

M. Tech. II Semester Degree Examination, September/October - 2022
MINERAL PROCESSING
21MNP2C7L : ORE CLASSIFICATION AND GRAVITY SEPARATION
PROCESSES

Time : 3 Hours

Maximum Marks : 70

Instructions : (i) Answer **any 5** of the following.
(ii) Question number **1** is **compulsory**.

1. (a) Derive an expression for particles falling under Newtonian conditions. **4**
(b) Explain the design and operating parameters of a Hydro cyclone. **10**
2. (a) Calculate the particle size of a spherical galena particle of specific gravity 7.5 settling in water from rest with a terminal velocity of 0.57 cm/sec. **5**
(b) Reflux classifiers. **5**
(c) What are the factors affecting settling of solids in fluid medium ? **4**
3. (a) Describe in brief with necessary illustration "Bird's cycle" and "Meyer's cycle". **5**
(b) Write a note on Deck shape and Riffle pattern of a shaking table. **4**
(c) Flowing film concentration. **5**
4. (a) Define Teeter column and Quick sand. **4**
(b) Explain Autogenous media cyclones. **5**
(c) A mill in closed circuit with a classifier discharge material containing 21.1% by weight of -200 mesh size. If the overflow and under flow of the classifier contains 60.2% and 8.2% of -200 mesh material, what is the efficiency of the classifier ? **5**
5. (a) Define the term Gravity Concentration Criteria. **2**
(b) Illustrate design features and working principle of Humphrey's spiral concentrator with a neat sketch and its industrial applications. **12**

6. (a) Floatex density separator. **5**
- (b) Describe in brief the Dyna Whirl Pool Separator. **4**
- (c) A beneficiation plant treats 200 tons/day of lead ore. Assay analysis of samples of feed, concentrate and tailing determined as 4.4% Pb, 55% Pb, and 0.05% Pb. Calculate the amount of concentrate recovered, percentage of recovery and the loss of lead in tailing. **5**
7. (a) Describe the stratification mechanism of Jigging process. **5**
- (b) With a neat sketch describe Falcon concentrator. **5**
- (c) What is Reynolds number ? Discuss the physical significance of Reynolds number and Resistance coefficient. **4**
8. (a) What is Heavy Media Separation (HMS) ? With a neat sketch, describe Vorsyle Separator. **5**
- (b) Explain the Apic Jig. **5**
- (c) What is the characteristic difference between free settling and hindered settling ? **4**

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