Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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

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

**( Extra Ordinary Graph Sheet Allowed )**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | List out the types of size reduction equipments and what are the factors to be considered select the equipments. | CO1 | 5 |
| b. | State and explain crushing Law’s. | CO1 | 3 |
| c. | Describe the working procedure of Blake Jaw Crusher with neat diagram. | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Illustrate the open-circuit and closed circuit Grinding. | CO2 | 6 |
| b. | Derive and express the Angle of Nip of Roll crusher. | CO2 | 7 |
| c. | Calculate the operating speed of the ball mill from the data given below: Diameter of ball mill = 800mm, Dia of ball = 60mm  If (I) Operating speed is 55% less than the critical speed,  (II) Critical Speed is 40% more than the operating speed. | CO2 | 7 |
| 3. | a. | List out the separation of solids particles from mixed size particles. | CO1 | 2 |
| b. | Derive the Screening effectiveness. | CO1 | 8 |
| c. | A dolomite mixture having the following screen analysis is screened through a standard 100 mesh screen.Calculate the effectiveness of the screen and the mass ratios of overflow and under flow to feed.   |  |  |  |  | | --- | --- | --- | --- | | Mesh No | Feed | Oversize | Undersize (wt%) | | 35 | 7.07 | 13.67 | 0.00 | | 48 | 16.60 | 32.09 | 0.00 | | 65 | 14.02 | 27.12 | 0.00 | | 100 | 11.82 | 20.70 | 2.32 | | 150 | 9.07 | 4.35 | 14.32 | | 200 | 7.62 | 2.07 | 13.34 | | -200 | 33.8 | 0.00 | 70.02 | | Total | 100 | 100 | 100 | | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Describe the various factors effecting performance of screen. | CO1 | 4 |
| b. | Discuss about industrial screening equipments with neat sketch. | CO1 | 8 |
| c. | A quartz mixture having a certain screen analysis is screened through a standard mesh screen.Calculate (a) the mass ratio of overflow and under flow to feed and (b) the effectiveness of the screen.Due to blinding an appreciable fraction of the screen surface becomes inactive .The blinding tendency is more pronounced with fine screen than with coarse screens.  Data Dp= Dpc= 1.651mm, XF =0.47,XD = 0.85, XB =0.916( Cummulative mass fraction) | CO1 | 8 |
| 5. | a. | State and Explain Resistance of Cake and filter medium. | CO3 | 4 |
| b. | Derive and express the Constant Pressure filtration. | CO3 | 8 |
| c. | Describe the working principles of Rotary drum filter and give its advantages and disadvantages. | CO3 | 8 |
| (OR) | | | | |
| 6. | a. | Discuss about working procedure of centrifugal filteration with neat sketch. | CO3 | 10 |
| b. | A filter press is used to filter a sludge forming a nonuniform compressible cake .At a constant pressure difference, 6000 litre of filterate is obtained in 1 hours.Washing is done with 1200 litre of water , it proceeds exactly as filteration.The filtrate has the same properties as the wash water .Neglecting the resistance of filter cloth ,Calculate the washing time required .*Given Date. Rate of washing ¼ for a filter press.* | CO3 | 10 |
| 7. | a. | Describe the batch sedimentations with neat sketch. | CO3 | 10 |
| b. | Calculate the settling velocity of glass spheres having a diameter of 1.554 x 10-4 m in water at 293.2 K(20 º C ) .The slurry contains 60 wt% solids. The density of the glass spheres ρ = 2467 kg/ m3. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss about working principles of different settling and sedimentations equipments. | CO2 | 10 |
| b. | A batch settling test on a slurry gave the following results.Where the height Z in meters between the clear liquid and the suspended solids is given at time t hours.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Time(hr) | 0 | 0.50 | 1.00 | 1.75 | 3.00 | 5.00 | 12. | 20 | | Z (m) | 0.360 | 0.285 | 0.211 | 0.150 | 0.125 | 0.113 | 0.102 | 0.090 |   The original slurry concentration is 250 kg/m3 of slurry. Determine the velocityof settlingconcentrations and make a plot of velocity versus concentration. | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | What is the purpose of mixing and agitation, list out the factors affect the mixing? | CO1 | 6 |
| b. | Derive and express the power consumption of impellers. | CO1 | 6 |
| c. | State the methods of avoiding Vortex in an agitated vessel. | CO1 | 8 |