plot of log-log co-ordinate system.   **4**

5. (a) Determine the breakage function b_{52} for a crusher machine, if size class 2 has mesh sizes boundaries 13.4 cm and 9.5 cm and size class 5 has boundaries 7.50 cm and 5.60 cm. **8**

(b) Discuss the half size factor and bulk density factors of a screen. **6**

6. (a) The breakage function in a crusher machine was determined to be given by $B(x:y) = 0.3(x/y)^{0.45} + 0.7(x/y)^{3.2}$. If size class 2 has mesh size boundaries 13.4 cm and 9.5 cm and size class 5 has boundaries 7.5 cm and 5 cm, calculate b_{52}. **8**

(b) Discuss the Rosin-Rammler distribution function. **6**

7. (a) Write a note on screen transmission Efficiency. **8**

(b) Write a note on crushing mechanism and product size distribution. **6**

8. (a) Write a note on production of magnetic field. **8**

(b) Explain the froth phase in floatation. **6**

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