Reg. No.



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14BT2022** | **Duration :** | **3hrs** |
| **Sub. Name :** | **UNIT OPERATIONS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q.**  **No.** | **Sub**  **Div.** | **Questions** | | | | | | **Course**  **Outcome** | **Marks** |
| 1. | a. | Elaborate on Crushing Laws and discuss on Jaw and Gyratory crushers. | | | | | | CO1 | 10 |
| b. | A certain crusher accepts a feed material having a volume –surface  mean diameter of 25 mm and gives a product of volume –surface mean diameter of 8.2 mm. The power required to crush 18 tones per hour is 7.9 KW. What will be the power consumption if the capacity is reduced to 13 tonnes per hour? | | | | | | CO2 | 10 |
| **(OR)** | | | | | | | | | |
| 2. | a. | Give an account on equipments for Reducing the size of particles. | | | | | CO1 | | 10 |
| b. | Derive and express the Nc value of the ball mill with a neat sketch. | | | | | CO2 | | 10 |
|  |  |  | | | | |  | |  |
| 3. | a. | Derive an expression to analyze the Mesh effectiveness. | | | | | CO1 | | 10 |
|  | b. | One tone per hour of mineral ore is produced by a ball mill operating in closed circuit with a 14 mesh screen. The screen analysis (weight %) is given below. Calculate the screen efficiency. | | | | | CO2 | | 10 |
|  | Mesh Number (#) | Feed (%) | Oversize (%) | Undersize (%) |
| 4 | 14.3 | 12.6 | 0 |
| 8 | 20.0 | 21.0 | 0 |
| 14 | 20.0 | 17.0 | 2.7 |
| 28 | 28.5 | 1.0 | 2.0 |
| 48 | 8.6 | 1.0 | 12.0 |
| 100 | 5.7 | 0 | 20.0 |
| pan | 2.9 | 2.0 | 8.0 |
| **(OR)** | | | | | | | | | |
| 4. | a. | Explain in detail on Agitators and Mixers in the Bioprocessing. | | | | | | CO3 | 10 |
|  | b. | Differentiate between actual screen and ideal screen. | | | | | | CO2 | 5 |
|  | c. | Draw neat sketches of any two motions of screen. | | | | | | CO1 | 5 |
|  |  |  | | | | | |  |  |
| 5. | a. | Discuss about working principles of plate and frame filtration device with neat sketch.  sketch | | | | | | CO2 | 10 |
|  | b. | Derive and express the constant pressure filtration. | | | | | | CO3 | 10 |
| **(OR)** | | | | | | | | | |
| 6. | a. | Write a note on:  i) cake resistance ii) medium resistance iii) Filter aids. | | | | | | CO2 | 10 |
|  | b. | Discuss about centrifugal filtrations. | | | | | | CO3 | 10 |
|  |  |  | | | | | |  |  |
| 7. | a. | Explain the following term:  i) Free settling ii) Hindered settling iii) Terminal velocity | | | | | | CO2 | 10 |
|  | b. | Differentiate between Sedimentation and Filtrations. | | | | | | CO2 | 10 |
| **(OR)** | | | | | | | | | |
| 8. | a. | Describe the batch sedimentations with derivations and neat sketch. | | | | | | CO2 | 10 |
|  | b. | Explain the working principles of thickener with neat sketch. | | | | | | CO3 | 10 |
|  | | **Compulsory**: | | | | | |  |  |
| 9. | a. | What are the purposes of mixing and agitation? | | | | | | CO3 | 10 |
|  | b. | Derive the Np value of mixing devices. | | | | | | CO3 | 10 |