Registration No : | | | | | | | | | | |

Total number of pages : 02 **B.Tech.**
PCCH4204

4th Semester Back Examination 2017-18
MECHANICAL OPERATION
BRANCH : CHEM
Time : 3 Hours
Max Marks : 70
Q.CODE : C1137

Answer Question No. 1 which is compulsory and any FIVE from the rest.
The figures in the right-hand margin indicate marks.
Assume suitable notations wherever necessary.
Answer all parts of a question at a place.

Q1. **Answer the following questions :** **(2 x 10)**

(a) Is sphericity independent of particle size?
(b) How do the solid particles break into smaller fragments?
(c) What are angle of nip and angle of bite?
(d) Why are the crushing efficiencies low?
(e) What are the advantages of vibrating screens?
(f) What do you understand by screen efficiency and capacity?
(g) What is the role of electrolyte in sedimentation?
(h) Why is gas cleaning practised in the industry?
(i) When are the flat belts used?
(j) What are kneaders?

Q2. **(a)** Calculate the sphericity of a cuboid whose length, breadth, and depth are in the ratio of 3 : 2.2 : 1.2. **(5)**
(b) Discuss the different ways to represent particle size of a mixture. **(5)**

Q3. **(a)** Discuss the empirical laws for size reduction. **(6)**
(b) Discuss in detail the range of applicability of crushing laws. **(4)**

Q4. A double-roll crusher having a set of crushing rolls of 1200 mm diameter and 400 mm width face are set so that the crushing surfaces are 20 mm apart at the narrowest point. Find out the maximum permissible feed size to the crusher if the angle of nip is 30°. **(10)**

Q5. **(a)** Discuss the construction and working of a Jig with a neat diagram. **(5)**
(b) Discuss the construction and working of a Shaking Table with a neat diagram. Also show the stratification of materialsbetween riffles. **(5)**

Q6. **(a)** Discuss the types of cake filtration and the factors affecting the rate of filtration. **(5)**

(b) Discuss the construction and working of a Plate-and-Frame Filter Press with a neat diagram. **(5)**

Q7. **(a)** Discuss the construction and working of a Screw Conveyor with a neat diagram. **(5)**

(b) Derive the expressions for power input to the impeller in liquid mixing. **(5)**

Q8. **Write short notes on any TWO :** **(5 x 2)**

(a) Hammer mill

(b) Magnetic drum separator

(c) Hydrocyclone

(d) Thickener